REVIEW ARTICLE

Mechanisms of Mindfulness

Shauna L. Shapiro
Santa Clara University

Linda E. Carlson
University of Calgary

John A. Astin
California Pacific Medical Center

Benedict Freedman
Occidental College

Recently, the psychological construct *mindfulness* has received a great deal of attention. The majority of research has focused on clinical studies to evaluate the efficacy of mindfulness-based interventions. This line of research has led to promising data suggesting mindfulness-based interventions are effective for treatment of both psychological and physical symptoms. However, an equally important direction for future research is to investigate questions concerning mechanisms of action underlying mindfulness-based interventions. This theoretical paper proposes a model of mindfulness, in an effort to elucidate potential mechanisms to explain how mindfulness affects positive change. Potential implications and future directions for the empirical study of mechanisms involved in mindfulness are addressed. © 2005 Wiley Periodicals, Inc. J Clin Psychol 62: 373–386, 2006.

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Correspondence concerning this article should be addressed to: Shauna L. Shapiro, Ph.D., Santa Clara University, Department of Counseling Psychology, 500 El Camino Real, Santa Clara CA 95053-0201; e-mail: slshapiro@scu.edu

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Recently, the psychological construct *mindfulness* has received a great deal of attention, and has even been proposed as a common factor across all schools of psychotherapy (Martin, 1997). Mindfulness has its roots in Eastern contemplative traditions and is most often associated with the formal practice of mindfulness meditation. In fact, mindfulness has been called the "heart" of Buddhist meditation (Kabat-Zinn, 2003; Thera, 1962). Mindfulness, however, is more than meditation. It is "inherently a state of consciousness" which involves consciously attending to one's moment-to-moment experience (Brown & Ryan, 2003). Meditation practice is simply a "scaffolding" used to develop the state, or skill, of mindfulness (Kabat-Zinn, 2005). The intention of this paper is to refine the exploration of this particular state of mindfulness and to explore the questions: "What exactly is mindfulness? And, how does it work?"

Over the past 20 years, the majority of research has focused on clinical intervention studies to evaluate the efficacy of mindfulness-based interventions such as the Mindfulness Based Stress Reduction (MBSR) program (Kabat-Zinn, 1990). This line of research has primarily addressed the first order question "Are mindfulness-based interventions effective?" These studies have led to promising data suggesting that MBSR is an effective intervention for treatment of both psychological and physical symptoms (see Baer 2003; Bishop 2002; Grossman, Niemann, Schmidt, & Walach, 2004). Clearly this line of research is fundamental to validating mindfulness as an efficacious psychological intervention, and controlled clinical trials across diverse populations should continue. However, an equally important direction for future research is to address the second order question "How do mindfulness-based interventions actually work?"

Investigating questions concerning the mechanisms of action underlying mindfulness based interventions will require two different but complementary lines of inquiry. Dismantle studies are necessary in order to separate and compare the various active ingredients in mindfulness-based interventions such as social support, relaxation, and cognitive behavioral elements. A second line of inquiry is examining the central construct of *mindfulness* itself to determine if the development of "mindfulness" is what actually leads to the positive changes that have been observed. This step can be facilitated through the recent development of valid and reliable measures of mindfulness (see Baer, 2003; Bishop, 2002; Brown & Ryan, 2003—the KIMS), allowing measurement of mindfulness for use in statistical models of mediation. A testable theory of the *mechanisms* involved in the process of mindfulness itself is needed to explicate whether and how mindfulness affects change and transformation. The aim of this paper is to propose a first draft of such a theory, focusing on the construct of mindfulness itself, as opposed to the whole package of MBSR and other mindfulness-based interventions. We would like to emphasize that this is a beginning, a first attempt at understanding the mysterious and complex process that is mindfulness. Further, it is "a" theory, not "*the*" theory—it is a search for common ground on which to build a more precise understanding of the primary mechanisms of action involved in mindfulness practices that have become increasingly prominent in contemporary psychology and behavioral medicine. Our intention is to open a dialogue.

How does mindfulness work? We posit three components (axioms) of mindfulness: (1) intention, (2) attention, and (3) attitude (IAA). We then introduce a meta-mechanism of action, "reperceiving" and discuss the significance of this shift in perspective in terms of the transformational effects of mindfulness. Finally, we highlight four potential mechanisms, which may stem from reperceiving.

