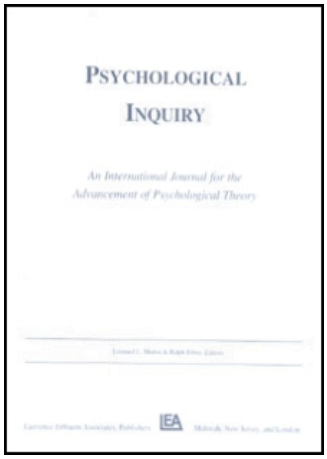

Psychological Inquiry
An International Journal for the Advancement of Psychological Theory
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t775648164

Mindfulness: Theoretical Foundations and Evidence for its Salutary Effects

Kirk Warren Brown [a]; Richard M. Ryan [b]; J. David Creswell [c]
[a] Virginia Commonwealth University, Richmond, Virginia
[b] University of Rochester, Rochester, New York
[c] University of California, Los Angeles, California

Online Publication Date: 19 October 2007
To cite this Article: Brown, Kirk Warren, Ryan, Richard M. and Creswell, J. David (2007) 'Mindfulness: Theoretical Foundations and Evidence for its Salutary Effects', Psychological Inquiry, 18:4, 211 - 237
To link to this article: DOI: 10.1080/10478400701598298
URL: http://dx.doi.org/10.1080/10478400701598298

Psychological Inquiry
2007, Vol. 18, No. 4, 211–237

TARGET ARTICLE

Mindfulness: Theoretical Foundations and Evidence for its Salutary Effects

Kirk Warren Brown
Virginia Commonwealth University, Richmond, Virginia

Richard M. Ryan
University of Rochester, Rochester, New York

J. David Creswell
University of California, Los Angeles, California

Interest in mindfulness and its enhancement has burgeoned in recent years. In this article, we discuss in detail the nature of mindfulness and its relation to other, established theories of attention and awareness in day-to-day life. We then examine theory and evidence for the role of mindfulness in curtailing negative functioning and enhancing positive outcomes in several important life domains, including mental health, physical health, behavioral regulation, and interpersonal relationships. The processes through which mindfulness is theorized to have its beneficial effects are then discussed, along with proposed directions for theoretical development and empirical research.

Interest in mindfulness and its enhancement has quietly exploded in recent years. Psychological and medical research on the topic has been increasing exponentially over the past 20 years, with the number of mindfulness-related reports increasing from less than 80 in 1990 to over 600 at the time of this writing (October, 2006). The number of clinical sites offering mindfulness-based interventions to help clients and patients with a variety of psychological, somatic, and interpersonal ills has also increased dramatically (Baer, 2003), new books on the subject appear regularly, and the popular media regularly reports on both the clinical utility of mindfulness and the latest research findings demonstrating beneficial effects (e.g., Park, 2003).

That said, the current popularity of the topic among researchers and clinicians is somewhat incongruous. Mindfulness is fundamentally a quality of consciousness, and except among intrepid bands of philosophically oriented psychologists and cognitive scientists, consciousness has received relatively little attention in psychological scholarship, research, and clinical practice. Of overwhelming interest to most psychologists is the *content* of consciousness—thought, memory, emotion, and so on—rather than the *context* in which those contents are expressed—that is, consciousness itself (Hayes, Strosahl, & Wilson, 1999; Rychlak, 1997). Also remarkable is the fact that the study of mindfulness and its effects present challenges to popular Western cultural attitudes, and to some established paradigms in psychology, that emphasize the primacy of the ego, or constructed self, as the appropriate guiding force for human behavior.

This article has five aims. First, we seek to define and characterize mindfulness, primarily by drawing upon both Buddhist psychological traditions and the developing scholarship within empirical psychology. For many readers, the concept of mindfulness will be unfamiliar given its novelty in contemporary psychological discourse. The importance of this first aim also lies in the fact that to date, psychological research in mindfulness has primarily been focused on the effects of mindfulness training, usually as part of a clinical treatment package, and less so on understanding the meaning and expression of mindfulness itself. The second aim of the article is to place the concept of mindfulness in the context of other, established theoretical treatments of attention and awareness in daily life. We then provide an overview of the salutary effects of mindfulness and the interventions designed to enhance it. Mindfulness is theorized to have widespread effects on human functioning and behavior and, drawing upon a burgeoning research literature that uses several distinct methodologies, we attempt to demonstrate the influence of mindfulness on mental health and well-being, physical health, self-regulation, and interpersonal behavior. Our fourth aim is to outline key

processes that may explain these positive effects of mindfulness. In doing so, we draw upon theory and research suggesting that it does so in various ways that act to "quiet" the ego and thereby lessen the intra- and inter-personal costs that self-identification spawns (e.g., Baumeister, 1991; Brown, Ryan, Creswell, & Niemiec, in press; Crocker & Park, 2004; Leary, 2004; Martin & Erber, 2005; Ryan & Brown, 2003). Finally, we will point out several key areas of obscurity concerning mindfulness and its effects and will propose avenues for future research in this developing area of inquiry.

What is Mindfulness? A Conceptual Overview

Background

The concept of mindfulness is most firmly rooted in Buddhist psychology, but it shares conceptual kinship with ideas advanced by a variety of philosophical and psychological traditions, including ancient Greek philosophy; phenomenology, existentialism, and naturalism in later Western European thought; and transcendentalism and humanism in America. That this mode of being has been commonly described suggests its centrality to the human experience, and indeed, mindfulness is rooted in the fundamental activities of consciousness: attention and awareness.

Awareness is the conscious registration of stimuli, including the five physical senses, the kinesthetic senses, and the activities of the mind. Awareness is our direct, most immediate contact with reality. When a stimulus is sufficiently strong, *attention* is engaged, which is manifest as an initial "taking notice" of, or "turning toward" the object (Nyaniponika, 1973). However basic these features of consciousness are, they are of decisive importance to quality of experience and action. Commonly, sensory objects are held in focal attention only briefly, if at all, before some cognitive and emotional reaction to them is made. These rapid perceptual reactions have several characteristics of relevance to subjective experience and functioning: First, they are often of a discriminative nature, in which a primary appraisal of the object is made as, most basically, 'good,' 'bad,' or 'neutral,' usually in reference to the self. Second, they are usually conditioned by past experience of the sensory object or other objects of sufficient similarity to evoke an association in memory. Third, perceptual experience is easily assimilated or, through further cognitive operations upon the object, made to assimilate into existing cognitive schemas.

The consequence of such processing is that concepts, labels, ideas, and judgments are often imposed, often automatically, on everything that is encountered (e.g., Bargh & Chartrand, 1999). Cognitive schemas, beliefs, and opinions also channel perceptions in particular ways (Leary, 2004, 2005). Such processing has certain adaptive benefits, including the establishment and maintenance of order upon events and experience of relevance to the self, and the facilitation of goal pursuit and attainment. However, it also means that sensory objects and events are rarely seen impartially, as they truly are, but rather through the filters of self-centered thought and prior conditioning, thereby running the risk of furnishing superficial, incomplete, or distorted pictures of reality.

In contrast to the conceptual mode of processing described here, a mindful mode of processing involves a receptive state of mind, wherein attention is kept to a bare registering of the facts observed. When used in this way to prolong that initial contact with the world, the basic capacities for awareness and attention permit the individual to "be present" to reality as it is rather than to react to it or habitually process it through conceptual filters. In this mode, even the usual psychological reactions that may occur when our attention is engaged—thoughts, images, verbalizations, emotions, impulses to act, and so on—can be observed as part of the ongoing stream of consciousness. For example, in the moment-to-moment experience of anger or some other emotion, it can be known in its cognitive, affective, somatic, and conative manifestations. Mindfulness thus involves the capacity to be aware of internal and external events and occurrences as phenomena, "rather than as the objects of a conceptually constructed world" (Olendzki, 2005, p. 253). Because mindfulness permits an immediacy of direct contact with events as they occur, without the overlay of discriminative, categorical, and habitual thought, consciousness takes on a clarity and freshness that permits more flexible, more objectively informed psychological and behavioral responses.

Definition and Characteristics

The term *mindfulness* derives from the Pali language word *sati* meaning "to remember" but as a mode of consciousness it commonly signifies presence of mind (Bodhi, 2000; Nyaniponika, 1973). We have formally defined mindfulness as *a receptive attention to and awareness of present events and experience* (Brown & Ryan, 2003). This is a deceptively simple definition, as is true of many basic concepts, and it may prove helpful to outline several characteristics of mindfulness to shed more light on its nature. This discussion will primarily draw on the rich store of Buddhist scholarship on the topic. Before beginning, it is important to note that different schools of thought emphasize certain characteristics of mindfulness more than others. The present discussion seeks to outline the core concepts appearing in the literature of several major Buddhist traditions, but will highlight scholarship that has provided fuller expositions (e.g., Gunaratana, 2002; Nyaniponika, 1973; Rahula, 1974), particularly on those features that

appear most relevant to the empirical study of mindfulness. It is also important to note that the characteristics to be discussed are overlapping and mutually supportive, so should not be regarded as distinct components. We will focus on mindfulness as a quality of consciousness and its relation to the contents of consciousness.

Clarity of Awareness

First and foremost, mindfulness concerns a clear awareness of one's inner and outer worlds, including thoughts, emotions, sensations, actions, or surroundings as they exist at any given moment (e.g., Mishra, 2004). For this reason, mindfulness has been termed "bare" attention (Engler, 1986; Gunaratana, 2002; Nyanikonika, 1973; Rahula, 1974) and "pure" or "lucid" awareness (Das, 1997; Gunaratana, 2002; Sogyal, 1992) which reveals what is occurring, before or beyond *ideas* about what is or has taken place (e.g., Welwood, 1996). A Zen metaphor likens this state to that of a polished mirror, wherein the mind simply reflects what passes before it, unbiased by conceptual thought about what is taking place. This unbiased receptivity of mind is also thought to facilitate insight into reality, wherein phenomena that would otherwise remain hidden from view are 'seen' or known with increasing clarity. In Langer's (2002) metaphoric language, the walls, floors, and ceilings of one's life become glass-like, permitting a clearer view of the contents from attic to basement. Such clarity is also thought to facilitate unhindered access to all of one's relevant knowledge (e.g., intellectual, emotional, and physical/intuitive) to aid in negotiating life situations (Tart, 1994).

Certain phenomena can remain hidden from conscious awareness because they represent threats to the self-concept or to aspects of self that are ego-invested. Recognizing this, several therapeutic interventions incorporating mindfulness training (e.g., Hayes et al., 1999; Kabat-Zinn, 1990; Linehan, 1993a) encourage certain attitudes toward experience—nonjudgmentality or acceptance, in particular—that can facilitate direct contact with uncomfortable realities or experiences. This is thought to diminish impulsive or defensive reactions to unsettling experiences (Ryan, 2005) and promote the development of insight into self, others, and the human condition.

Nonconceptual, Nondiscriminatory Awareness

The direct contact with reality that characterizes clear awareness suggests its nonconceptual nature. As described above, consciousness is usually in the service of mental activity in day-to-day life. As Hayes et al. (1999) note, we do not merely live in the world, we live in the world as we view it, construct it, or interpret it; said differently, we attend in order to fuel cognitive operations upon what we encounter. Unlike this cognitive processing style, in which attention and cognition are tightly intertwined, the mindful mode of processing is pre- or para-conceptual (c.f. Marcel, 2003); it does not compare, categorize, or evaluate, nor does it contemplate, introspect, reflect, or ruminate upon events or experiences based on memory (Brown & Ryan, 2003; Teasdale, 1999). Instead, mindfulness concerns a non-interference with experience, by allowing inputs to enter awareness in a simple noticing of what is taking place.

It is important to note, however, that mindfulness is not seen as antithetical to thought, but rather fosters a different relationship to it. Scholars point out that people have or can develop the ability to observe the contents of consciousness, including thoughts. Thoughts, then—including mental images, narratives, and other cognitive phenomena—can be regarded as objects of attention and awareness, just as are sights, sounds, and other sensory phenomena. This disentanglement of consciousness from cognitive content may allow thought to be used with greater effectiveness and precision. That is, when mindful, the activity of conceptual thought can be engaged and disengaged more choicefully, and because one can be aware of thoughts *as thoughts*, and their accompanying emotions as simply reactions to them, thoughts are less likely to be colored by beliefs, prejudices and other biases that are not supported by objective or experiential evidence (e.g., Niemiec, Brown & Ryan, 2006).

Flexibility of Awareness and Attention

Another key feature of mindfulness is its flexibility. Like a zoom lens, it can move back from particular states of mind to gain a larger perspective on what is taking place (clear awareness), and can also zero in on situational details (focused attention) according to inclination or circumstance (J. C. Bays, cited in Cullen, 2006; Welwood, 1996). Put differently, one can be mindfully aware of all that is currently salient, and one can also be mindful of something in particular—focusing attention toward a stimulus or phenomenon (Kornfield, 1993). Preliminary evidence suggests that mindfulness is associated with attentional control and other indicators of concentrative capacity (Brown, 2006), but mindfulness and concentration are considered unique capacities, and some evidence supports this distinction (Dunn, Hartigan, & Mikulas, 1999). A primary difference between them is that concentration entails a restriction of attention to a single interoceptive or exteroceptive object, leading to a withdrawal of sensory and other inputs (Engler, 1986). By contrast, in its fullest expression the mindful mode of processing involves a voluntary, fluid regulation of states of attention and awareness.

Empirical Stance Toward Reality

The characteristics described thus far indicate that the mindful state of being is inherently empirical, in that it seeks possession of the "full facts" in a

manner similar to that of the objective scientist seeking accurate knowledge of some phenomenon (e.g, Rahula, 1974; Smith & Novak, 2004). This stance encourages a deferral of judgment until a careful examination of facts has been made (Nyaniponika, 1973). Yet this objective, "unprejudiced receptivity" to life is not to be confused with aloof or disinterested spectatorship; it is more akin to participatory observation that involves both awareness of experience while being immersed in it (Marcel, 2003). In attending to emotions or physical sensations, for example, one feels them at the same time. Mindfulness has been described as "an alert participation in the ongoing process of living" (Gunaratana, 2002, p. 142). As this statement implies, the mindful state is actively engaged, not passively resigned or dissociated from the observed experience (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Some evidence suggests that this stance promotes greater, not lesser, interest and concern for life, reflected in higher levels of compassion for self (Neff, 2003; Shapiro, Brown, & Biegel, 2006), empathy for others (Beitel, Ferrer, & Cecero, 2005; Shapiro, Schwartz, & Bonner, 1998), and ecological stewardship (Brown & Kasser, 2005).

Present-oriented Consciousness

The characteristics outlined here also highlight the notion of presence (e.g., Tsoknyi, 1998; Uchiyama, 2004). The mind is adept at "time-traveling" into memories of the past, fantasies about the future and, in general, away from the immediacy of experience in the present. This time travel serves the important regulatory purpose of protecting, maintaining, and enhancing the self in, for example, the pursuit of goals (Sheldon & Vansteenkiste, 2005), but it is easily forgotten that we exist only in the present moment, with no direct experience of either past or future. When consciousness dwells in thought-generated accounts of the past, present, and future, current reality, as it actually offers itself, is often ignored or only partially experienced.

A number of clinical approaches, particularly humanistic (Rogers, 1961) and Gestalt (Perls, 1973) psychologies have emphasized the importance of immediacy of experiencing in full, authentic functioning. For example, Rogers (1961) argued that the movement from cognitive distance to direct contact with, and ownership of experience was a central therapeutic change process, and Raskin and Rogers (1995) described one aspect of "full functioning" as "allowing awareness to flow freely in and through [one's] experiences" (p. 146). Gestalt psychologists have been careful to note that living "in the present" is conceptually distinct from living "for the present," which can imply impulsiveness, hedonism, fatalism (Zimbardo & Boyd, 1999) or a disregard for the consequences of one's behavior (Strathman, Gleicher, & Boninger, 1994). Mindfulness involves being fully aware of what is occurring in the moment, while other forms of present time orientation, such as hedonism, can imply an inability or unwillingness to contact objective or experiential realities (Sheldon & Vansteenkiste, 2005). Evidence suggests that not only is mindfulness inversely related to hedonism, fatalism, and a lack of consideration of future consequences (Brown & Vansteenkiste, 2006) but also, as will be described later, promotes behavioral self-control and more effective goal attainment.