A Model Of Mindfulness

The Axioms. In an attempt to break mindfulness down into a simple, comprehensible construct, we reflected on the core components of the practice, the essential building

blocks of mindfulness, and examined the literature on this topic. An often cited definition of mindfulness"—paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 1994, p. 4)—embodies the three axioms of mindfulness:

1. "On purpose" or intention,
2. "Paying attention" or attention,
3. "In a particular way" or attitude (mindfulness qualities).

Axioms are fundamental building blocks out of which other things emerge. From an understanding of IAA, we can deduce how mindfulness might work. Intention, attention, and attitude are not separate processes or stages—they are interwoven aspects of a single cyclic *process* and occur simultaneously (See Figure 1). Mindfulness *is* this moment-to-moment process.

Axiom I. Intention

When Western psychology attempted to extract the essence of mindfulness practice from its original religious/cultural roots, we lost, to some extent, the aspect of intention, which for Buddhism was enlightenment and compassion for all beings. It seems valuable to explicitly bring this aspect back into our model (Shapiro & Schwartz, 2000). As Kabat-Zinn writes, "Your intentions set the stage for what is possible. They remind you from moment to moment of why you are practicing in the first place" (p. 32). He continues, "I used to think that meditation practice was so powerful . . . that as long as you did it at all, you would see growth and change. But time has taught me that some kind of personal vision is also necessary" (p. 46, 1990). This personal vision, or intention, is often dynamic and evolving (Freedman, 2005). For example, a highly stressed businessman may begin a mindfulness practice to reduce hypertension. As his mindfulness practice continues, he may develop an additional intention of relating more kindly to his wife.

The role of intention in meditation practice is exemplified by Shapiro's study (1992), which explored the intentions of meditation practitioners and found that as meditators continue to practice, their intentions shift along a continuum from self-regulation, to

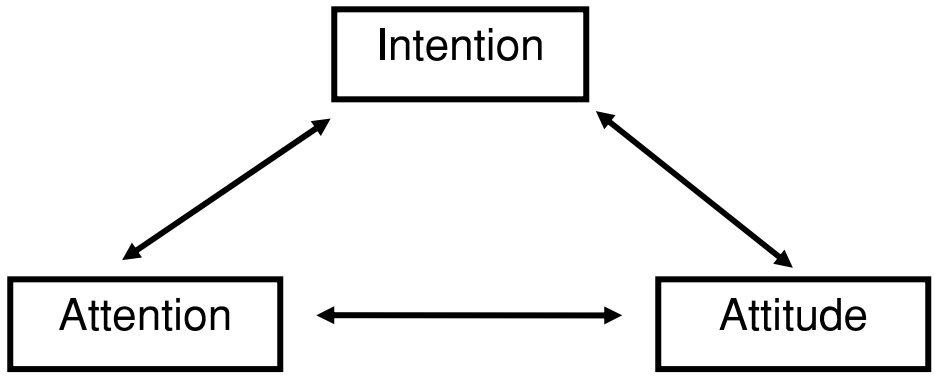

Figure 1. The three axioms of mindfulness, Intention, Attention, and Attitude, are not separate stages. They are interwoven aspects of a single cyclic process and occur simultaneously. Mindfulness is this moment-to-moment process.

self-exploration, and finally to self-liberation.[1] Further, the study found that outcomes correlated with intentions. Those whose goal was self-regulation and stress management attained self-regulation, those whose goal was self-exploration attained self-exploration, and those whose goal was self-liberation moved toward self-liberation and compassionate service. These findings correspond with our definition of intentions as dynamic and evolving, which allows them to change and develop with deepening practice, awareness, and insight. The inclusion of intention (i.e., *why* one is practicing) as a central component of mindfulness is crucial to understanding the process as a whole, and often overlooked in other contemporary definitions (Bishop et al., 2004).

Axiom II. Attention

A second fundamental component of mindfulness is *attention*. In the context of mindfulness practice, paying attention involves observing the operations of one's moment-to-moment, internal and external experience. This is what Husserl refers to as a "return to things themselves," that is, suspending all the ways of interpreting experience and attending to experience itself, as it presents itself in the here and now. In this way, one learns to attend to the contents of consciousness, moment by moment. Attention has been suggested in the field of psychology as critical to the healing process. For example, Gestalt therapy emphasizes present moment awareness, and its founder, Fritz Perls claimed that, "attention in and of itself is curative." The importance of attention can also be seen in cognitive-behavior therapy, which is based on the capacity to attend to (i.e., observe) internal and external behaviors. At the core of mindfulness, is this practice of paying attention.

Cognitive psychology delineates many different aspects of attentional abilities, including the capacity to attend for long periods of time to one object (vigilance or sustained attention, Parasuraman, 1998; Posner & Rothbart, 1992), the ability to shift the focus of attention between objects or mental sets at will (switching; Posner, 1980), and the ability to inhibit secondary elaborative processing of thoughts, feelings and sensations (cognitive inhibition; Williams, Mathews, & MacLeod, 1996). The self-regulation of attention as described in this mindfulness axiom would be predicted to result in the enhancement of all three of these skills.

Axiom III. Attitude

How we attend is also essential. The *qualities* one brings to attention have been referred to as the attitudinal foundations of mindfulness (Kabat-Zinn, 1990, Shapiro & Schwartz, 1999, 2000). This axiom asserts that the attitude one brings to the attention is essential. Often, mindfulness is associated with bare awareness, but the quality of this awareness is not explicitly addressed. However, the qualities one brings to the act of paying attention is crucial. For example, attention can have a cold, critical quality, or it can include an "an affectionate, compassionate quality . . . a sense of openhearted, friendly presence and interest" (Kabat-Zinn, 2003, p. 145). It is helpful to note the Japanese characters of mindfulness are composed of two interactive figures: one mind, and the other heart (Santorelli, 1999). Therefore, perhaps a more accurate translation of "mindfulness" from the Japanese is heart-mindfulness (Shapiro & Schwartz, in preparation), which underlines

[1]Self-liberation refers to the experience of transcending (i.e., becoming free of or dis-identifying from) the sense of being a separate self.

the importance of including "heart" qualities in the attentional practice of mindfulness (see Shapiro & Schwartz, 2000, for review).

We posit that persons can learn to attend to their own internal and external experiences, without evaluation or interpretation, and practice acceptance, kindness and openness even when what is occurring in the field of experience is contrary to deeply held wishes or expectations. However, it is essential to make the attitudinal quality of attention explicit. It is important for the practitioner to consciously commit, e.g. "may I bring kindness, curiosity, and openness to my awareness, may I infuse my awareness with . . ."

With intentional training, one becomes increasingly able to take interest in each experience as it arises and also allow what is being experienced to pass away (i.e., not be held on to). Through intentionally bringing the attitudes of patience, compassion and non-striving to the attentional practice, one develops the capacity not to continually strive for pleasant experiences, or to push aversive experiences away. In fact, attending without bringing the heart qualities into the practice may result in practice that is condemning or judgmental of inner experience. Such an approach may well have consequences contrary to the intentions of the practice; for example cultivating the patterns of judgment and striving instead of equanimity and acceptance.

Bishop et al. (2004) also propose an attitudinal component in the operational definition of mindfulness, referred to as the *orientation to experience*, which involves curiosity, nonstriving and acceptance.

Proposing "a" Theory

We suggest that the three axioms, IAA, are the fundamental components (or internal behaviors from a Behaviorist perspective) of mindfulness. We posit that they account directly or indirectly for a large amount of the variance in the transformations that are observed in mindfulness practice. Building on these behaviors, we propose a model of the potential mechanisms of mindfulness, which suggests that intentionally (I) attending (A) with openness and non-judgmentalness (A) leads to a significant shift in perspective, which we have termed *reperceiving*. We believe reperceiving is a meta-mechanism of action, which overarches additional direct mechanisms that lead to change and positive outcome. We highlight four of these additional mechanisms: (1) self-regulation, (2) values clarification, (3) cognitive, emotional, and behavioral flexibility, and (4) exposure. These variables can be seen as both potential mechanisms for other outcomes, such as psychological symptom reduction, or as outcomes in and of themselves. Furthermore, this is by no means a linear pathway; each variable supports and affects the others.

Reperceiving as Meta Mechanism

Through the process of mindfulness, 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. We term this process *reperceiving* as it involves a fundamental *shift in perspective*. Rather than being immersed in the drama of our personal narrative or life story, we are able to stand back and simply witness it. As Goleman suggests, "The first realization in "meditation" is that the phenomena contemplated are distinct from the mind contemplating them" (1980, p. 146).