Stability or Continuity of Attention and Awareness

The qualities of attention and awareness described here are not entirely uncharacteristic of most people. Indeed, mindfulness is considered an inherent capacity of the human organism (Brown & Ryan, 2003; Goldstein, 2002; Kabat-Zinn, 2003). But it nevertheless varies in strength. In a rudimentary form, mindful states may be fleeting or infrequent. In a fuller form, mindful states are more frequent or continuous. Steadiness of awareness and attention help to eliminate opportunities for concepts, ideas, and associated emotions to be blindly or automatically tacked onto bare facts (e.g., Smith & Novak, 2004). Such steadiness also facilitates the recognition of being caught up in conceptual thoughts or emotions rooted in past experience or anticipated futures, and the return to an awareness of what is currently taking place. Mindfulness, then, is noticing what is present, including noticing that one is no longer present. Recognizing that one is not being attentive and aware is itself an instance of mindfulness. Finally, continuity of mindfulness helps to ensure that attention can move from narrow focus to broad vista without distraction or loss of collectedness.

Conceptualizations of Mindfulness in Contemporary Psychology

The Buddhist scholarly literature presents a detailed picture of the nature of mindfulness. However, that literature's characterization of mindfulness has not been clearly translated into contemporary research psychology. The psychological literature reveals considerable variance in descriptions of the nature of mindfulness on both theoretical and operational levels (Dimidjian & Linehan, 2003; Hayes & Wilson, 2003); for example, mindfulness has been defined as a self-regulatory capacity (Brown & Ryan, 2003), an acceptance skill (Linehan, 1994), and a meta-cognitive skill (Bishop, Lau, Shapiro, Carlson, Anderson, Carmody et al., 2004). The extant measures of mindfulness also reflect a diversity of definitions, with self-report scales ranging in complexity from one factor (Brown & Ryan, 2003; Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006) to five (Baer et al., 2006). There is a clear need for conceptual agreement on the meaning of mindfulness, not only to facilitate communication

about the construct but, most pragmatically, to create a stable platform of basic and applied research in this still young area of investigation.

In seeking such agreement, it is noteworthy that the meaning of mindfulness can be quite nuanced, as the characterization already given suggests, and is therefore subject to interpretation and a selective highlighting of one or more aspects over others. It is also helpful to understand the prevailing context in which mindfulness was first, and continues to be, investigated in psychological research. Since its introduction as a topic of study, mindfulness has been closely affiliated with clinical practice and research. To a degree, the meaning that has been given to mindfulness by clinicians and researchers has been colored by these particular clinical approaches. For example, the commonly used definition of mindfulness as intentional, nonjudgmental awareness was introduced by Kabat-Zinn (e.g., 1990) to describe training in the Mindfulness-Based Stress Reduction program, while Baer et al.'s (2004) conceptual definition and self-report instrument was designed to tap the various mindfulness *skills* developed in Dialectical Behavioral Therapy (DBT; Linehan, 1993a) and other mindfulness interventions (see also Buchheld, Grossman, & Walach, 2001). In contrast, other approaches (e.g., Brown and Ryan, 2003; 2004a) have been directed toward examining the nature and manifestations of mindfulness with or without specific training.

There are two primary reasons why the clinical approach to understanding the nature of mindfulness can be problematic: First, different clinical approaches can spawn different definitions and operationalizations of the construct that accord with their particular treatment perspectives and with the outcomes they seek to foster. Indeed, some clinical approaches attempt to facilitate not only mindfulness *per se*, but also a variety of outcomes with which mindfulness has traditionally been associated (e.g., self-control, emotion regulation, compassion). Second, clinically oriented conceptualizations of mindfulness can confound the description of the phenomenon with the methods through which it is fostered. Buddhist scholars have long recognized a diversity of methods by which mindfulness can be cultivated and practiced, but have made a clear distinction between these methods and the meaning of mindfulness itself. For example, the definition of mindfulness given by Kabat-Zinn as intentional, nonjudgmental awareness is consistent with scholarship that recognizes nondiscriminatory or nondiscursive awareness as central to mindfulness, but it also includes an act of will brought to bear to cultivate such awareness, namely intention,[1] and depending on how it is construed, may also reflect a particular attitude toward current events and experience (nonjudgment or acceptance).[2] These elements can be skillfully used to enhance mindful states. For example, in one effective guided mindfulness exercise (Broderick, 2005), the listener is instructed to "commit yourself to be fully present, here and now" (intention) and to remember that "anything that comes into the field of awareness is OK" (acceptance). In this way, these elements appear to reflect aids to fostering mindfulness. Baer et al.'s (2004; 2006) DBT-inspired operationalization of mindfulness includes features reflecting present awareness, along with methods used to cultivate mindfulness, such as the labeling of thoughts, emotions, and other perceptual experiences.[3]

It is understandable that contemporary clinical researchers approach mindfulness in terms of mindfulness-relevant practices and the skills that may be cultivated in mindfulness intervention programs. A prevailing interest has been in presenting the 'treatment package' to clients in need, and such practices have been traditional vehicles for engendering mindfulness. Yet it remains important to bear in mind that mindfulness is a quality of consciousness manifest in, but not isomorphic with, the activities through which this quality is enhanced. Mindfulness is, as already noted, an inherent capacity of mind (e.g., Goldstein, 2002). We propose that by seeking close guidance from the centuries-old meaning of mindfulness that is exhaustively described in the scholarly literature, the task of separating essential and nonessential ingredients of mindfulness will be simplified considerably (c.f. Olendzki, 2005). This will also aid the advancement of the science of mindfulness, insofar as it aims to de-confound mindfulness from both its antecedents and consequences.

Mindfulness Theory in Relation to Other Theories of Awareness

Despite the novelty of the concept in contemporary psychology, mindfulness can be seen as part of a long-standing tradition in the field that recognizes the adaptive value in bringing consciousness to bear on subjective experience, behavior, and the immediate

[1]In the Buddhist view, intention is one of eight key elements in personal development, separate from mindfulness, which is presented as another key element. Intention is desire or aspiration; it can also be thought of as an aid to remember to engage in some predefined activity. Intention can be brought to bear on any activity, or realm of human endeavor, but is separable from the activity itself.

[2]It deserves mention that Kabat-Zinn (cited in Cullen, 2006) has acknowledged finding appropriate use of detailed and elaborated as well as simpler definitions of mindfulness according to audience characteristics and circumstances.

[3]This distinction between mindfulness and the methods used to cultivate it is also implied by Linehan (1993b), who notes that two mindfulness skills cultivated in DBT—close observation of, and description of, one's internal experience and behavior—are only necessary at the beginning of mindfulness training; as the capacity for "participation with awareness" develops, observing and describing cease.

environment (e.g., Carver & Scheier, 1981; Csikszentmihalyi, 1997; Deci & Ryan, 1985; Derryberry & Tucker, 2006; Duval & Wicklund, 1972; Rothbart, Posner, & Kieras, 2006). A variety of theories discuss attention and awareness in a way that bears some relation to the concept of mindfulness as we define it here.

Theories of Reflexive Self-Consciousness

The most extensive treatments of the role of attention in day-to-day life come from theories of self-awareness represented within the work of Buss (1980), Carver and Scheier (1981; 1998), Duval and Wicklund (1972) and others describing various forms of reflexive consciousness, which connotes taking oneself or one's experiences as an object of attention. The conceptualization of mindfulness outlined already shares both similarities and differences with discussions of attention in these self-awareness theories along three dimensions: strength, direction, and quality or kind of attention deployed.

Attentional strength varies widely, from its virtual absence, as in daydreaming, to acutely active alertness, and there is general agreement that a sufficient degree of attention is necessary for effective self-regulation to occur. People need to be attentive to their inner states and behavior to pursue reflectively considered goals, and failing to bring sufficient attention to oneself tends to foster habitual, overlearned, or automatized reactions rather than responses that are self-endorsed and situationally appropriate. Effective functioning demands that attention be directed toward both inner and outer events, but there is also scholarly agreement that directing attention to subjective mental, emotional, and physical experience is key to healthy self-regulation. Indeed, the willingness to "look inside" is foundational to the development of self-knowledge from which regulated action proceeds.

The primary difference between mindful and reflexive attention concerns the quality or nature of attention deployed. Consciousness is thought to serve two basic capacities: monitoring and control, where the former is an "observer" function, while the latter is a goal-directed agent of maintenance and change (e.g., Westen, 1999). There is indication that the two functions are somewhat independent (e.g., Cramer, 2000), although as noted early in this article, they are often intertwined, a feature highlighted by self-awareness theories. However, these theories emphasize the central role of conscious control of experience. In such models, the organism determines what stimuli to monitor, or attend to, on the basis of salient interests and goals, such that awareness and attention function in service to goal selection and pursuit (Rosch, 1997). In this mode of processing, there is a tight loop between consciousness and self-relevant cognition, such that attention to stimuli continually feeds cognitive operations that associate those stimuli, directly or indirectly through related stimuli, to the self, and more specifically, to thought-generated accounts about the self—self-representations, the self-concept, or more simply, 'Me' (Mead, 1934). Thus, in reflexive self-awareness, self-regulation primarily concerns control, and preservation or enhancement of identity or self-concept is of primary concern.

In contrast to this self-focused mode of conscious processing, mindful awareness and attention more clearly serves a monitoring or observer function. The mindful mode of processing simply offers a "bare display of what it taking place," rather than generating "accounts of semantic, syntactic or other cognitive functions" (Shear & Jevning, 1999, p. 204). As a form of data-driven processing, direct, receptive contact with inner and outer stimuli is predominant. Here, accuracy in the present is more important than direction toward future goals (cf., Kunda, 1990). The effect of such processing is the introduction of a mental gap between attention and its objects, including self-relevant contents of consciousness. This de-coupling of consciousness and mental content, variously called *decentering, disidentification,* and *de-embedding,* among other terms (see Martin, 1997), means that self-regulation is more clearly driven by awareness itself, rather than by self-relevant cognition.[4]

Some evidence for the uniqueness of the two self-regulatory modes outlined here comes from Brown and Ryan (2003), who found that self-reported mindfulness showed small or null relations with several indicators of self-awareness, including private self-consciousness, reflection, and self-monitoring. There also appear to be somewhat unique implications to these differing regulatory modes. Private self-consciousness, the most popular self-report measure of reflexive awareness, has been associated with social sharing, enhanced relationship satisfaction and an ability to ward off stress-induced illness, but it has also been linked with several forms of dysfunctionality (Davis & Franzoi, 1999). The discrepant findings may be explained by the dual modes of functioning apparently tapped by private self-consciousness, namely "internal state awareness" and "self-reflectiveness" (e.g., Burnkrant & Page, 1984) The former has been associated with psychological health while the latter appears to be maladaptive (e.g., Creed & Funder, 1998; Trapnell & Campbell, 1999). Notably, internal state awareness shows conceptual and

[4] A number of philosophers and psychologists have made a distinction between two modes of consciousness that is similar to the distinction between mindfulness and reflexive consciousness described here. For example, in an extensive review of research on these modes, Lambie and Marcel (2002; see also Marcel, 2003) use the terms *first-order phenomenal experience* and *second-order awareness* to refer to experiential and reflexive consciousness, respectively.

empirical convergence with mindfulness while self-reflectiveness does not (Brown & Ryan, 2003), and as will be seen later in this article, the extant research on mindfulness suggests that this form of self-regulation has robust positive effects on psychological, physical, motivational, and interpersonal functioning.

Langer's (e.g., 1989, 2002) conception of mindfulness as novel distinction-making also bears similarities and differences with the formulation of mindfulness discussed here. Both perspectives emphasize a present-oriented state of mind reflected in an awareness of one's behavior and the active deployment of attention. There is also theoretical agreement, and research evidence, that such engagement can undercut habitual, automatic evaluations and routines and open possibilities for fresh, creative response (Alexander, Langer, & Newman, 1989; Levesque & Brown, 2006). However, like the predominant self-awareness theories discussed already, Langer's formulation of mindfulness emphasizes cognitive processing of sensory input, such as the intentional search for novelty, distinctions, and multiple perspectives on task performance and behavior. For this reason, Langer's conception of mindfulness has been called a "cognitive style" (Sternberg, 2000). Also, Langer's focus is upon how the individual perceives and organizes behavior and the environment, while the present formulation highlights the importance of attentional receptivity to both inner and external realities as a platform for informed response. Despite these conceptual differences, preliminary evidence suggests that the two forms of mindfulness are related, most strongly on the dimension of present-oriented engagement, and to a lesser extent on novel distinction-seeking and -making (Brown & Ryan, 2003). Further research will be needed to determine whether these two forms of mindfulness represent alternative paths to the same salutary outcomes or whether they show benefits for different domains of experience and behavior.

Theories of Integrative Awareness

Juxtaposed with theories of reflexive self-consciousness, in which self, phenomenal experience, and behavior are objects of evaluative, self-relevant attention, a number of personality and clinical theories across a broad spectrum of orientations—including psychodynamic (e.g., French, 1952; Freud, 1912; Perls, 1973), humanistic (e.g., Rogers, 1961), cognitive-behavioral (e.g., Teasdale, 1999), and motivational (e.g., Kuhl & Kazen, 1994; Ryan & Deci, 2000)—converge in highlighting the importance of *integrative awareness*. Although variously described within differing frameworks, integrative awareness is invariantly characterized by an assimilatory, non-discriminatory interest in what is occurring both internally and externally that serves the function of promoting synthesis, organization or integration in functioning (Ryan, 1995). Thus, as we use the term, integrative awareness involves an openly explorative attention and awareness for gathering information, developing insight, and thereby facilitating well-being and adaptation.

Noteworthy in this regard is the discussion of awareness in Gestalt approaches to therapy (e.g., Perls, Hefferline, & Goodman, 1958), which explicitly draws from both psychoanalytic and Zen perspectives. The Gestalt approach focuses on presence, in which "relaxed" attention, rather than effortful, control-oriented attention, permits the creation of a "fertile void" from which what is salient in the present moment will spontaneously emerge. This is the fundamental, integrative process of Gestalt formation, and is thought to be the key to healthy self-regulation.

A number of approaches that characterized Cognitive Behavior Therapy (CBT) in its early years emphasized deploying attention in a reflexive, discriminatory manner in which the individual learned to discriminate between adaptive and maladaptive thoughts and emotions and then attempted to replace or restructure the latter (e.g., Ellis, 1991; Michenbaum, 1979). However recent work by Teasdale (1999) and others in CBT has distinguished such activities from mindful processing. Teasdale specifies three distinct modes of processing: a mindless, emoting mode (simple immersion in emotions or experience); a conceptualizing/doing mode, (thought about, and evaluation of, self and emotions, which corresponds to many traditional restructuring methods); and a mindful experiencing mode, which is variously described as involving a direct experiential awareness of what is occurring, or a non-evaluative intuitive knowing (see also Linehan's (1993a,b) description of "wise mind"). This description of the mindful mode of processing is consistent with the conception of mindfulness outlined here, and Teasdale and colleagues have linked it with greater resilience to depressive relapse, as will be discussed later.