Reperceiving is akin to the western psychological concepts of *decentering* (Safran & Segal, 1990), *deautomatization* (Deikman, 1982; Safran & Segal, 1990) and *detachment* (Bohart, 1983). For example, Safran and Segal define decentering as the ability to "step

outside of one's immediate experience, thereby changing the very nature of that experience." (117). Deikman describes deautomatization as "an undoing of the automatic processes that control perception and cognition." (p. 137). And according to Bohart (1983), detachment "encompasses the interrelated processes of gaining 'distance,' 'adopting a phenomenological attitude,' and the expansion of 'attentional space' " (see Martin, 1997, for review). All of these concepts share at their core a fundamental *shift in perspective*. This shift, we believe, is facilitated through mindfulness—the process of intentionally attending moment by moment with openness and nonjudgmentalness (IAA).

Reperceiving as Developmental Process

Reperceiving can be described as a rotation in consciousness in which what was previously "subject" becomes "object." This shift in perspective (making what was subject, object) has been heralded by developmental psychologists as key to development and growth across the lifespan (Kegan, 1982). Therefore, if reperceiving is in fact a meta-mechanism underlying mindfulness, then the practice of mindfulness is simply a continuation of the naturally occurring human developmental process whereby one gains an increasing capacity for objectivity about one's own internal experience.

This natural developmental process is illustrated in the classic example of a mother's birthday, in which her eight-year son gives her flowers, while her three-year old gives her his favorite toy. Although developmentally appropriate, the three-year old is basically caught in the limits of his own self-centered (i.e., narcissistic) perspective. For him, the world is still largely "subjective," that is, an extension of his self. And as a result, he cannot clearly differentiate his own desires from those of another. However, as he develops, a shift in perspective occurs such that there is an ever-increasing capacity to take the perspective of another (e.g., "my mother's needs are different from mine"), precisely because what was previously subject (identification with the mother) has now become an object which he subsequently realizes he is now separate from (no longer fused with). This is the dawning of empathy, the awareness of his mother as a *separate* person with her own needs and desires. The example demonstrates that as individuals are able to shift their perspective away from the narrow and limiting confines of their own personal points of reference, development occurs.

Mindfulness Practice Continues Developmental Process

This shift in perspective, which we have termed reperceiving, naturally occurs in the developmental process. We suggest, however, that mindfulness practice continues and accelerates this shift. Reperceiving, in which there is increasing capacity for objectivity in relationship to one's internal/external experience, is in many ways the hallmark of mindfulness practice. Through the process of intentionally focusing nonjudgmental attention on the contents of consciousness, the mindfulness practitioner begins to strengthen what Deikman refers to as "the observing self" (Deikman, 1982). To the extent that we are able to observe the contents of consciousness, we are no longer completely embedded in or fused with such content. For example, if we are able to see *it*, then we are no longer merely *it*; i.e., we must be *more* than *it*. Whether the *it* is pain, depression, or fear, reperceiving allows one to dis-identify from thoughts, emotions, and body sensations as they arise, and simply be with them instead of being defined (i.e., controlled, conditioned, determined) by them. Through reperceiving one realizes, "this pain is not me," "this depression is not me," "these thoughts are not me," as a result of being able to observe them from a meta-perspective.

The shift in perspective we are describing is analogous to our earlier example of the young toddler who over time is eventually able to see himself as separate from the objective world in which he had previously been embedded. However, in this case, the disidentification is from the content of one's mind (e.g., thoughts, feelings, self-concepts, memories) rather than one's physical environment. Through reperceiving brought about by the cultivation of mindfulness, the stories (e.g., about who we are, what we like or dislike, our opinions about others, etc.) that were previously identified with so strongly become simply "stories." In this way, there is a profound shift in one's relationship to thoughts and emotions, the result being greater clarity, perspective, objectivity, and ultimately equanimity.

This process is similar to Hayes, Strosahl, and Wilson's (1999) concept of cognitive defusion, in which the emphasis is on changing one's relationship to thought rather than attempting to alter the content of thought itself. As Hayes, Strosahl, and Wilson note, as one strengthens the capacity for mindful observing or witnessing of mental activity,, there is often a corresponding shift in the self-sense. The "self" starts to be seen through or deconstructed—i.e., it is realized to be a psychological construction, an ever-changing system of concepts, images, sensations and beliefs. These aggregates, or constructs, that were once thought to comprise the stable self, are eventually seen to be impermanent and fleeting. Through reperceiving, not only do we learn to stand back from and observe our inner commentary about life and the experiences encountered, we also begin to stand back from (witness) our "story" about who and what *we* ultimately are. Through this change in perspective, identity begins to shift from the contents of awareness to awareness itself. Hayes et al. (1999) describe this as the shift from "self as content" (that which can be witnessed or observed as an object in consciousness) to "self as context" (that which is observing or witnessing—i.e., consciousness itself). It is this figure/ground shift that may, in part, be responsible for the transformations facilitated through mindfulness practice.

Reperceiving vs. Detachment

Reperceiving can easily be confused with an attempt to detach from one's experience, distancing to the point of apathy or numbness. However, this is in sharp contrast with the actual experience of reperceiving, which engenders a deep knowing and intimacy with whatever arises moment by moment. Reperceiving does indeed facilitate greater distance in terms of clarity. And yet, this does not translate as disconnection or dissociation. Instead, reperceiving simply allows one to deeply experience each event of the mind and body without identifying with or clinging to it, allowing for "a deep, penetrative nonconceptual seeing into the nature of mind and world" (Kabat-Zinn, 146, 2003). Through this process we are actually able to connect more intimately with our moment-to-moment experience, allowing it to rise and fall naturally with a sense of non-attachment. We experience what *is* instead of a commentary or story about what is. Therefore, reperceiving, in this hypothesized model, does not create apathy or indifference, but instead allows one to experience greater richness, texture, and depth, moment by moment, what Peters refers to as "intimate detachment" (Peters, 2004).

Additional Mechanisms

Reperceiving, and the "shift in perspective" it fosters, may lead to additional mechanisms that in turn contribute to the positive outcomes produced by mindfulness practice. We

highlight four: (1) self-regulation and self-management, (2) emotional, cognitive and behavioral flexibility, (3) values clarification and, (4) exposure. Inherent in all of these mechanisms are the three axioms of intention, attention, and attitude.

Self-Regulation and Self-Management. Self-regulation is the process whereby systems maintain stability of functioning and adaptability to change. Self-regulation is based on feedback loops. According to Shapiro and Schwartz (1999, 2000) both intention and attention function to enhance these feedback loops and create health:

$$\text{intention} \rightarrow \text{attention} \rightarrow \text{connection} \rightarrow \text{regulation} \rightarrow \text{order} \rightarrow \text{health}.$$

Intentionally cultivating nonjudgmental attention leads to connection, which leads to self-regulation and ultimately to greater order and health. Through the process of reperceiving, we are able to attend to the information contained in each moment. We gain access to more data, even those data that may have previously been too uncomfortable to examine. As Hayes asserts, "experiential avoidance becomes less automatic and less necessary." (2002 p. 104) Through this process, dysregulation and subsequent disease can be avoided. In addition, reperceiving interrupts automatic maladaptive habits. We become less controlled by particular emotions and thoughts that arise, and in turn are less likely to automatically follow them with habitual reactive patterns. For example, if anxiety arises, and we strongly identify with it, there will be a greater tendency to react to the anxiety unskillfully and subsequently regulate it by some behavior such as drinking, smoking, or overeating. Reperceiving allows us to step back from the anxiety, to see it clearly as simply an emotional state that is arising and will in time pass away. Thus, this knowledge of the impermanence of all mental phenomena allows a higher level of tolerance for unpleasant internal states.

By developing the capacity to stand back and witness emotional states such as anxiety, we increase our "degrees of freedom" in response to such states, effectively freeing ourselves from automatic behavioral patterns. Through reperceiving, we are no longer controlled by states such as anxiety or fear but are instead able to use them as information. We are able to attend to the emotion, and choose to self-regulate in ways that foster greater health and well-being. Through consciously (intention) bringing awareness (attention) and acceptance (attitude) to experience in the present moment, we will be better able to use a wider, more adaptive range of coping skills. Preliminary support for this hypothesis can be found in a study by Brown and Ryan in which they demonstrated that people who scored higher on a valid and reliable measure of mindfulness reported significantly greater self-regulated emotion and behavior (Brown & Ryan, 2003).