The integrative function of awareness discussed here is also central to Self-determination theory (SDT; Deci & Ryan, 1980; Ryan & Deci, 2000). SDT characterizes optimal self-functioning in terms of autonomy, in which ones actions are integrated and self-endorsed. This entails acting in ways that are fully informed by what is occurring rather than by controlling forces, either in the environment or in the self-concept, that are alien to the core or "true" self, defined as an authentic, receptively informed process of self-organization. As Hodgins and Knee (2002) characterize it, "Individuals who are functioning autonomously . . . are responsive to reality rather than directed by ego-invested preconceived notions" (p. 89). Within this SDT view, awareness, defined as a relaxed and interested attention to what is occurring, is critical to the integrative functioning of self, as it reflects a sensitive and full processing of what is occurring (Deci & Ryan, 1985;

Hodgins & Knee, 2002). Deci and Ryan (2000) thus argue that "when awareness is blocked or inhibited the person is typically less able to engage in effective self-regulation" (p. 254). Mindfulness, as presently defined, has accordingly been described within SDT as a foundation for healthy self-regulation (Ryan & Deci, 2004).

Brown and Ryan (2003) provided some evidence for this connection by showing both between- and within-person associations between mindfulness and autonomous self-regulation (self-endorsed, choiceful action). Moreover, higher mindfulness, and qualities associated with it have been associated with more self-congruence, reflected in higher concordance between implicit (non-conscious) and explicit (conscious) assessments of self-related attributes (Brown & Ryan, 2003; Thrash & Elliot, 2002). Higher mindfulness has also been associated with less ego-defensive responsivity under threat (see Brown, Ryan, Creswell, & Niemiec, in press for review). Various experiments drawing on SDT have shown how ego-investment in outcomes precludes the experience of autonomy and is associated with pressure, tension, and lower vitality (e.g. Ryan, 1982; Nix, Ryan, Manly, & Deci 1999). In contrast, mindfully informed action appears less likely to be regulated by ego-concerns, and thus is more likely to represent, integrated, authentic functioning (Kernis & Goldman, 2006; Niemiec, Ryan, & Brown, 2006; Ryan & Brown, 2003).

It may seem paradoxical that a theory of integrated self-functioning is taken as support for the current argument that mindful functioning supports a quieting of self-concept concern. Yet there is a striking parallel between the concepts of integrated self-functioning and the concept of the mature psychological self derived from Buddhism, as both entail a relinquishing of attachment to fixed identities and concerns with self-esteem. For example, as Ryan and Brown (2003) noted, a person "acting in an integrated mindful way seeks not self-esteem, but rather, right action, all things considered" (p. 75).

A final theory of integrative awareness we will discuss here is that of Kuhl and Kazen (1994), who have discussed the role of awareness in self-regulation within their Personality Systems Interaction (PSI) approach. Specifically they discuss how introjected and controlled regulation involves the self-infiltration of the views of others, and a lack of access to one's own preferences. In their research they have shown that certain people, namely those who are "state-oriented" are vulnerable to poorer discrimination of self-versus-other assigned tasks. In part this reflects the role of negatively intrusive, repetitive thoughts (rumination), which cloud one's integrative capacity, and the capacity for checking the "self-compatibility" of goals or behaviors. PSI more generally suggests that the more frequently people experience self-suppression and external control the more they lose the capacity to access their own values and needs, a situation they describe as "use it or lose it" (Baumann & Kuhl, 2005). In a related vein, Baumeister, Vohs, and colleagues (e.g., Vohs & Baumeister, 2004) have described the self-regulatory costs associated with self-suppression and related forms of self-control. PSI suggests that healthy self-regulation involves both the capacity for wholistic self-representation, in which there is an open processing of what is occurring and a reflective, "self-compatibility" checking, in which ones actions are allowed to be intuitively informed by one's self-endorsed sensibilities and values. This wholistic, open processing as described within PSI bears similarities to mindfulness as traditionally described.

The Salutary Effects of Mindfulness: What the Evidence Shows

Investigations of the benefits of mindfulness have utilized psychometric, induction, and intervention methodologies. Several self-report measures have been recently published in attempts to assess dispositional mindfulness, including the Freiburg Mindfulness Inventory (FMI; e.g., Walach et al., 2006), the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004), the Five Factor Mindfulness Questionnaire (FFMQ; Baer et al., 2006), and the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003; Carlson & Brown, 2005). Example items include, "I observe how my thoughts come and go" (FMI); "I pay attention to how my emotions affect my thoughts and behavior" (KIMS, FFMQ); and "It seems I am 'running on automatic' without much awareness of what I'm doing" (MAAS). There is some agreement that "dispositional mindfulness" reflects a greater tendency to abide in mindful states over time. Measures of momentary mindful states have also been developed—the state MAAS (Brown & Ryan, 2003) and the Toronto Mindfulness Scale (TMS; Lau, Bishop, Seal, Buis, Anderson, Carlson et al., 2006). As will be described later, the mindfulness measures have been applied in both basic and applied contexts to assess the relevance of this quality to mental health, behavioral regulation, and relationship quality.

Researchers have also begun to utilize brief laboratory-based experimental inductions of a mindful state to examine its effects on the regulation of affect and behavior, and cognitive performance. These inductions guide individuals through instructions designed to bring attention to, and deepen awareness of moment-to-moment physical, emotional, and cognitive experiences. The induction exercise is designed to facilitate an observant stance toward ongoing events and experience, so that present realities can be seen clearly and without cognitive interference.

The vast majority of research on mindfulness has focused on the effects of clinical interventions either

based on, or incorporating, practices to enhance this quality of consciousness. Outcome studies of one ground-breaking modality, Mindfulness-Based Stress Reduction (MBSR), began appearing in the medical and psychological literature 25 years ago (e.g., Kabat-Zinn, 1982). Other approaches have followed since that time, including Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002), Acceptance and Commitment Therapy (ACT; Hayes et al., 1999), Dialectical Behavior Therapy (DBT; Linehan, 1993a), and variants of these approaches. All four of these interventions are manualized and are supported by a growing body of efficacy evidence, as reported in numerous narrative reviews (e.g., Bishop, 2002; Blennerhassett & O'Raghallaigh, 2005; Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hayes, Masuda, Bissett, Luoma, & Guerrero, 2004; Robins & Chapman, 2004; Williams, Duggan, Crane, & Fennell, 2006), and in two meta-analytic reviews of MBSR and MBCT, both of which showed moderate effect sizes for these interventions ($d \approx .50$; Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004). Given the detailed coverage of mindfulness intervention efficacy evidence in these reviews, this article will primarily address recent, randomized clinical trial (RCT) findings for each intervention.

The four interventions can be categorized along several dimensions. The first concerns the doctrinal roots of the approach. All four approaches are entirely secular in nature, but MBSR is most clearly rooted in eastern philosophy and psychology, which emphasizes the importance of experiential, meditative practice as a primary vehicle for personal development and transformation. MBCT, ACT, and DBT have sought a theoretical synthesis of eastern and western psychological (and specifically cognitive behavioral) approaches to well-being enhancement. However, unlike MBSR, MBCT, and ACT, DBT uses only non-meditative exercises to enhance awareness of thought, emotion, somatic sensation, and behavior. A second major dimension concerns the centrality of mindfulness in the treatment plan. In both MBSR and MBCT, mindfulness enhancement is a central element, while in ACT and DBT, it is one of several key treatment elements. Third, there is variation in format. MBSR and MBCT are group-based and have a brief, fixed duration (8–10 weeks). DBT includes both individual therapy and group skills training, and is implemented in stages, the first of which lasts approximately 1 year. ACT has been implemented in both individual and group contexts, with durations varying from 1 day to 16 weeks. Finally, these interventions can be distinguished by population focus. While initially targeting individuals with physical and psychiatric issues, MBSR and ACT are now also applied to healthy, stressed populations. The other interventions have, to date, focused on specific psychiatric populations—chronic depression (MBCT), and borderline personality disorder and impulse control conditions, including eating disorders (DBT).

All four intervention modalities are multidimensional in nature, and a range of methods are used to enhance mindfulness. MBSR and MBCT emphasize sitting and movement-based meditative practices that are designed to enhance attentional stability or continuity, sensory awareness, metacognitive skills (impartial, nonreactive observation of one's thoughts and feelings), and awareness of one's behavior in daily life. ACT also emphasizes nonreactive observation of thoughts and feelings (that is, without attempting to change them). Similarly, DBT emphasizes a recognition of the fluctuating nature of emotional and other experience cultivated through an observant stance on what is occurring. All four treatment modalities incorporate the use of labeling or noting of thoughts and feelings to facilitate decentering and an awareness of thoughts, emotions, desires, and other phenomena that arise without latching onto or acting on them. These are practiced during mindfulness meditation (MBSR, MBCT, ACT), other experiential exercises (all four interventions), and through the use of metaphors (ACT).

Finally, all modalities use techniques or practices to encourage an attitude of acceptance of self-relevant events and experience. As noted earlier, acceptance may facilitate the developing capacity to sustain attention to current experience, particularly when it is cognitively or emotionally engaging or challenging. Central to the methods outlined here is the facilitation of a sustained, nondiscriminatory observation of moment-to-moment experience and behavior. Their use in clinical contexts is premised on the belief that mindfulness will foster insight into psychological and behavioral sources of suffering and thereby leverage well-being enhancement or actions taken to facilitate it.

In the sections that follow, we review evidence derived from the use of all three methodologies outlined here—psychometric, induction, and intervention—that bears on the effects of mindfulness and its enhancement on mental health and psychological well-being, physical health, behavioral regulation, and interpersonal behavior.

Mental Health and Psychological Well-Being

Leary (2004, p. 72) notes that, "virtually every theory of mental health assumes that having an accurate view of reality is a hallmark of psychological adjustment." We have argued elsewhere (Brown & Ryan, 2003) that mindfulness may facilitate well-being directly, by adding clarity and vividness to current experience and encouraging closer, moment-to-moment sensory contact with life, that is, without a dense filtering of experience through discriminatory thought (cf., Csikszentmihalyi, 1990; Deci & Ryan, 1985;

Kabat-Zinn, 2005); it may also operate indirectly, through the enhancement of self-regulated functioning that comes with ongoing attentional sensitivity to psychological, somatic, and environmental cues (cf., Baumeister, Heatherton, & Tice, 1994; Carver & Scheier, 1998; Deci & Ryan, 1985).

Empirical research conducted to-date supports the role of mindfulness in well-being. Using trait measures of mindfulness, significant correlations have been found with a variety of cognitive and affective indicators of mental health and well-being. The trait MAAS has been associated with lower levels of emotional disturbance (e.g., depressive symptoms, anxiety, and stress), higher levels of subjective well-being (lower negative affect, higher positive affect, and satisfaction with life) and higher levels of eudaimonic well-being (e.g., vitality, self-actualization) (Brown & Ryan, 2003; Carlson & Brown, 2005). The FMI, FFMQ, KIMS, and MAAS have been shown to correlate inversely with a variety of indicators of psychopathology, including dissociation, alexithymia, and general psychological distress (e.g., Baer et al., 2006; Walach et al., 2006). Scores on these scales have also been negatively related to neuroticism (e.g., Baer et al., 2006) and the MAAS has also been positively related to extroversion (Brown & Ryan, 2003); both personality dispositions have been linked to affective well-being (e.g., Diener, Suh, & Lucas, 1999).

There is some indication that, aside from the benefits of a mindful disposition, simply being in a mindful state is associated with higher well-being (e.g., Lau et al., 2006). For example, in a two-week long experience-sampling study with community adults, Brown and Ryan (2003) found that while the trait MAAS predicted lower day-to-day negative affect, heightened states of mindfulness (as assessed by the state MAAS) were also associated with higher positive affect and lower negative affect after controlling for variance attributable to the trait MAAS. These effects were independent, suggesting that the benefits of mindfulness are not limited to those with a general disposition to be mindful. However, this research also found that those who were dispositionally higher in mindfulness were more likely to report higher states of mindfulness on a day-to-day basis.

Psychometric research has also explored the role of mindfulness in affect regulation, a skill that is foundational for mental health and other aspects of adaptive functioning (Gross & Munoz, 1995). Consistent with the notion that mindfulness is associated with clarity of awareness and an objective, or unbiased processing of experience, both the MAAS and the KIMS have been associated with stronger affect regulatory tendencies, including a greater awareness, understanding, and acceptance of emotions, and a greater ability to correct or repair unpleasant mood states (Brown & Ryan, 2003; Baer, Smith, & Allen, 2004).

This self-report, correlational research has been corroborated and extended by fMRI research examining the neural substrates of emotional reactivity and repair. Creswell, Way, Eisenberger, and Lieberman (2007) examined reactivity to threatening emotional visual stimuli, as measured by amygdala activation, and the prefrontal cortical mechanisms by which people regulate their threat responses through stimulus labeling. The study found that, relative to those lower in MAAS-assessed mindfulness, higher MAAS scorers were less reactive to threatening emotional stimuli, as indicated by an attenuated bilateral amygdala response and greater prefrontal cortical activation (in dorsomedial, left and right ventrolateral, medial, and right dorsolateral prefrontal cortex) while labeling those stimuli. A stronger inverse association between these areas of the prefrontal cortex and the right amygdala was also found among higher MAAS scorers. This latter result suggests that more mindful people may have greater affect regulation ability through enhanced prefrontal cortical inhibition of amygdala responses. Ochsner, Bunge, and Gross (2002) have suggested that this pattern of activations may be associated with a "turning down" of evaluation processes, thus switching from an emotional to an unemotional mode of stimulus analysis. This is consistent with the receptive, non-evaluative aspect of mindfulness described already, in which objects and events in focal attention are simply observed, without attempts to alter or analyze them.

Investigations of induced mindfulness have also provided opportunities to closely examine the role of this quality of consciousness in promoting affect regulation. The regulation of negative emotional states is particularly relevant to mental health (Feldman Barrett, Gross, Chistensen, & Benvenuto, 2001; Ryan, 2005), and two studies have examined how mindfulness can attenuate the experience of elicited negative affect. Arch and Craske (2006) found that, relative to experimental controls, those receiving a mindfulness induction showed less negative affective reactivity and emotional volatility in response to affectively valenced picture slides and a greater willingness to maintain visual contact with aversive slides. An induced mindful state also appears to facilitate recovery after emotionally provocative events. Broderick (2005) found that, in comparison to those in distraction and rumination conditions, individuals in a mindfulness induction condition showed quicker recovery from an induced sad mood. These results, along with the fMRI results reported already, are most consistent with unpredjudiced receptivity of mindfulness, particularly in its promotion of equanimity in the face of emotionally challenging events, as reflected in a greater willingness to tolerate or remain experientially present to unpleasant stimuli without cognitive reactivity (Eifert & Heffner, 2003; Levitt, Brown, Orsillo, & Barlow, 2004). Though preliminary, these findings on reduced reactivity and a

speeding the recovery from unpleasant emotional experiences offer promise for clinical research by suggesting a means to cope with difficult emotions when they arise (Broderick, 2005).

Mindfulness intervention research has provided evidence for reductions in a variety of psychopathological symptoms, while enhancing mental health and well-being. The MBSR intervention encapsulates many of the characteristics of mindfulness outlined earlier, but at its core is a focus on fostering mindfulness through close, receptive attention to present events and experiences. Randomized clinical trials (RCTs) of MBSR with healthy and patient populations, most using wait-list controls, show that MBSR is effective in reducing self-reported distress (Astin, 1997; Monti, Peterson, Shakin Kunkel, Hauck, Pequignot, Rhodes et al., 2005; Shapiro, Schwartz, & Bonner, 1998; Tacon, McComb, Caldera, & Randolph, 2003; Williams, Kolar, Reger, & Pearson, 2001), and stress symptoms and mood disturbance (Speca, Carlson, Goodey, & Angen, 2000), while increasing affect regulation (Tacon et al., 2003), perceptions of control (Astin, 1997), and trait mindfulness (Cohen-Katz, Wiley, Capuano, Baker, & Shapiro, 2005). Supporting the role of mindfulness enhancement itself in producing MBSR effects, Speca et al. (2000) showed that more time spent in home- and group-based mindfulness practice was associated with greater reductions in stress symptoms and mood disturbance.