Values Clarification. Reperceiving may also help people recognize what is meaningful for them and what they truly value. Often values have been conditioned by family, culture, and society, so that we may not realize whose values actually drive our choices in life. We become the value, instead of *the one who observes* the value. Frequently, we are pushed and pulled by what we believe (based on cultural or familial conditioning) is most important, but fail to reflect upon whether it is truly important in the context of our own lives. However, when we are able to separate from (observe) our values and reflect upon them with greater objectivity, we have the opportunity to rediscover and choose values that may be truer for us. In other words, we become able to *reflectively* choose what has been previously *reflexively* adopted or conditioned. The literature suggests that automatic processing often limits considerations of options that would be more congruent with needs and values (Brown & Ryan, 2003; Ryan, Kuhl, & Deci, 1997). However, an open, intentional awareness can help us choose behaviors that are congruent with our needs,

interests and values (Brown & Ryan, 2003; Ryan & Deci, 2000). A recent study found that when subjects are "acting mindfully," as assessed by the Mindful Attention Awareness Scale (MAAS) state measure, individuals act in ways that are more congruent with their actual values and interests. (Brown & Ryan, 2003).

Cognitive, Emotional and Behavioral Flexibility. Reperceiving may also facilitate more adaptive, flexible responding to the environment in contrast to the more rigid, reflexive patterns of reactivity that result from being overly identified with one's current experience. If we are able to see a situation and our own internal reactions to it with greater clarity, we will be able to respond with greater freedom of choice (i.e., in less conditioned, automatic ways). As Borkovec points out, research from cognitive and social psychology demonstrates, "existing expectations or beliefs can distort the processing of newly available information." (2002, p. 78). Learning to see clearly (and learning in general) depends upon the ability to disidentify from prior patterns and beliefs.

Reperceiving facilitates this capacity to observe one's mental commentary about the experiences encountered in life. It enables us to see the present situation as it is in this moment and to respond accordingly, instead of with reactionary thoughts, emotions and behaviors triggered by prior habit, conditioning, and experience. Reperceiving affords a different place from which to view the present moment. For example, when we are caught on the surface of the ocean, and the waves are thrashing us about, it is difficult to see clearly. However when we drop down beneath the surface of the waves (which is analogous to observing and disidentifying from the movement of one's thoughts and emotional reactions), we enter a calmer, clearer space (Deikman's (1982) "observing self," or what contemplative traditions refer to as "the Witness"). From this new vantage point, we can look up to the surface and see whatever is present more clearly—and therefore respond with greater consciousness and flexibility. Reperceiving enables the development of this capacity to observe our ever-changing inner experience and thereby see more clearly our mental-emotional content, which in turn fosters greater cognitive-behavioral flexibility and less automaticity or reactivity.

Exposure. The literature is replete with evidence of the efficacy of exposure in treating a variety of disorders (Barlow & Craske, 2000). Reperceiving—the capacity to dispassionately observe or witness the contents of one's consciousness—enables a person to experience even very strong emotions with greater objectivity and less reactivity. This capacity serves as a counter to the habitual tendency to avoid or deny difficult emotional states thereby increasing exposure to such states. Through this direct exposure, one learns that his or her emotions, thoughts, or body sensations are not so overwhelming or frightening. Through mindfully attending to negative emotional states, one learns experientially and phenomenologically that such emotions need not be feared or avoided and that they eventually pass away (Segal, Williams, & Teasdale, 2002). This experience eventually leads to the "extinction of fear responses and avoidance behaviors previously elicited by these stimuli" (Baer, 2003). Goleman suggests that meditation provides a "global desensitization" as meditative awareness can be applied to all aspects of one's experience (Goleman, 1971).

Baer provides an example of this process with chronic pain patients: " . . . prolonged exposure to the sensations of chronic pain, in the absence of catastrophic consequences, might lead to desensitization, with a reduction over time in the emotional responses elicited by the pain sensations. Thus the practice of mindfulness skills could lead to the ability to experience pain sensations without excessive reactivity" (Baer, 2003). Indeed, one of the first successful clinical applications of mindfulness was in the context of

chronic pain (Kabat-Zinn, 1990). Another example of how facilitation of exposure to internal stimuli can help therapeutically comes from the literature on interoceptive exposure to physical sensations in panic disorder. Reperceiving allows one to explore and tolerate a broad range of thoughts, emotions, and sensations, which may in turn positively impact a number of debilitating conditions.

Building on Previous Models

Other theorists have developed models of the role of attention and meta-cognition in the development and maintenance of mental disorders, for example, Wells' Self-Regulatory Executive Function (S-REF) model (Myers & Wells, 2005; Wells, 1999) and Teasdale's Differential Activation Hypothesis (DAH) (Sheppard & Teasdale, 1996; Lau, Segal, & Williams, 2004; Teasdale, et al., 2002).

Specifically, Wells describes a cognitive-attentional syndrome characterized by heightened self-focused attention, threat monitoring, ruminative processing, and activation of dysfunctional beliefs. These are measured in the Metacognitions Questionnaire (Cartwright-Hatton & Wells, 1997; Wells & Cartwright-Hatton, 2004). Wells and colleagues have shown that dysfunctional metacognitions are associated with disorders and symptoms including psychosis, generalized anxiety disorder, obsessive-compulsive symptoms, hypochondriasis, and PTSD. The S-REF model emphasizes the importance of self-directed attention in potentially enhancing anxiety, by focusing attention on internal sensations associated with the experience of anxiety. This internal focus might engender fears of losing control, fear of the anxiety symptoms themselves, heightened awareness of dissatisfaction with the self, and negative cognitive activity (Wells, 1990). Wells suggests that an external attentional focus might help people with anxiety disorders, rather than an internal focus as one would use in mindfulness training. His intervention consists of external attentional monitoring and attention switching in an auditory mode.

Unlike the IAA model we have been describing, the S-REF model of therapy applies attentional abilities of focusing, switching and divided attention externally, rather than internally. An obvious empirical test of this would be to directly compare the efficacy of treatments based on the IAA model of mindfulness to the S-REF model in patients with anxiety disorders.

Another model that emphasizes attention is Teasdale's DAH theory, which describes vulnerability to depressive relapse by activation of dysfunctional negative cognitions, many of which may be comparable to the dysfunctional metacognitions described by Wells. This model of relapse to depression posits that transient negative moods evoke these characteristic negative thought patterns, which can spiral and trigger a relapse. This group has developed a Mindfulness Based Cognitive Therapy (MBCT) intervention focusing on the idea of "decentering" from the cascade of automatic negative thoughts associated with negative moods, a concept very similar to reperceiving. In their model, practicing mindfulness allows people to become aware of negative thoughts and feelings that signify potential relapse, and to relate to them in a new way. Participants learn, through mindfulness practice, to disengage from ruminative processing, observing thoughts as simply thoughts, thereby increasing metacognitive awareness. In this respect, the target is not the content of the thoughts per se, but the relationship of the individual to the process of thinking. Using Wells' terminology, through mindfulness practice the metacognitions shift from evaluating thoughts as personal and dangerous, to seeing thoughts as impersonal and part of the passing show, from a decentered perspective.

The IAA model is not contradictory to either of these models; in fact the richness of the S-REF and DAH models help to elucidate the manner by which attention is important

in engendering the positive effects of mindfulness practice in the context of mental health. Indeed, the attentional component of the IAA model could be tested using the Metacognitions Questionnaire in MBSR program participants, investigating changes that may occur over the course of mindfulness training. This could help to determine if, in fact, a shift in metacognitive awareness is occurring, as postulated.

Although IAA is not in contradiction with these two models, it is distinct from them. IAA emphasizes a tri-axiomatic model, as opposed to a purely attentional model. IAA defines mindfulness as a state involving the simultaneous arising of a particular intention, attention and attitude. The S-REF and the DAH models do not explicitly discuss intention. Further, although the DAH does talk about a "friendly" attitude toward one's experience, the IAA model makes the attitudinal component of mindfulness more explicit and essential. IAA can be seen as an expansion of the above two models; an attempt to continue the process of developing a theoretical model of mindfulness.

Suggestions for Future Research

In summary, we posit the state of mindfulness arises when IAA are simultaneously cultivated. Through this process, reperceiving occurs, facilitating a shift in perspective. This shift, we suggest, is at the heart of the change and transformation affected by mindfulness practice. We hypothesize that multiple mechanisms may be facilitated by this shift, including (1) self-regulation, (2) values clarification, (3) cognitive-behavioral flexibility, and (4) exposure. Future research on mindfulness could begin by developing a measure of reperceiving and then examine whether this shift in perspective occurs in mindfulness-based interventions and if it is related to well-being outcomes.