The central aim of ACT is to enhance the ability to become more fully aware of present behavior, self-endorsed values, and then to commit to behaviors that are consistent with those values (Hayes et al., 2006). ACT has been tested in a variety of patient and healthy populations, with RCT studies showing reductions over a 4-month period in symptoms and rehospitalizations in psychotic patients (Bach & Hayes, 2002), as well as reduced self-harming behaviors and improved measures of emotion regulation, mental health, and stress in borderline personality disorder patients at the end of treatment (using a combination ACT and DBT; Gratz & Gunderson, 2006). In healthy stressed populations, ACT has been shown to be effective in reducing psychological symptoms (Bond & Bunce, 2000), and in reducing stigmatizing attitudes and burnout in substance abuse counselors (Hayes, Bissett, Roget, Padilla, Kohlenberg, Fisher et al., 2004). Evidence from several ACT studies shows that increases in acceptance mediate treatment outcomes, suggesting potential mechanisms of change in ACT (Hayes et al., 2006).

MBCT and DBT have focused on treating psychopathology in targeted clinical patient populations. MBCT focuses on increasing metacognitive awareness and present moment, non-judgmental awareness of negative thoughts and feelings in at-risk depressive patient populations (Segal et al., 2002). This increased awareness is thought to enable patients to recognize depressive thought patterns early and thereby prevent depressive relapse. Two well-conducted RCTs have shown that MBCT is effective in reducing depression relapse rates in participants with a history of three or more depressive episodes (Ma & Teasdale, 2004; Teasdale, Segal, Williams, Ridgeway, Soulsby, & Lau, 2000). DBT has been tested primarily in borderline personality disorder patients, with whom mindfulness training has emphasized participatory, or engaged, nonreactive observation of present moment experiences, among other qualities (Linehan, 1993a). Controlled studies of DBT in borderline personality disorder samples have shown that DBT reduces distress symptoms (Bohus, Haaf, Simms, Limberger, Schmahl, Unckel et al., 2004; Turner, 2000), suicidal ideation (Koons, Robins, Tweed, Lynch, Gonzalez, Morse et al., 2001) and psychiatric hospitalizations (Linehan, Armstrong, Suarez, Allman, & Heard, 1991), and improves social adjustment (Bohus et al., 2004; Linehan, Schmidt, Dimeff, Craft, Kanter, & Comtois, 1999) and global mental health functioning (Turner, 2000). DBT, in combination with anti-depressive medication, has been shown to reduce depressive symptoms in depressed older adults, with symptom improvements maintained 6 months after treatment (Lynch, Morse, Mendelson, & Robins, 2003). In fact, studies including follow-up assessments have shown stability of DBT effects up to one year post-treatment (Linehan, Heard, & Armstrong, 1993; van den Bosch, Koeter, Stijnen, Verheul, & van den Brink, 2005).

Physical Health

Arguably, physical health relies on the willingness to bring attention to somatic experience, particularly when the state of the body is disrupted by pain, injury, or illness (e.g., Carver & Scheier, 1981). However, few people *like* pain and discomfort, the most common manifestations of physical distress and illness, and common sense suggests that they should be avoided when possible, whether that be through a diversion of attention away from the body or suppression of experience through conscious will, self-medication, or other, more extreme interventions like alcohol and drug use. People generally do not believe that attending to pain will alleviate it (Cioffi, 1993) and for some time now, behavioral health researchers and practitioners have concurred, describing the benefits of distraction and other attentional diversion strategies in coping with pain and discomfort.

Two assumptions appear to justify the idea that directing attention inward will not only fail to alleviate, but will even increase somatic distress (Cioffi, 1991): First, more somatic information is available to the individual when attention is internally directed; and second, the increased salience of somatic

symptom information will produce distress. There is some evidence to support a belief in the efficacy of avoidance strategies. Initially, the direction of attention toward physical discomfort may heighten symptom experience rather than ameliorate it (see Cioffi, 1993). Further, active distraction from noxious physical sensations or from one's own reaction to them may facilitate an adaptation to physical stressors (e.g., Mullen & Suls, 1982).

However, there are boundary conditions to the efficacy of distraction, suppression, and other experiential avoidance strategies in coping with noxious physical sensations. Distraction appears best suited to mild and acute (self-limiting) conditions (e.g., McCaul & Malott, 1984). When severe or chronic noxious states represent underlying pathology, inattention or avoidance may have serious health consequences. Avoidant strategies may also produce, perpetuate, or exacerbate anxiety and cognitive disruption (Cioffi, 1993), and the unwillingness to openly experience physical pain and distress may also have the unintended consequence of fostering an increased sensitivity to, and intolerance of the very states an individual seeks to avoid (Dahl & Lundgren, 2006).

Consistent with the discussion of mindfulness here, several researchers have explored the conditions under which attention to somatic states can serve the short-term goal of alleviating physical discomfort while reaping the regulatory benefits that such attention can provide. Leventhal and colleagues (e.g., Leventhal, Brown, Shacham, & Engquist, 1979) proposed that uncomfortable physical events can be processed experientially, that is, with attention to concrete, sensory qualities, or can be processed conceptually or interpretatively—in terms of their emotional or threat value. Leventhal termed the first mode *sensory monitoring* (later also called *sensory focusing*), which was thought to produce a neutral perception of sensation and more benign interpretations of the meaning of those sensations. The second, interpretive mode, was thought to bias toward a heightened experience of pain and subjective distress. Suls and Fletcher (1985) similarly argued that the strategic use of attention is preferable to distraction when that attention focuses on the concrete aspects of physical sensations rather than on diffuse physical states or on emotional or cognitive reactions to sensory experience (see Cioffi, 1991 for review).

Support for these claims comes from several studies with healthy and clinical pain groups (e.g., Burns, 2006; Cioffi & Holloway, 1993; Haythornthwaite, Lawrence, & Fauerbach, 2001; Logan, Baron, & Kohout, 1995). An early experimental investigation by Cioffi and Holloway (1993) tested the relative efficacy of three strategies for managing cold pressor pain in healthy adults. Subjects were asked to perform one of two forms of experiential avoidance—distraction or suppression—or to monitor their pain sensations by attended to the "location, quality, intensity" and other concrete details of their sensory experience. Subjects in all conditions initially rated their pain as severe, but those in the sensory monitoring condition showed the most rapid recovery from the pain over a 2-min period (with suppressors showing the slowest recovery). Interestingly, in the interval before an expected second cold-pressor test, sensory monitors showed no change in their reported self-efficacy to withstand the test, relative to their reports before the first test; in contrast, suppressors showed a significant drop in coping self-efficacy (which is consistent with the notion that suppression leads to ego depletion; Vohs & Baumeister, 2004). Manipulation checks provided anecdotal support for the theoretical interpretation of the sensory monitoring strategy in this study, with subjects in this condition reporting their pain experience in concrete sensory and affectively neutral terms (e.g., "I noticed how the sensations changed and shimmered" p. 280). In a more recent study with burn patients receiving dressing changes, Haythornthwaite et al. (2001) found that those in a sensory focusing condition reported greater pain relief relative to those in a distraction group and less remembered pain compared to usual care group participants.

The concept of sensory monitoring/focusing described here bears some resemblance to the bare attentional, nondiscriminatory, and empirically grounded aspects of mindfulness described earlier. And indeed, a number of studies with clinical pain patients receiving mindfulness-based treatment have shown results consistent with the laboratory-based work described here in showing declines in subjective pain experience. For example, in an early, uncontrolled demonstration (Kabat-Zinn, Lipworth, & Burney, 1985), chronic pain patients enrolled in an MBSR program reported significant pre-post intervention declines in present-moment pain, inhibition of activity by pain, pain-related medication usage, and several psychological symptoms, relative to control patients receiving standard medical treatment. Most of the positive effects of the MBSR program were maintained at a 15-month follow-up assessment.

Aside from research focused on the regulation of physical sensation and symptom experience, there is now accumulating evidence that mindfulness, and specifically, mindfulness-based interventions, may also have salutary effects on physical health more generally. A number of within-subjects designs have tested MBSR in various stress-related diseased patient populations (e.g., chronic pain, cancer, HIV, fibromyalgia), though few have used rigorous RCT methodologies in assessing physical health outcomes (see Grossman et al., 2004). However, controlled studies of MBSR have demonstrated effectiveness in reducing medical symptoms and increasing health-related quality of life

in healthy stressed (Monti et al., 2005) and cancer patient populations (e.g., Carlson,Speca, & Patel, 2003; Williams et al., 2001).

Like the Kabat-Zinn et al. (1985) pain study reviewed earlier in this section, recent research also suggests that MBSR may produce changes in biological and clinical markers of health. For example, Kabat-Zinn, Wheeler, Light, Skillings, Scharf, Cropley et al. (1998) conducted an RCT examining the effects of mindfulness meditation exercises completed during 30–40 phototherapy treatment sessions for individuals with psoriasis (a stress sensitive inflammatory skin condition). Compared to controls, these participants had significantly more skin clearing at the end of treatment, as measured by blinded health professionals. Barnes, Davis, Murzynowski, and Treiber (2004) had middle-school children practice mindfulness meditation exercises 20 min each day for three months. Relative to controls, intervention participants had reductions in resting and some ambulatory measures of systolic blood pressure.

Controlled studies have also shown positive effects of mindfulness intervention on some markers of immune system functioning. For example, in a sample of stressed biotechnology workers, Davidson, Kabat-Zinn, Schumacher, Rosenkranz, Muller, Santorelli et al. (2003) measured the effects of MBSR on adaptive immune responses to an influenza vaccine given after the intervention. Findings showed that, compared to control participants, MBSR participants had greater antibody titer responses at follow-up, suggesting enhanced immune responsiveness. Further, these antibody responses were associated with greater EEG-assessed left-sided neural activation to an experimental mood induction, suggesting a neural basis for enhanced affect regulation and immune adaptation.

While very little work has examined the physical health effects of the other three interventions, preliminary evidence suggests that ACT may have beneficial effects on health in at-risk populations. A controlled study with adults at risk for long-term disability showed that ACT was effective in reducing medical treatment utilization and the overall number of sick days, based on assessments made up to 6 months following intervention (Dahl, Wilson, & Nilsson, 2004).

Behavioral Regulation

Paralleling the role of attention in the regulation of physical health and psychological states, the importance of bringing attention to current events and experiences is central to a number of prominent theories of behavioral regulation (e.g., Baumeister et al., 1994; Carver & Scheier, 1981; Csikszentmihalyi, 1990; Deci & Ryan, 1985), and also has an important place in cognitive-behavioral treatments of pathologies marked by self-control deficits (e.g., Linehan, 1993a; Petry, 2005). We, and others, have argued elsewhere that mindfulness not only facilitates the control of behavior in the service of adaptive ends (e.g., Lakey, Campbell, Brown, & Goodie, 2007; Ryan, 2005), but also promotes a regulation of behavior that optimizes well-being and human flourishing (Brown & Ryan, 2003, 2004a; Ryan, 2005; Deci & Ryan, 1980). Specifically, we argue that the receptively observant processing of internal and external information that characterizes mindfulness facilitates the healthy regulation of action through the provision of choice that is informed by abiding needs, values, and feelings and their fit with situational options and demands. That is, the fuller awareness afforded by mindfulness facilitates more flexible, adaptive responses to events, and helps to minimize automatic, habitual, or impulsive reactions (Bishop et al., 2004; Ryan & Deci, 2004).

As noted earlier, the operation of mindfulness may occur through the creation of a mental gap between the stimulus-response relations that shape automatic behavior, such that behavior becomes disengaged from its usual causes (c.f., Baumeister & Sommer, 1997). In this sense, mindfulness may encourage the capacity to respond in ways that subserve one's values, goals, or needs, rather than to react in terms of habits, overlearned responses, or reactions to situational cues (Leary, Adams, & Tate, 2006). For example, the flexible application of attention to both a stimulus cue and one's impulse to react to that cue may create space for the recognition of choice in how to respond.

Mindfulness may also serve the actions required for the engagement and successful completion of specific tasks. Reviewing several lines of evidence, Leary et al. (in press) suggest that bringing present-focused attention to the task itself helps to disengage from thoughts about the task or preoccupation with other concerns that can interfere with successful task completion, lowers or eliminates anxiety and other emotions that can disrupt performance, and requires less effort than does abstract, self-relevant thought, thereby helping to prevent the depletion of self-regulatory energy resources that can occur when task demands are high.

Several studies lend support to the theorized role of mindfulness in both behavioral self-control and self-endorsed, or autonomous, self-expression. Barnes, Brown, Krusemark, Campbell, and Rogge (in press) and Lakey et al. (2007) found that dispositional, MAAS-assessed mindfulness was related to higher dispositional self-control, defined as the ability to override or change inner responses, and to interrupt and refrain from acting on undesired behavioral tendencies (Tangney, Baumeister, & Boone, 2004). Lakey et al. (2007) also discovered an important role for mindfulness in gambling behavior, a potentially pathological tendency that can lead to manifold intrapsychic and interpersonal problems (e.g, Potenza, Fiellin, Heninger, Rounsaville, & Mazure, 2002). In an initial study with

undergraduates who were frequent gamblers, dispositional mindfulness was inversely related to reports of gambling problems after controlling for gender and dispositional self-control. Then, in a laboratory study with gamblers performing two gambling-related tasks, more mindful individuals, as measured by baseline MAAS scores, displayed greater accuracy when answering general knowledge questions and exhibited better calibration between their purported confidence assessments and their objective accuracy; that is, they showed less overconfidence. Coupling these more adaptive discernment processes with less frequent risk-taking, more mindful individuals objectively outperformed their less mindful counterparts on the gambling tasks. The fact that more mindful persons were more accurate implies that mindfulness may function to inhibit distraction from intrusive thoughts, allowing for deeper processing of relevant stimuli (i.e., greater accuracy and less overconfidence) and greater recognition of risk (i.e., less bet acceptance). Those higher in dispositional mindfulness also made safer choices on the tasks, indicating greater awareness of mixed gain and loss outcomes. Indeed, more mindful individuals appeared better able to implicitly learn reward and punishment contingencies than those less mindful.

Self-control difficulties are marked by several regulatory deficits, including poor affect regulation and habitual responding. Psychometric, induction, and intervention research reviewed already suggests that mindfulness has positive affect regulatory effects. Induction and intervention work similarly suggests that mindfulness promotes less habitual responding. In two experimental studies examining habitual behavior, Wenk-Sormaz (2005) found that, relative to controls, participants in a mindfulness induction condition showed less automatized responding on tasks designed to measure such responses (a Stroop task and a word production task).

Mindfulness intervention studies are consistent with psychometric and inductions studies in showing self-control enhancement. DBT has been shown to produce robust improvements in behavioral self-control in female borderline personality disorder populations, manifest in reductions in self-mutilating behaviors, drug abuse, and parasuicidal attempts (e.g., Bohus, Haaf, Stiglmayr, Pohl, Bohme, & Linehan, 2000; Koons et al., 2001; Linehan et al., 1991; Linehan et al., 2002; Linehan et al., 1999; Turner, 2000; Verheul, Bosch, Koeter, De Ridder, Stijnen, & Brink et al., 2003). RCT studies using wait-list controls also show that DBT may be effective in reducing the number of binge episodes and binge eating days among those with the disorder (Safer, Telch, & Agras, 2001; Telch, Agras, & Linehan, 2001). ACT has shown effectiveness in reducing drug use in opiate addicts, relative to an active treatment comparison (Hayes, Wilson, Gifford, Bissett, Piasecki, Batten et al., 2004) and in improving smoking cessation rates in nicotine-dependent smokers (Gifford, Kohlenberg, Hayes, Antonuccio, Piasecki, Basmussen-Hall et al., 2004).

Before leaving this research on self-control, it must be noted that it is not entirely consistent. Leigh, Bowen, and Marlatt (2005) found, unexpectedly, that FMI-assessed mindfulness was related to more frequent smoking and binge drinking among college students, which Leigh et al. suggest may be due to a perceived need to desensitize a heightened physical sensitivity among more mindful individuals.