Further, it will be important to determine the pathways by which change occurs. We have proposed four possible mechanisms. Future research could examine if any of these proposed mechanisms do indeed account for a significant amount of the variance in change observed. Models linking mindfulness practice to outcomes of interest such as reduction in psychopathological symptoms and cultivation of positive psychological qualities could investigate the role of the proposed direct mechanisms described above using statistical tests of mediating and moderating effects. Using longitudinal designs of mindfulness training would allow for clarification of the pathways of causality between practice and outcomes. Large sample sizes would allow for simultaneous investigation of several possible pathways and mechanisms, while controlling for the effects of other factors that may also be important in the cultivation of mindfulness. An important step in research of this nature will be to devise sound measures not only for the concept of mindfulness, but for the other proposed mediating factors of self-regulation, flexibility, values clarification and exposure. Well-considered measures are currently available in the literature for some, but not all, of these constructs (see Bishop et al., 2004; Brown & Ryan, 2003).

Mediation and Moderation

Statistical models of mediation and moderation could be tested to determine if any of the three axioms account for change in outcomes, or if interventions are differentially effective for groups of people with varying backgrounds. For example, to test mediation of attention using the Baron and Kenny model (Baron & Kenny, 1986), if a relationship is established between a mindfulness-training intervention and improvement on the outcome of stress symptoms, three conditions need to be met to determine mediation: (1) the

initial variable (program attendance) is associated with outcome (decreased stress); (2) the initial variable (program attendance) is correlated with the mediator variable (enhanced attention); (3) the mediator variable (attention) affects the outcome variable. This is established by entering both the initial variable and mediator in a regression equation or structural equation model and showing that the mediator is correlated with the outcomes, after controlling for effects of the initial variable. The relationships between the initial variable and the outcome may be partially or fully mediated. In a fully mediated model, the relationship between program attendance and the outcome of decreased stress drops to nonsignificance in the equation when the mediator of attentional skills is added. Partial mediation results when the coefficient between the initial variable and the outcome drops, but still explains some significant variance in outcome, while the mediator also explains a significant amount of variance. This type of analysis can be done with latent constructs using structural equation modeling, or with measured variables using multiple regression, and could be highly beneficial to future research in determining models of mindfulness.

In contrast to mediation, a moderated effect occurs when the moderator variable completely changes the causal relationship between the initial variable (program attendance) and the outcome (stress symptoms). This is usually the case with fixed moderator variables such as age, gender or ethnicity. In the case of moderation, the initial variable is usually randomized, and hence there is no correlation between the initial variable and the moderator. A classic example is that an intervention (mindfulness training) may be moderated by gender (more effective for women than men). It is unlikely that assignment to mindfulness training would be correlated with gender, as people would be randomly assigned to treatment groups and both genders equally represented across groups. The main distinction between moderation and mediation is that mediation is an attempt to establish *mechanisms* by which one variable may be affecting another, whereas moderation is looking for differences in the relationship between group assignment and outcomes based on *pre-existing* variables.

The most likely use of these models in investigating the IAA constructs may be as tests of mediational effects of intention, attention and attitude between mindfulness training and outcomes. For example, improvements in the outcome of self-compassion might be mediated by an attitude of non-judging, such that program participants who fail to develop a non-judgmental attitude might show little change in self-compassion and empathy, while larger changes may be associated with consistent application of an open, non-judgmental attitude. Similarly, an explicit intention of enhancing spirituality through mindfulness training may mediate the effect of training on measures of spirituality.

A moderational effect might be found if baseline characteristics of people affect their ability to benefit from mindfulness training. For example, people with obsessive-compulsive disorder may find that techniques of mindfulness training exacerbate rather than ameliorate certain compulsive anxiety-relieving behaviors. If this were the case, an OCD diagnosis would be a moderating variable in the relationship between program participation and the outcome of anxiety level. Other personality characteristics, such as emotional repression, might also be moderating variables between mindfulness training and specific outcomes.

Conclusion

The investigation of mindfulness is still in its infancy and requires great sensitivity and a range of theoretical and methodological glasses to illuminate the richness and complexity of this phenomenon. We have attempted to provide a first formulation of a model to

describe how mindfulness might be fostering transformation and change. Clearly this model is preliminary, and is merely "a" model, not "the" model. There are numerous other possibilities and pathways that may play a role in this mysterious and complex process. The next step is to develop testable hypotheses that can be empirically examined. From these results new hypotheses could be developed, and new, more fully elaborated theories derived.

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