As noted earlier in this section, the regulatory benefits of mindfulness appear to extend beyond self-control deficit reduction to fostering more autonomous self-regulation in which individuals feel more volitional and congruent in their actions. Brown and Ryan (2003) used a diary-based methodology to show that trait and state mindfulness were independently associated with more autonomous self-regulation, a tendency that has considerable importance for psychological well-being, fulfilling relationships, creativity and task performance, and other markers of optimal human functioning (e.g., Ryan & Deci, 2000). Levesque and Brown (2006) found that a more mindful disposition led to more autonomous motivation for day-to-day behavior even when that meant overriding an implicit, or automatic tendency to associate the self with control by internal or external forces (ie., low autonomy). These findings suggest that the heightened awareness of internal and external stimuli that denotes mindful attunement may facilitate a subsequent consonance between one's behavior and the affective consequences that are associated with particular stimuli.

Finally, the enhanced self-regulation that accompanies "being present" is also reflected in preliminary evidence showing that mindfulness can support more effective goal attainment. Brown and Vansteenkiste (2006), for example, found that mindfulness was prospectively related to better academic and personal goal outcomes among college students, even after controlling for characteristics theorized to be associated with behavioral regulation, including optimism and future time orientation. This suggests that, in accord with self-awareness theory (e.g., Duval & Wicklund, 1972), behavior is guided by goal standards only to the extent that people are attentive to those goals, but also suggests that mindful attention to one's day-to-day actions may facilitate goal attainment (Leary, Adams, & Tate, 2006), perhaps by enhancing self-regulation and integrated goal commitment (Hodgins & Knee, 2002).

Relationship and Social Interaction Quality

Study of the effects of mindfulness on social relationships is among the newest areas of investigation in this field, and research to date has largely focused on the role of this quality in enhancing romantic

relationships. Several authors have suggested that mindfulness may have considerable value in this life domain. Kabat-Zinn (1993) and Welwood (1996) argued that mindfulness promotes attunement, connection, and closeness in relationships. Specifically, the receptive attentiveness that characterizes mindfulness may promote a greater ability or willingness to take interest in the partner's thoughts, emotions, and welfare; it may also enhance an ability to attend to the content of a partner's communication while also being aware of the partner's (sometimes subtle) affective tone and nonverbal behavior (Goleman, 2006). At the same time, such a person may be more aware to their own cognitive, emotional, and verbal responses to the communication. Boorstein (1996) has argued that mindfulness promotes an ability to witness thought and emotion so as not to react impulsively and destructively to them. Thus, this open, non-evaluative stance may be important to predicting the outcomes of relationship conflict. More generally, this scholarship suggests that mindfulness may promote interaction styles that support healthy relationship functioning and enhance overall relationship quality.

While the evidence in this area of inquiry is still sparse, preliminary psychometric and intervention research suggests that mindfulness may enhance both the quality of romantic relationships and the communication that happens within those relationships. Barnes et al. (in press) found that higher MAAS-measured trait mindfulness predicted higher relationship satisfaction and greater capacities to respond constructively to relationship stress among non-distressed dating couples. A second study replicated and extended these findings. Using a conflict discussion paradigm, trait MAAS scores predicted lower emotional stress responses to conflict, and this effect was explained by lower emotional stress before the discussion. This corroborates past research, reviewed already, showing that those more dispositionally mindful are less susceptible to negative mood states in general, and suggests that this lower susceptibility is evident in the specific context of romantic couple interactions. The results showed that rather than buffering the effects of stress during conflict, mindfulness helped to inoculate against stress. The capacity of mindfulness to inhibit reactivity to conflict was also evident in the cognitive judgments that each partner made; those higher in trait mindfulness showed a more positive (or less negative) pre-post conflict change in their perception of the partner and the relationship. This study also supported the importance of bringing a mindful state into challenging exchanges, in that state mindfulness was related to better communication quality, as assessed by objective raters. This latter result is consistent with evidence that bringing sustained attention to social exchanges is key to the establishment of rapport (e.g., Tickle-Degnan & Rosenthal, 1990).

Incipient intervention research has also supported the beneficial role of mindfulness in romantic relationships. Adapting the MBSR program to a couples-based program called Mindfulness-Based Relationship Enhancement, Carson, Carson, Gil, and Baucom (2004; see also Carson, Carson, Gil, & Baucom, in press) showed that, relative to wait-list controls, intervention couples (all in nondistressed relationships) had significantly greater relationship satisfaction, autonomy, partner acceptance, and lower personal and relationship distress at post-test and at 3-month follow-up. Evidence also indicated that more day-to-day mindfulness practice was associated with many of these positive individual and couple outcomes.

Other research supports the potential importance of mindfulness to interpersonal relationships more generally. Baer et al. (2004; 2006) and Brown and Ryan (2003) found correlations between mindfulness and components of emotional intelligence; these, in turn, have been associated with better social skills and perspective taking, cooperative response patterns, and marital partner satisfaction (Schutte, Malouff, & Bobik, 2001). More directly, Brown and colleagues (Brown & Kasser, 2005; Brown & Ryan, 2003; 2004b) showed that MAAS-assessed mindfulness was positively related to, or predictive of a felt sense of relatedness and interpersonal closeness. These findings suggest the proposition, to be tested in future research, that mindfulness supports social connectedness, which theory and research indicates is an inherent psychological need (e.g., Deci & Ryan, 1991).

There is also initial evidence that mindfulness can protect against the distress that is commonly experienced when that connectedness is lost due to social exclusion, an experience that people are highly motivated to avoid (e.g., Allen & Knight, 2005). In line with the proposition that mindfulness promotes more open, non-defensive processing of challenging events, Creswell, Eisenberger, and Lieberman (2006) tested whether mindful awareness incurs protective benefit against distress when facing exclusion by members of a group. Creswell et al. also examined whether the more mindful person's greater equanimity in the face of exclusion was due to reduced reactivity to this form of social threat, measured by functional Magnetic Resonance Imaging (fMRI) of neural regions known to be implicated in the experience of social pain and distress.

Undergraduates participated in a virtual ball tossing game with two other "participants" (actually a computer) while undergoing fMRI. In the first task block, the participant was included in the ball tossing game, while in the second block, the participant was excluded during the majority of the throws. After the task, participants reported their perceptions of social rejection during exclusion. Results showed that MAAS-assessed

mindfulness predicted lower perceived rejection. Further, this association was partially mediated by reduced activity in the dorsal Anterior Cingulate Cortex (dACC), a region activated during social distress (Eisenberger, Lieberman, & Williams, 2003). These findings are consistent with the study of romantic couple conflict described already, in suggesting that mindfulness predicts a more subdued response to social threat, in this case, apparent rejection by peers, and that this attenuated response is due, in part, to reduced evaluative reactivity to that threat (see also Creswell, Way et al., 2006).

The findings also provide a window onto the role of mindfulness in altering the expression of self in social contexts. Theory and research suggest that personal identity, or the self-concept, is strongly influenced by the opinions and reactions of others, and negative evaluative reactions to rejection occur because the individual's sense of self-worth is invested in, or contingent upon, validation by others (e.g., Leary, 2004). However, if a deeper sense of self that is grounded in experiential awareness is operational, events like rejection that impinge upon the self-concept may be less threatening than they otherwise might (Brown et al., in press).

Relatedly, scholars have long suggested that the greater insight into self, others, and human nature, along with an easing of ego-based concerns that is afforded by mindfulness encourages a more compassionate concern for others (Davidson & Harrington, 2002) and initial correlational evidence supports this notion (e.g., Beitel et al., 2005). A study with medical students (Shapiro et al., 1998) found that, relative to wait-list controls, those receiving an MBSR program showed increases in empathy over time, despite the fact that post-course assessments were collected in a high-stress, final exam period. These findings suggest the possibility, to be tested in future research, that mindfulness may enhance professional as well as personal relationship quality.

Why is Mindfulness Beneficial?

With accumulating evidence that mindfulness shows beneficial effects on a variety of outcomes, researchers have begun to turn attention to the processes that may help to explain its effects. Suggested processes involve changes in the use of attention, cognition, and emotion, and include, among others, insight, exposure, and nonattachment (see reviews by Baer, 2003; Hayes et al., 2006; Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006; McIntosh, 1997; and Shapiro, Carlson, & Astin, 2006). In what follows we summarize these processes and conjecture others that may be directly or indirectly facilitated by mindfulness, and that in turn may yield salutary outcomes.

Insight

Several characteristics of mindful processing, including its observant stance, perceptual flexibility, and relative freedom from conceptualization, encourage the recognition that all consciously perceived phenomena, including thoughts and feelings, are insubstantial in nature; thoughts becomes 'just thoughts,' feelings 'just feelings,' rather than necessarily accurate reflections of reality (Hayes 2004; Kabat-Zinn, 1990; Linehan, 1993a). The metacognitive insight that comes from this decentered perspective (e.g., Teasdale, Segal, & Williams, 1995) may have myriad psychological and behavioral consequences by, for example, discouraging automatic, habitual thought patterns, including rumination and obsession, and the rigid psychological states and behaviors that follow from them (e.g., Teasdale, Moore, Hayhurst, Pope, Williams, & Segal, 2002); encouraging a willingness to face and accept threatening thoughts and emotions; and facilitating reality testing. Insight into desires, abiding needs, and values may also discourage the tendency to be controlled by internal or external demands or pressures and facilitate greater choicefulness in behavior (Deci & Ryan, 1985; Ryan, 2005).

Exposure

Because mindfulness concerns a sustained, 'clear seeing' of internal and external phenomena as they are, it may lead to desensitization, a reduction in emotional reactivity, quicker recovery, and a greater tolerance for, and acceptance of, unpleasant states—that is, more effective affect regulation (Borkovec, 2002). This voluntary exposure to unpleasant or challenging events and experiences may in turn lead to decreases in emotional and cognitive disturbance and more adaptive behavioral responses, as recent research suggests (e.g., Felder, Zvolensky, Eifert, & Spira, 2003; Levitt et al., 2004; Sloan, 2004). Conversely, alternative regulatory strategies, such as experiential avoidance (including distraction and suppression), may hinder the extinction of emotional responses (Broderick, 2005; Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Cioffi, 1993), and introspection, particularly of a ruminative nature, may contribute to psychopathology (e.g., Nolen-Hoeksema, Morrow, & Frederickson, 1993). There is some experimental evidence that mindfulness leads to voluntary exposure (Arch & Craske, 2006; Niemiec et al., 2006), and exposure is a component of all four major mindfulness interventions, but whether exposure plays an operative role in explaining the effects of mindfulness, and mindfulness interventions, has received little empirical attention to date.

Nonattachment

Within classical Buddhist thought, a great deal of suffering is thought to be caused by the perceived need for things to be other than what they are, including

both the desire to acquire or maintain for oneself what is not present (craving) and to remove what is (aversion or hatred) (e.g., Ekman, Davidson, Ricard, & Wallace, 2005). Some evidence supports this assertion (see McIntosh, 1997 for review). Inherent in mindfulness is an acceptance of, or willingness to be with what is, in contrast to states of mind that involve avoidance, control, and the investment of personal well-being in altering circumstances or attaining goals. Mindful nonattachment may facilitate equanimity, ease, and other states reflecting a stable experience of well-being—or unconditional happiness—that is not contingent on circumstances (McIntosh, 1997; Tart, 1994).

Enhanced Mind-body Functioning

More speculatively, it may be worth considering the small, but intriguing body of evidence that mindfulness may yield benefits on health through not only psychological and behavioral mediators, but also by enhancing immunological resistance, promoting relaxation and pain tolerance, and other physical processes. Clearly this is an area where study of mediating processes is needed; even the evidence of direct effects of mindfulness on health is still nascent. Nonetheless, it does seem clear that persons higher in mindfulness incur less stress, and experience greater subjective vitality (Brown & Ryan, 2003). In turn lower stress and higher subjective vitality have been associated with fewer physical symptoms and greater overall health at both between- and within-person levels of analysis (e.g., Ryan & Frederick, 1997). It is thus possible that mindfulness may permit more direct relief of stress, and in turn to leave more biological and psychological resources available to the organism to maintain health and wellness. It is also possible that mindfulness permits more adaptive responses to stressors that can cause wear and tear on bodily systems (McEwen, 1998).

Integrated Functioning

Finally, the characteristics of willing exposure, nonattachment, insight, and more effective processing of stress all bespeak the potentially central role of mindfulness in integrated functioning. The fact that mindfulness is associated with enhanced executive functioning, better self-regulation, greater autonomy, and enhanced relationship capacities, all attests to the fact that when individuals are more mindful they are more capable of acting in ways that are more choiceful and more openly attentive to and aware of themselves and the situations in which they find themselves, "all things considered."

Underlying all of these processes is a disengagement from self-concern—the perceptions, thoughts, beliefs, evaluations, and related feelings people have about themselves that tend to channel and filter contact with reality in self-serving ways (Ryan & Brown, 2003; Leary, 2004; 2005). As an experiential mode of being, mindfulness involves a capacity to 'step outside' of the cognitive operations that fuel such egoic functioning. As noted already, mindfulness is not a form of escape that results in passivity or disconnection from life; rather, it is thought to bring one into closer contact with life by helping to circumvent the self-generated accounts *about* life that act to pull one away from it. The observant stance of mindfulness allows an element of skepticism toward ego-based perspectives and interpretations. Further, when no longer ego-involved, a more fundamental "I" that is grounded in awareness has room to emerge and guide experience and behavior (Deikman, 1996).

Summary and Further Considerations

This brief review illustrates a growing convergence of findings across multiple methodologies, all of which point to the provisional conclusion that mindfulness and its cultivation support healthy, adaptive human functioning. The field of mindfulness studies is still in its early stages, and concomitant with its youth, the literature suffers from a number of methodological limitations. Instruments designed to assess mindfulness are a recent addition to the literature, and to date, few studies have tested whether these measures show temporal predictions of relevant outcomes. Induction studies are still few and their effect sizes have been relatively small. Finally, the strength of the current RCT evidence for mindfulness interventions is constrained by small samples, differential attrition rates across conditions, and limited follow-up assessments in some studies, and by the relative scarcity of active control conditions (see Baer, 2003; Bishop, 2002). The development of this field of study will benefit from greater methodological rigor in future research. Aside from design issues, there are important questions about the mindfulness phenomenon, its practical application, and the processes through which it is developed. We highlight several of those issues here with an eye toward encouraging further theoretical and empirical inquiry.

The Mindfulness Construct

Advancing any field of scientific inquiry depends on the development of means to validly and reliably measure the construct under study. There are several issues pertinent to the measurement of mindfulness, which to-date has been conducted through self-report measures. First, as already noted earlier in this article, the current mindfulness scales show considerable variation in content and structure according to theoretical conceptualization; such diversity is not inherently problematic, but it does suggest a lack of agreement on the meaning of the mindfulness construct. Second, all of the extant

measures are quite new, and most, if not all, suffer from a paucity of construct and predictive validation. Finally, the utility of these measures, as with all self-report methods, relies on the assumption that mindfulness can be assessed via declarative knowledge, meaning that individuals can directly report on those experiential qualities that constitute mindfulness (c.f. Matthews, Roberts, & Zeidner, 2004). But as is now well-known, dissociations can exist between experiential (veridical) consciousness and meta-consciousness; that is, we can only know what people are meta-conscious of (what they believe they experience) not the actual contents of their subjective experience (e.g., Schooler & Schreiber 2004; Wilson, 2002). The validity of self-report measures of mindfulness would be enhanced if they were shown to converge with other probable—and preferably objective—indicators of subjective experience (Schooler, 2004). There is evidence that one self-report measure of mindfulness (MAAS) predicts neural activation in brain regions that are theoretically relevant to our understanding of mindfulness and its effects (Creswell et al., 2006; Creswell, Way et al., 2006); behavioral assessments, including lab-based attentional tasks or observation of behavior in vivo could also be used to facilitate the validation of self-report measures of mindfulness.

Such research could also contribute to our understanding of mindful states and traits. Research to-date supports the claim that mindfulness is a unique construct, but little is known about its convergence with other phenomena that appear to have conceptual overlap. For example, how is mindfulness related to primary attentional processes, including stability (concentration), flexibility, task switching, and executive, top-down control processes, and to awareness?

Recent reviews suggest that mindfulness may be linked to the three primary attention networks: alerting attention, orienting attention, and executive attention (Raz & Buhle, 2006). Alerting attention concerns a steady, uninterrupted attention to one's experience, while orienting attention involves effective scanning and situationally appropriate selection of information in the perceptual field. Executive attention concerns a conscious examination of one's reactions and responses to environmental events. The alerting attention network functions to maintain response readiness and alertness, primarily through the steady monitoring and maintenance of sustained attention (Raz & Buhle, 2006; Robertson & Garavan, 2004). Advances in cognitive neuroscience have identified a functional neural network guiding alerting attention, with the right dorsolateral prefrontal cortex and right parietal cortex guiding the monitoring and maintenance of sustained attention, respectively (Robertson & Garavan, 2004). Orienting attention is the most studied attention network, and orienting tasks assess speed of orientation to a cued location (Raz & Buhle, 2006). Mindfulness appears conceptually related to both alerting and orienting attention, and recent evidence suggests that both alerting and orienting attention may be enhanced by mindfulness training. For example, a recent study showed greater cortical thickening in areas of the right prefrontal cortex and right anterior insula in experienced mindfulness meditation practitioners, areas that were interpreted as associated with sustained attention and awareness, particularly of interoceptive (internal bodily) states (Lazar et al., 2005). Similarly, Jha, Krompinger, and Baime (2006) found, relative to controls, enhanced alerting attention effects in participants who had completed a month-long mindfulness meditation retreat, and also found enhanced orienting attention in participants who had completed the MBSR intervention.

Mindfulness may also be associated with enhancements in executive attention in situations requiring self-regulation. Executive attention has been referred to as supervisory or selective attention. It has the function of monitoring and resolving conflicts among competing behavioral responses and has been associated with effortful control, planning and decision making, error monitoring, cognitive and emotion regulation, and the ability to overcome habitual actions (de-automatization) (Fernandez-Duque, Baird, & Posner, 2000; Raz & Buhle, 2006; Zylowska, Ackerman, Yang, Futrell, Horton, Hale, Pataki, & Smalley et al., 2006). This attentional capacity to monitor is consistent with accounts of mindfulness as a metacognitive skill (Bishop et al., 2004) and with our discussion of mindfulness as offering an empirical stance on reality. The evidence described in this review supports links between mindfulness and enhanced executive attention, including more effective behavioral regulation and self-control in healthy and clinical populations. Evidence that mindfulness engages executive attentional neural networks also comes from research demonstrating enhanced prefrontal cortical inhibition of amygdala responses during affect labeling (Creswell et al., 2006), and from a recent study with adolescents and adults diagnosed with Attention Deficit Hyperactivity Disorder, in which a modified MBSR intervention improved executive attention using several standard laboratory tasks (Zylowska et al., 2006). Improvements in executive attentional control may help to explain the salutary effects observed in mindfulness interventions targeting self-regulatory deficits, including DBT for impulse control in borderline personality patients (Lieb, Zanarini, Schmahl, Linehan, & Bohus, 2004) and ACT for drug addiction (Hayes et al., 2004). Clearly, more research is needed to place mindfulness in a nomological network of other, related attentional phenomena. Such work would deepen our understanding of this quality of consciousness and permit theoretically richer, more informed tests of its effects on other aspects of human functioning.

Processes of Development

As already noted, mindfulness is considered an inherent capacity of the human organism that can be enhanced through training, but little is known about the genetic or developmental antecedents of individual differences in this characteristic. Recent research has identified specific genetic variants underlying individual differences in attentional capacities (Parasuraman & Greenwood, 2004) and preliminary evidence has shown that dispositional mindfulness is associated with genetic variation in the monoaminergic system, particularly in the regulatory region of the monoamine oxidase A (MAOA) gene (Way, Creswell, Eisenberger, & Lieberman, 2006). Individual genetic differences at this site may help explain the role of mindfulness in enhanced attention and self-regulation, as this same genetic polymorphism has been linked to disorders of attention (Brookes et al., 2006; Manor, Tyano, Mel, Eisenberg, Bachner-Melman, Kotler, & Ebstein et al., 2002), and also to aggression (Caspi et al., 2002; Eisenberger et al., 2006).

It is likely, however, that the developmental trajectory of the mindful disposition is significantly influenced by the forces of socialization and culture and is thus, at least in part, an outcome of experience-dependent development (Greenough & Black, 1992). For example, it seems clear that the capacity for receptive awareness that mindfulness entails can be disrupted by various developmental insults, especially those that engender chronic feelings of threat and/or fear-based vigilance (e.g., physical and sexual abuse) (Fonagy & Target, 1997; Ryan, 2005). In addition, excessive external control may, as Bronson (2000) notes, "reduce a child's capacity for self-regulation by arousing emotional responses that limit higher level thinking and flexible executive functioning" (p. 149). Similarly, social conditions that foster ego-involvement and contingent self-worth may preclude mindful functioning (Ryan & Deci, 2004). These issues await further research, as does the question of how cognitive, emotional, motivational, and other developmental unfoldings bear influence on the growing child's mindful capacities.

Relatedly, it is important to note that while much of the existing research has been focused on the directional pathway from mindfulness to other aspects of human functioning, it is highly plausible that cognitive, emotional, somatic, and behavioral factors can foster or inhibit mindful states, given what is known about the effects of stress, fatigue, lifestyle choices, and other factors on the quality of conscious states of mind.

Aside from questions concerning the natural unfolding of mindful capacities, there are also unknowns about the ways in which interventions designed to enhance mindfulness actually work.[5] Each of the major, manualized forms of intervention have multiple components. Along with mindfulness-based practices, they typically include social support as well as techniques specific to each intervention. It is unclear whether the enhancement of mindfulness itself carries some or all of the responsibility for the demonstrated intervention effects, or whether the specific intervention practices designed to enhance mindfulness actually do so. Investigation of this question will depend on the careful application of mindfulness, mindfulness practice, and related (e.g., attentional) assessments. To date, research examining the relation between amount of mindfulness practice (as well as session attendance) and degree of change in affective, behavioral, and neurophysiological outcomes has been mixed, with some reporting positive findings (e.g., Carson et al., 2004; Shapiro, Bootzin, Figueredo, Lopez, & Schwartz, 2003) and others reporting null findings (e.g., Carlson et al., 2004; Davidson et al., 2003). However, recent research has shown that significant changes in dispositional mindfulness can occur over the course of, and following participation in, the MBSR program (Cohen-Katz, Wiley, Capuano, Baker, Kimmel & Shapiro, 2005; Shapiro, Brown, & Biegel, 2006), and that such changes are related to positive mental health outcomes (Shapiro et al., 2006). Much more research is needed to understand these and other process-related questions about mindfulness interventions (see also the "Why is Mindfulness Beneficial?" section above).

Practical Application

Despite these open questions, the research published to date suggests that mindfulness and its enhancement has salutary psychological, somatic, behavioral, and interpersonal effects. Along with potential avenues of future research pointed out already, additional research is needed to better understand the scope of application of mindfulness and mindfulness interventions, included in which should be investigation of limiting conditions. For example, can mindfulness and the means used to foster it be harmful as well as helpful? Addressing whether it is possible to come to know oneself, others, and the world too well rests on assumptions regarding the risk potential in developing insight into reality. Is a deeper grasp of the facts inherently dangerous or ultimately liberating? While we, in line with others (e.g., Rogers, 1961), argue the latter, we recognize that there may be circumstances in which too much reality contact may be detrimental to well-being. For example, attention to physical or emotional pain may initially worsen the subjective

[5] Some have speculated that mindfulness may also be enhanced through one or more established forms of psychotherapy (Bishop et al., 2004; Brown & Ryan, 2004b), but this remains an empirical question.

experience of it (e.g., Cioffi, 1993). In the immediate aftermath of a serious illness diagnosis or (other) traumatic experience, some short-term psychological defense may have adaptive value over the longer term (e.g., Lazarus, 1983). Even in such circumstances however, a mindfully chosen turning away from what appear to be overwhelming facts may foster more peace of mind and greater success in later opening up to, and thereby integrating those facts than a defensive flight that is driven by fear and despair.

Short-term defense may be adaptive in trauma contexts, but mindfulness may facilitate adjustment following some traumatic experiences. A growing literature shows that active processing of highly challenging life circumstances can facilitate *post-traumatic growth* (Tedeschi & Calhoun, 2004). Descriptions of post-traumatic growth include reports of enhanced awareness of moment-to-moment experiences (Creswell et al., 2007), suggesting that coping with traumatic events may increase mindfulness in some individuals. Mindfulness may also predispose individuals to experience growth after traumatic events, for two reasons. First, traumatic experiences are often accompanied by thought suppression and other forms of experiential avoidance (e.g., Palm & Follette, 2000; Pennebaker & O'Heeran, 1984) as well as intrusive, ruminative thoughts (Tedeschi & Calhoun, 2004). Used to regulate cognitive and affective experience, both experiential avoidance and negative, recurrent thinking can be problematic (e.g., Nolen-Hoeksema et al., 1993; Teasdale, 1999; Wegner & Zanakos, 1994; however see Martin & Tesser, 1996 for a discussion of adaptive rumination). However, evidence reviewed here suggests that mindfulness is associated with less ruminative thought and experiential avoidance. Second, because post-traumatic growth is often dependent on a reconstruction of schemas about self and the world, this process may be inhibited by avoidance and by attachments to schemas that are no longer adaptive. Yet, as outlined already, scholars suggest that mindfulness facilitates a loosening of attachments to notions of self, others, and the world, so that life events can be approached with greater equanimity. Research has yet to test the influence of mindfulness on post-traumatic growth; however, mindful awareness to what is happening in even difficult emotional circumstances may enhance efforts to reflectively process the accompanying challenges to individuals' previous understandings of themselves and the world, permit an easier disengagement from previous goals that are no longer adaptive, and facilitate the process of developing new life goals and meaning based on present life realities. Evidence suggests that incorporating mindfulness skills into the treatment of trauma is beneficial (Becker & Zayfert, 2001) but this area of inquiry is still very new (see Follette, Palm, & Pearson, 2006 for review).

Another challenge to understanding the practical application of mindfulness concerns the adaptive value in having accurate perceptions of reality more generally. While many perspectives argue that such contact is fundamental to psychological adjustment (e.g., Jahoda, 1958), these views have been challenged by research examining the salutary benefits of positive illusions (Taylor & Brown, 1988). These mild positive distortions of reality are reflected in self-enhancement, unrealistically optimistic self-views, and exaggerated perceptions of control (Taylor & Brown, 1994; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). Research has shown that positive illusions are associated with lower rates of psychopathology (Mezulis, Abramson, Hyde, & Hankin, 2004), enhanced physical health (e.g., Reed, Kemeny, Taylor, & Visscher, 1999; Taylor, Lerner, Sherman, Sage, & McDowell, 2003a, 2003b), improved motivation and task persistence (Taylor & Brown, 1988), and romantic relationship satisfaction (e.g., Murray, Holmes, & Griffin, 2000). Both mindfulness and positive illusions predict similar salutary outcomes, but maintaining self-serving, distorted views of reality would seem to run contrary to a mindful mode of functioning. Why do such ostensibly contrary processes predict similar outcomes?

It is possible that mindfulness and positive illusions serve complimentary mental health goals. For example, research indicates that dispositional mindfulness is positively associated with self-esteem and optimism (Brown & Ryan, 2003; cf., Kabat-Zinn, Lipworth, & Burney, 1985), and both traits have been associated with self-enhancement processes (Taylor et al., 2003). Mindfulness and positive illusions may also produce comparable states of receptive attention to present events. As in the mindfulness research reviewed here, self-enhancement manipulations have been shown to make individuals more open and objective in evaluating threatening information (Correll, Spencer, & Zanna, 2004; Sherman & Cohen, 2002). In considering these common underlying features of mindfulness and self-enhancement, it may be that the two processes are mutually reinforcing. This explanation is supported by research describing how chronic disease patients are (mindfully) aware of their worsening condition while also maintaining an overly optimistic picture of their present and future circumstances (Taylor & Brown, 1994).

It is also possible that positive illusions are not really adaptive at all, when measured properly, and in fact deleteriously affect health and other outcomes. Some theorists have argued that positive illusions represent a form of defensive neuroticism (e.g., Colvin & Block, 1994), and studies have shown that some measures of self-enhancement are associated with lower independent judge ratings of social functioning, and with poorer psychological adjustment (Colvin, Block,

& Funder, 1995). More recent studies, however, have not supported this position (Taylor et al., 2003b).

It is certainly reasonable that positive views of oneself and one's capabilities will enhance mood, motivation, and lead one to engage others and the environment in an adaptive, productive way, at least in the short-term, but there may be longer-term costs associated with inaccurate perceptions of self and reality that have yet to be explored empirically (Leary, 2004). Indeed, little is known about the longer-term consequences of either positive illusions or mindfulness, and investigations are needed to examine these processes and their outcomes side-by-side.

Conclusion

Perhaps the greatest challenge for those tilling the field of mindfulness research will be to develop empirically grounded, theoretical models examining the directional links between those conditions that support the unfolding and expression of mindfulness (e.g., attitudes like acceptance), mindfulness itself, processes explaining its effects (e.g., insight), and relevant outcomes of mindful states, traits, and interventions. Several of these pieces have yet to be examined, but the existing evidence suggests that developing a sophisticated understanding of mindfulness is a worthy endeavor. This venture pursues a line of inquiry that is as old as psychology itself but carries no less mystery for its age: the study of consciousness. The investigation of mindfulness can help to widen our window into the nature of consciousness, its fundamental role in human functioning, and how it can be refined to optimize that functioning.

Note

Preparation of this article was supported in part by NIH grant R01 AG025474-02 to the first author, NIH/NCI grant R01-CA 106668 to the second author, and a NIMH National Research Service Award to the third author. We thank Guy Armstrong, Jeremy Gray, Hector Myers and his research group, Shinzen Young, and Lidia Zylowska for helpful comments and suggestions on previous drafts of this article.

Address correspondence to Kirk Warren Brown, Department of Psychology,Virginia Commonwealth University, 806 West Franklin St, Richmond, VA 23284-2018. E-mail: kwbrown@vcu.edu

References

Alexander, C. N., Langer, E. J., & Newman, R. I. (1989). Transcendental Meditation, mindfulness, and longevity: An experimental study with the elderly. *Journal of Personality and Social Psychology, 57*, 950–964.

Allen, N. B., & Knight, W. (2005). Mindfulness, compassion for self, and compassion for others. In P. Gilbert (Ed.), *Compassion: Conceptualizations, research and use in psychotherapy* (pp. 239–262). New York: Routledge.

Arch, J. J., & Craske, M. G. (2006). Mechanisms of mindfulness: Emotion regulation following a focused breathing induction. *Behavior Research and Therapy, 44*, 1849–1858.

Astin, J. A. (1997). Stress reduction through mindfulness meditation. Effects on psychological symptomatology, sense of control, and spiritual experiences. *Psychotherapy and Psychosomatics, 66*, 97–106.

Bach, P., & Hayes, S. C. (2002). The use of Acceptance and Commitment Therapy to prevent the rehospitalization of psychotic patients: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 70*, 1129–1139.

Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice, 10*, 125–143.

Baer, R. A., Smith, G. T. & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment, 11*, 191–206.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*, 27–45.

Bargh, J. A., & Chartrand, T. L. (1999). The unbearable automaticity of being. *American Psychologist, 54*, 462–479.

Barnes, S., Brown, K. W., Krusemark, E., Campbell, W. K., & Rogge, R. D. (in press). The role of mindfulness in romantic relationship satisfaction and responses to relationship stress. *Journal of Marital and Family Therapy*.

Barnes, V. A., Davis, H. C., Murzynowski, J. B., & Treiber, F. A. (2004). Impact of meditation on resting and ambulatory blood pressure and heart rate in youth. *Psychosomatic Medicine, 66*, 909–914.

Baumann, N., & Kuhl, J. (2005). How to resist temptation: The effects of external control versus autonomy support on self-regulatory dynamics. *Journal of Personality, 73*, 443–470.

Baumeister, R. F. (1991). *Escaping the self: Alcoholism, spirituality, masochism, and other flights from the burden of selfhood*. New York: Basic Books.

Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*. San Diego, CA: Academic Press.

Baumeister, R. E., & Sommer, K. L. (1997). Consciousness, free choice, and automaticity. In Wyer, R. S. (Ed.), *Advances in social cognition* (Vol. 10, pp. 75–82). Mahwah, NJ: Lawrence Erlbaum.

Becker, C. B., & Zayfert, C. (2001). Integrating DBT-based techniques and concepts to facilitate exposure treatment for PTSD. *Cognitive and Behavioral Practice, 8*, 107–122.

Beitel, M., Ferrer, E., & Cecero, J. J. (2005). Psychological mindedness and awareness of self and others. *Journal of Clinical Psychology, 61*, 739–750.

Bishop, S. R. (2002). What do we really know about mindfulness-based stress reduction? *Psychosomatic Medicine, 64*, 71–83.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., et al. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology:Science & Practice, 11*, 230–241.

Blennerhassett, R. C., & O'Raghallaigh, J. W. (2005). Dialectical behaviour therapy in the treatment of borderline personality disorder. *British Journal of Psychiatry, 186*, 278–280.

Bodhi, B. (2000). *A comprehensive manual of Abhidhamma*. Seattle, WA: BPS Pariyatti Editions.

Bohus, M., Haaf, B., Simms, T., Limberger, M. F., Schmahl, C., Unckel, C., et al. (2004). Effectiveness of inpatient dialectical behavioral therapy for borderline personality disorder: a controlled trial. *Behaviour Research and Therapy, 42*, 487–499.

Bohus, M., Haaf, B., Stiglmayr, C., Pohl, U., Bohme, R., & Linehan, M. (2000). Evaluation of inpatient dialectical-behavioral

therapy for borderline personality disorder—a prospective study. *Behaviour Research and Therapy, 38*, 875–887.

Bond, F. W., & Bunce, D. (2000). Mediators of change in emotion-focused and problem-focused worksite stress management interventions. *Journal of Occupational Health Psychology, 5*, 156–163.

Boorstein, S. (1996). *Transpersonal psychotherapy*. Albany, NY: State University of New York Press.

Borkovec, T. D. (2002). Life in the future versus life in the present. *Clinical Psychology: Science and Practice, 9*, 76–80.

Broderick, P. C. (2005). Mindfulness and coping with dysphoric mood: Contrasts with rumination and distraction. *Cognitive Therapy and Research, 29*, 501–510.

Brookes, K., et al. (2006). The analysis of 51 genes in DSM-IV combined type attention deficit hyperactivity disorder: association signals in DRD4, DAT1 and 16 other genes. *Molecular Psychiatry, 11*, 934–53.

Bronson, M. B. (2000). *Self-regulation in early childhood: Nature and nurture*. New York: Guilford.

Brown, K. W. (2006). *Mindfulness and attentional control*. Unpublished data, University of Rochester.

Brown, K. W., & Kasser, T. (2005). Are psychological and ecological wellbeing compatible? The role of values, mindfulness, and lifestyle. *Social Indicators Research, 74*, 349–368.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822–848.

Brown, K. W., & Ryan, R. M. (2004a). Fostering healthy self-regulation from within and without: A Self-Determination Theory perspective. In P. A. Linley & S. Joseph (Eds.), *Positive psychology in practice* (pp. 105–124). New York: Wiley.

Brown, K. W., & Ryan, R. M. (2004b). Perils and promise in defining and measuring mindfulness: Observations from experience. *Clinical Psychology: Science and Practice, 11*, 242–248.

Brown, K. W., Ryan, R. M., Creswell, J. D., & Niemiec, C. (in press). Beyond Me: Mindful responses to social threat. In In H.A. Wayment & J.J. Bauer (Eds.), *The quiet ego: Research and theory on the benefits of transcending egoistic self-interest*. Washington, DC: American Psychological Association.

Brown, K. W., & Vansteenkiste, M. (2006). Future and present time perspectives, goal-attainment, and well-being: Antithetical or complementary? Manuscript in preparation.

Buchheld, N., Grossman, P., & Walach, H. (2001). Measuring mindfulness in insight meditation (Vipassana) and meditation-based psychotherapy: The development of the Freiburg Mindfulness Inventory (FMI). *Journal of Meditation and Meditation Research, 1*, 11–34.

Burnkrant, R. R., & Page, T. (1984). A modification of the Fenigstein, Scheier, and Buss Self-Consciousness Scale. *Journal of Personality Assessment, 48*, 629–637.

Burns, J. W. (2006). The role of attentional strategies in moderating links between acute pain induction and subsequent psychological stress: Evidence for symptom-specific reactivity among patients with chronic pain versus healthy nonpatients. *Emotion, 6*, 180–192.

Buss, A. H.. (1980). *Self-consciousness and social anxiety.* San Francisco, CA: Freeman.

Campbell-Sills, L., Barlow, D. H., Brown, T. A., & Hofmann, S. G. (2006). Effects of suppression and acceptance on emotional responses of individuals with anxiety and mood disorders. *Behaviour Research and Therapy, 44*, 1251–1263.

Carlson, L. E., & Brown, K. W. (2005). Validation of the Mindful Attention Awareness Scale in a cancer population. *Journal of Psychosomatic Research, 58*, 29–33.

Carlson**,** L. E., Speca, M., & Patel, K. D. (2003). Mindfulness-based stress reduction in relation to quality of life, mood, symptoms of stress, and immune parameters in breast and prostate cancer outpatients. *Psychosomatic Medicine, 65*, 571–581.

Carlson**,** L. E., Speca, M., & Patel, K. D. (2004). Mindfulness-based stress reduction in relation to quality of life, mood, symptoms of stress and levels of cortisol, dehydroepiandrosterone sulfate (DHEAS) and melatonin in breast and prostate cancer outpatients. *Psychoneuroendocrinology, 29*, 448–474.

Carson, J. W., Carson, K. M., Gil, K. M., & Baucom, D. H. (2004). Mindfulness-based relationship enhancement. *Behavior Therapy, 35*, 471–494.

Carson, J. W., Carson, K. M., Gil, K. M., & Baucom, D.H. (in press). Self-expansion as a mediator of relationship improvements in a mindfulness intervention. *Journal of Marital and Family Therapy.*

Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: A control-theory approach to human behavior.* New York: Springer-Verlag.

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior.* New York: Cambridge University Press.

Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., et al. (2002): Role of genotype in the cycle of violence in maltreated children. *Science, 297*, 851–854.

Cioffi, D. (1991). Beyond attentional strategies: A cognitive-perceptual model of somatic interpretation. *Psychological Bulletin, 109*, 25–41.

Cioffi, D. (1993). Sensate body, directive mind: Physical sensations and mental control. In D. M. Wegner & J. W. Pennebaker (Eds.), *Handbook of mental control* (pp. 410–442). Upper Saddle River, NJ: Prentice-Hall.

Cioffi, D., & Holloway, J. (1993). Delayed costs of suppressed pain. *Journal of Personality and Social Psychology, 64*, 274–282.

Cohen-Katz, J., Wiley, S. D., Capuano, T., Baker, D. M., Kimmel, S., & Shapiro, S. (2005). The effects of mindfulness-based stress reduction on nurse stress and burnout, Part II: A quantitative and qualitative study. *Holistic Nursing Practice, 19*, 26–35.

Colvin, C. R., & Block, J. (1994). Do positive illusions foster mental health? An examination of the Taylor and Brown formulation. *Psychological Bulletin, 116*, 3–20.

Colvin, C. R., Block, J., & Funder, D. C. (1995). Overly positive self-evaluations and personality: negative implications for mental health. *Journal of Personality and Social Psychology, 68*, 1152–1162.

Correll, J., Spencer, S. J., & Zanna, M. P. (2004). An affirmed self and an open mind: self-affirmation and sensitivity to argument strength. *Journal of Experimental Social Psychology, 40*, 350–356.

Cramer, K. M. (2000). Comparing the relative fit of various factor models of the self-consciousness scale in two independent samples. *Journal of Personality Assessment, 75*, 295–307.

Creed. A. T., & Funder, D. C. (1998). The two faces of private self-consciousness: Self-report, peer-report, and behavioral correlates. *European Journal of Personality, 12*, 411–431.

Creswell, J. D., Eisenberger, N. I., & Lieberman, M. D. (2006). Neurobehavioral correlates of mindfulness during social exclusion. Manuscript in preparation.

Creswell, J. D., Lam, S., Stanton, A. S., Taylor, S. E., Bower, J. E., & Sherman, D. K. (2007). Does self-affirmation, cognitive processing, or discovery of meaning explain the cancer-related health benefits of expressive writing? *Personality and Social Psychology Bulletin, 33*, 238–250.

Creswell, J. D., Way, B. M., Eisenberger, N. I., & Lieberman, M. D. (2007). Neural correlates of dispositional mindfulness during affect labeling. *Psychosomatic Medicine, 69*, 560–565.

Crocker, J., & Park, L. E. (2004). The costly pursuit of self-esteem. *Psychological Bulletin, 130*, 392–414.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper/Collins.

Csikszentmihalyi, M. (1997). *Finding Flow: The psychology of engagement with everyday life*. New York: Basic Books.

Cullen, M. (2006). Mindfulness: The heart of Buddhist meditation? *Inquiring Mind, 22*, 4–7, 28–29.

Dahl, J., & Lundgren, T. (2006). Acceptance and Commitment Therapy (ACT) in the treatment of chronic pain. In R. A. Baer (Ed.), *Mindfulness-based treatment approaches: Clinician's guide to evidence base and applications* (pp. 285–306). San Diego, CA: Elsevier.

Dahl, J., Wilson, K. G., & Nilsson, A. (2004). Acceptance and Commitment Therapy and the treatment of persons at risk for long-term disability resulting from stress and pain symptoms: A preliminary randomized trial. *Behavior Therapy, 35*, 785–801.

Das, S. (1997). *Awakening the Buddha within*. New York: Broadway.

Davidson, R. J., & Harrington, A. (2002). *Visions of compassion: Western scientists and Tibetan Buddhists examine human nature.* New York: Oxford University Press.

Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. F., et al. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine, 65*, 564–570.

Davis, M. H., & Franzoi, S. L. (1999). Self-awareness and self-consciousness. In V. J. Derlega, Winstead, B. A. & Jones, W. H. (Eds.), *Personality: Contemporary theory and research,* 2nd ed. Chicago, IL: Nelson-Hall.

Deci, E. L., & Ryan, R. M. (1980). Self-determination theory: When mind mediates behavior. *The Journal of Mind and Behavior, 1*, 33–43.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York: Plenum.

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska Symposium on Motivation*, (Vol. 38, pp. 237–288). Lincoln, NE: University of Nebraska Press.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227–268.

Deikman, A. J. (1996). 'I' = awareness. *Journal of Consciousness Studies, 3*, 350–356.

Derryberry, D. & Tucker, D. M. (2006). Motivation, self-regulation, and self-organization. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology, Vol 2* (pp. 502–532). Hoboken, NJ: Wiley.

Diener, E., Suh, E. M. & Lucas, R. E. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin, 125*, 276–302.

Dimidjian, S., & Linehan, M. M. (2003). Defining an agenda for future research on the clinical application of mindfulness practice. *Clinical Psychology: Science and Practice, 10*, 166– 171.

Dunn, B. R., Hartigan, J. A., & Mikulas, W. L. (1999). Concentration and mindfulness meditations: Unique forms of consciousness? *Applied Psychology and Biofeedback, 24*, 147–165.

Duval, S., & Wicklund, R. A. (1972). *A theory of objective self-consciousness*. New York: Academic.

Eifert, G. H., & Heffner, M. (2003). The effects of acceptance versus control contexts on avoidance of panic-related symptoms, *Journal of Behavioral Therapy and Experimental Psychiatry, 34*, 293–312.

Eisenberger, N. E., Way, B. M., Taylor, S. E., Welch, W. T., & Lieberman, M. D. (2007). Understanding genetic risk for depression: Clues from the brain's response to social exclusion. *Biological Psychiatry, 61*, 1100–1108.

Eisenberger, N. I., Lieberman, M. D., & Williams, K. D. (2003). Does rejection hurt? An FMRI study of social exclusion. *Science, 302*, 290–292.

Ekman, P., Davidson, R. J., Ricard, M., & Wallace, B. A. (2005). Buddhist and psychological perspectives on emotions and well-being. *Current Directions in Psychological Science, 14*, 59–63.

Ellis, A. (1991). Thee revised ABC's of RET. *Journal of Rational-Emotive and Cognitive Therapy, 9*, 139–172.

Engler, J. (1986). Therapeutic aims in psychotherapy and meditation. In K. Wilber, J. Engler, & D.P. Brown (Eds.), *Transformations of consciousness: Conventional and contemplative perspectives on development* (pp. 17–51). Boston: MA: Shambhala.

Felder, M. T., Zvolensky, M. J., Eifert, G. H., & Spira, A. P. (2003). Emotional avoidance: An experimental test of individual differences and response suppression using biological challenge. *Behaviour Research and Therapy, 41*, 403–411.

Feldman Barrett, L., Gross, J., Chistensen, T. C., & Benvenuto, M. (2001). Knowing what you're feeling and knowing what to do about it: Mapping the relation between emotion differentiation and emotion regulation. *Cognition & Emotion, 15*, 713–724.

Fernandez-Duque, D., Baird, J. A., & Posner, M. I. (2000). Executive attention and metacognitive regulation. *Consciousness and Cognition, 9*, 288–307.

Follette, V., Palm, K. M., & Pearson, A. N. (2006). Mindfulness and trauma: Implications for treatment. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 24*, 45–61.

Fonagy, P., & Target, M. (1997) Attachment and reflective function: Their role in self-organization. *Development and Psychopathology, 9*, 679–700.

French, T. M. (1952) *The integration of behavior: Volume 1, basic postulates*. Chicago: University of Chicago Press.

Freud, S. (1912). *Recommendations to physicians practicing psychoanalysis*. Standard Edition XII: 218–226. London: Hogarth Press.

Gifford, E. V., Kohlenberg, B. S., Hayes, S. C., Antonuccio, D. O., Piasecki, M., Rasmussen-Hall, M. L., et al. (2004). Acceptance-based treatment for smoking cessation. *Behavior Therapy, 35*, 689–705.

Goldstein, J. (2002). *One Dharma: The emerging western Buddhism*. New York, NY: Harper San Francisco.

Goleman, D. (2006). *Social intelligence: The new science of human relationships*. NY: Bantam.

Gratz, K. L., & Gunderson, J. G. (2006). Preliminary data on an acceptance-based emotion regulation group intervention for deliberate self-harm among women with borderline personality disorder. *Behavior Therapy, 37*, 25–35.

Greenough, W., & Black, J. (1992). Induction of brain structure by experience: Substrates for cognitive development. In M. Gunnar & C.A. Nelson (Eds.), *Developmental behavioral neuroscience: The Minnesota symposium on child psychology* (Vol. 24, pp. 155–200). Hillsdale, NJ: Erlbaum.

Gross, J. J., & Munoz, R. F. (1995). Emotion regulation and mental health. *Clinical Psychology: Science and Practice, 2*, 151–164.

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research, 57*, 35–43.

Gunaratana, H. (2002). *Mindfulness in plain English*. Boston, MA: Wisdom Publications.

Hayes, S. C. (1994). Content, context, and the types of psychological acceptance. In S. C. Hayes, N. S. Jacobson, V. M. Follette, & M. J. Dougher (Eds.),*Acceptance and change: Content and context in psychotherapy* (pp. 13–32). Reno, NV: Context Press.

Hayes, S. C. (2004). Acceptance and commitment therapy and the new behavior therapies: Mindfulness, acceptance, and relationship. In S.C. Hayes, V.M. Follette & M.M. Linehan (Eds.), Mindfulness and acceptance: Expanding the cognitive-behavioral tradition (pp. 1–29). New York: Guilford.

Hayes, S. C., Bissett, R., Roget, N., Padilla, M., Kohlenberg, B. S., Fisher, G., et al. (2004). The impact of Acceptance and Commitment training and multicultural training on the stigmatizing attitudes and professional burnout of substance abuse counselors. *Behavior Therapy, 35*, 821–835.

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes, and outcomes. *Behaviour Research and Therapy, 44*, 1–25.

Hayes, S. C., Masuda, A., Bissett, R., Luoma, J., & Guerrero, L. F. (2004). DBT, FAP, and ACT: how empirically oriented are the new behavior therapy technologies? *Behavior Therapy, 35*, 35–54.

Hayes, S. C., Strosahl, K., & Wilson, K. G. (1999). *Acceptance and commitment therapy: an experiential approach to behavior change.* New York, NY: Guilford Press.

Hayes, S. C., & Wilson, K. G. (2003). Mindfulness: Method and process. *Clinical Psychology: Science and Practice, 10*, 161–165.

Hayes, S. C., Wilson, K. G., Gifford, E. V., Bissett, R., Piasecki, M., Batten, S. V., et al. (2004). A preliminary trial of twelve-step facilitation and Acceptance and Commitment Therapy with polysubstance-abusing methadone-maintained opiate addicts. *Behavior Therapy, 35*, 667–688.

Haythornthwaite, J. A., Lawrence, J. W. & Fauerbach, J. A. (2001). Brief cognitive interventions for burn pain. *Annals of Behavioral Medicine, 23*, 42–49.

Hodgins, H. S., & Knee, R. (2002). The integrating self and conscious experience. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of Self-determination research* (pp. 87–100). Rochester, NY: University of Rochester Press.

Jahoda, M. (1958). *Current concepts of positive mental health*. New York: Basic Books.

Jha, A. P., Krompinger, J., & Baime, M. J. (2007). Mindfulness training modifies subsystems of attention. *Cognitive, Affective, & Behavioral Neuroscience, 7*, 109–119.

Kabat-Zinn, J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: theoretical considerations and preliminary results. *General Hospital Psychiatry, 4*, 33–47.

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain and illness*. New York: Delacourt.

Kabat-Zinn, J. (1993). Mindfulness meditation: Health benefits of an ancient Buddhist practice. In Goleman, D. & Garin, J. (Eds.), *Mind/Body Medicine.* Yonkers, NY: Consumer Reports.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice, 10*, 144–156.

Kabat-Zinn, J. (2005). *Coming to our senses*. New York: Hyperion.

Kabat-Zinn, J., Lipworth, L., & Burney, R. (1985). The clinical use of mindfulness meditation for the self-regulation of chronic pain. *Journal of Behavioral Medicine, 8*, 163–190.

Kabat-Zinn, J., Wheeler, E., Light, T., Skillings, A., Scharf, M. J., Cropley, T. G., et al. (1998). Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (UVB) and photochemotherapy (PUVA). *Psychosomatic Medicine, 60*, 625–632.

Kernis, M. H., & Goldman, B. M. (2006). A multicomponent conceptualization of authenticity: Theory and research. *Advances in Experimental Social Psychology, 38*, 283–357.

Koons, C. R., Robins, C. J., Tweed, J. L., Lynch, T. R., Gonzalez, A. M., Morse, J. Q., et al. (2001). Efficacy of dialectical behavior therapy in women veterans with borderline personality disorder. *Behavior Therapy, 32*, 371–390.

Kornfield, J. (1993). *A path with heart*. New York: Bantam.

Kuhl, J., & Kazen, M. (1994). Self-discrimination and memory: State orientation and false self-ascription of assigned activities. *Journal of Personality and Social Psychology, 66*, 1103–1115.

Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin, 108*, 480–498.

Lakey, C. E., Campbell, W. K., Brown, K. W., & Goodie, A. S. (2007). Dispositional mindfulness as a predictor of the severity of gambling outcomes. *Personality and Individual Differences, 43*, 1698–1710.

Lambie, J. A., & Marcel, A. J. (2002). Consciousness and the varieties of emotion experience: A theoretical framework. *Psychological Review, 109*, 219–259.

Langer, E. (1989). *Mindfulness*. Reading, MA: Addison Wesley.

Langer, E. (2002). Well-being: Mindfulness versus positive evaluation. In Snyder, C.R. & Lopez, S.J. (Eds.), *Handbook of positive psychology* (pp. 214–230). New York: Oxford University Press.

Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., et al. (2006). The Toronto Mindfulness Scale: Development and validation. *Journal of Clinical Psychology, 62*, 1445–1467.

Lazar, S. W., Kerr, C., Wasserman, R., et al. (2005). Meditation experience is associated with increased cortical thickness. *Neuroreport, 16*, 1893–1897.

Lazarus, R. S. (1983). The costs and benefits of denial. In S. Bresnitz (Ed.), *Denial of stress* (pp. 1–30). New York: International Universities Press.

Leary, M. R. (2004). *The curse of the self: Self-awareness, egotism, and the quality of human life*. NY: Oxford University Press.

Leary, M. R. (2005). Nuggets of social psychological wisdom. *Psychological Inquiry, 16*, 176–179.

Leary, M. R., Adams, C. E., & Tate, E. B. (2006). Hypo-egoic self-regulation: Exercising self-control by diminishing the influence of the self. *Journal of Personality, 74*, 1803–1831.

Leigh, J., Bowen, S., & Marlatt, G. A. (2005). Spirituality, mindfulness and substance abuse.*Addictive Behaviors, 30*, 1335–1341.

Leventhal, H., Brown, D., Shacham, S., & Engquist, G. (1979). Effects of preparatory information about sensations, threat of pain, and attention on cold pressor distress. *Journal of Personality and Social Psychology, 37*, 688–714.

Levesque, C., & Brown, K. W. (2006). Overriding motivational automaticity: Mindfulness as a moderator of the influence of implicit motivation on daytoday behavior. Manuscript submitted for publication.

Levitt, J. T., Brown, T. A., Orsillo, S. M., & Barlow, D. H. (2004). The effects of acceptance Vs. suppression of emotion on subjective and psychophysiological response to carbon dioxide challenge in patients with panic disorder. *Behavior Therapy, 35*, 747–766.

Lieb, K., Zanarini, M. C., Schmahl, C., Linehan, M. M., & Bohus, M. (2004). Borderline personality disorder. *Lancet, 364*, 453–461.

Linehan, M. (1993a). *Cognitive-behavioral treatment of borderline personality disorder.* New York: Guilford.

Linehan, M. (1993b). *Skills training manual for treating borderline personality disorder.* New York: Guilford.

Linehan, M. M. (1994). Acceptance and change: The central dialectic in psychotherapy. In S. C. Hayes, N. S. Jacobson, V. M. Follette, & M. J. Dougher (Eds.), *Acceptance and change: Content and context in psychotherapy* (pp. 73–90). Reno, NV: Context Press.

Linehan, M. M., Armstrong, H. E., Suarez, A., Allman, D., & Heard, H. L. (1991). Cognitive-behavioral treatment of chronically parasuicidal borderline patients. *Archives of General Psychiatry, 48*, 1060–1064.

Linehan, M. M., Dimeff, L. A., Reynolds, S. K., Comtois, K. A., Welch, S. S., Heagerty, P., et al. (2002). Dialectical behavior therapy versus comprehensive validation therapy plus 12-step for the treatment of opioid dependent women meeting criteria for borderline personality disorder. *Drug and Alcohol Dependence, 67*, 13–26.

Linehan, M. M., Heard, H. L., & Armstrong, H. E. (1993). Naturalistic follow-up of a behavioral treatment for chronically parasuicidal borderline patients. *Archives of General Psychiatry, 50*, 971–974.

Linehan, M. M., Schmidt, H., Dimeff, L. A., Craft, J. C., Kanter, J., & Comtois, K. A. (1999). Dialectical behavior therapy for patients with borderline personality disorder and drug-dependence. *American Journal of Addiction, 8*, 279–292.

Logan, H. L., Baron, R. S., & Kohout, F. (1995). Sensory focus as therapeutic treatments for acute pain. *Psychosomatic Medicine, 57*, 475–484.

Lynch, T. R., Chapman, A. L., Rosenthal, M. Z., Kuo, J. R., & Linehan, M. M. (2006). Mechanisms of change in Dialectical Behavior Therapy: Theoretical and empirical observations. *Journal of Clinical Psychology, 62*, 459–480.

Lynch, T. R., Morse, J. Q., Mendelson, T., & Robins, C. J. (2003). Dialectical behavior therapy for depressed older adults: a randomized pilot study. *American Journal of Geriatric Psychiatry, 11*, 33–45.

Ma, S. H., & Teasdale, J. D. (2004). Mindfulness-based cognitive therapy for depression: replication and exploration of differential relapse prevention effects. *Journal of Consulting and Clinical Psychology, 72*, 31–40.

Manor, I., Tyano, S., Mel, E., Eisenberg, J., Bachner-Melman, R., Kotler, M., & Ebstein, R,P. (2002). Family-based and association studies of monoamine oxidase A and attention deficit hyperactivity disorder (ADHD): Preferential transmission of the long promoter-region repeat and its association with impaired performance on a continuous performance test (TOVA). *Molecular Psychiatry, 7*, 626–632.

Marcel, A. J. (2003). Introspective report: Trust, self-knowledge and science. *Journal of Consciousness Studies, 10*, 167–186.

Martin, J. R. (1997). Mindfulness: A proposed common factor. *Journal of Psychotherapy Integration, 7*, 291–312.

Martin, L. L., & Erber, R. (2005). Commentary: The wisdom of social psychology: Five commonalities and one concern. *Psychological Inquiry, 16*, 194–202.

Martin, L. L., & Tesser, A. (1996). Clarifying our thoughts. In R. S. Wyer (Ed.), *Ruminative thought: Advances in Social Cognition* (Vol. 9, pp. 189–209). Mahwah, NJ: Lawrence Erlbaum.

Matthews, G., Roberts, R. D., & Zeidner, M. (2004). Seven myths about emotional intelligence. *Psychological Inquiry, 15*, 179–196.

McCaul, K. D., & Malott, J. M. (1984). Distraction and coping with pain. *Psychological Bulletin, 95*, 516–533.

McEwen, B. S. (1998). Protective and damaging effects of stress mediators. *New England Journal of Medicine, 338*, 171–179.

McIntosh, W. D. (1997). East meets West: Parallels between Zen Buddhism and social psychology. *International Journal for the Psychology of Religion, 7*, 37–52.

Mead, G. H. (1934). *Mind, self, and society*. C. W. Morris (Ed.). Chicago, IL: University of Chicago Press.

Mezulis, A. H., Abramson, L. Y., Hyde, J. S., & Hankin, B. L. (2004). Is there a universal positivity bias in attributions? A meta-analytic review of individual, developmental, and cultural differences in the self-serving attributional bias. *Psychological Bulletin, 130*, 711–747.

Michenbaum, D. (1979). *Cognitive-behavior modification: An integrative approach*. New York: Plenum. Mishra, P. (2004). *An end to suffering*. New York: Farrar, Straus & Giroux.

Monti, D. A., Peterson, C., Shakin Kunkel, E. J., Hauck, W. W., Pequignot, E., Rhodes, L., et al. (2005). A randomized, controlled trial of Mindfulness-Based Art Therapy (MBAT) for women with cancer. *Psycho-Oncology, 14*, 1–11.

Mullen, B., & Suls, J. (1982). The effectiveness of attention and rejection as coping styles: A meta-analysis of temporal differences. *Journal of Psychosomatic Research, 26*, 43–49.

Murray, S. L., Holmes, J. G., & Griffin, D. W. (2000). Self-esteem and the quest for felt security: how perceived regard regulates attachment processes. *Journal of Personality and Social Psychology, 78*, 478–498.

Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*, 223–250.

Niemiec, C. P., Brown, K. W., & Ryan, R. M. (2006). Being present to death: Mindfulness modulates the effects of mortality salience on defensive interpersonal judgments. Manuscript submitted for publication.

Niemiec, C. P. Ryan, R. M., & Brown, K. W. (in press). The role of awareness and autonomy in quieting the ego: A Self-determination Theory perspective. In H. A. Wayment & J. J. Bauer (Eds.), *The quiet ego: Research and theory on the benefits of transcending egoistic self-interest*. Washington, DC: American Psychological Association.

Nix, G., Ryan, R. M., Manly, J. B., & Deci, E. L. (1999). Revitalization through self-regulation: The effects of autonomous Vs. controlled motivation on happiness and vitality. *Journal of Experimental Social Psychology, 35,* 266–284.

Nolen-Hoeksema, S., Morrow, J., & Frederickson, B. L. (1993). Response styles and the duration of episodes of depressed mood. *Journal of Abnormal Psychology, 102*, 20–28.

Nyaniponika (1973). *The heart of Buddhist meditation*. New York: Weiser Books.

Ochsner, K. N., Bunge, S. A., & Gross, J. J. (2002). Rethinking feelings: An *f* MRI study of the cognitive regulation of emotion. *Journal of Cognitive Neuroscience, 14*, 1215–1229.

Olendzki, A. (2005). The roots of mindfulness. In Germer, C. K., Siegel, R. D., & Fulton, P. R. (Eds.), *Mindfulness and psychotherapy* (pp. 241–261). New York: Guilford.

Parasuraman, R., & Greenwood, P. (2004). Molecular genetics of visuospatial attention and working memory. In M. I. Posner (Ed.), *Cognitive neuroscience of attention* (pp. 245–259). New York: Guilford.

Palm K. M., & Follette V. M. (2000). Counseling strategies with adult survivors of sexual abuse as children. *Directions in Clinical and Counseling Psychology, 11*, 49–60. Park, A. (August 4, 2003). Calming the mind. *Time, 162*, 52.

Pennebacker J. W., & O'Heeron R. C. (1984). Confiding in others and illness rate among spouses of suicide and accidental-death victims. *Journal of Abnormal Psychology, 93*, 473–476.

Perls, F. (1973). *The gestalt approach & eye witness to therapy.* New York: Bantam.

Perls, F., Hefferline, R. F., & Goodman, P. (1958). *Gestalt therapy*. New York: Julian Press.

Petry, N. M. (2005). Gamblers Anonymous and cognitive-behavioral therapies for pathological gamblers. *Journal of Gambling Studies, 21*, 27–33.

Potenza, M. N., Fiellin, D. A., Heninger, G. R., Rounsaville, B. J., & Mazure, C. M. (2002). Gambling: An addictive behavior with health and primary care implications. *Journal of General Internal Medicine, 17*, 721–732.

Rahula, W. S. (1974). *What the Buddha taught*. New York: Grove Press.

Raskin, N. J., & Rogers, C. R. (1995). Person-centered therapy. In R. J. Corsini & D. Wedding (Eds.), *Current psychotherapies* (pp. 133–167). Itasca, IL: F. E. Peacock Publishers.

Raz, A., & Buhle, J. (2006). Typologies of attentional networks. *Nature Reviews Neuroscience, 7*, 367–379.

Reed, G. W., Kemeny, M. E., Taylor, S. E., & Visscher, B. R. (1999). Negative HIV-specific expectancies and AIDS-related bereavement as predictors of symptom onset in asymptomatic HIV-positive gay men. *Health Psychology, 354–363*.

Robertson, I. H., & Garavan, H. (2004). Vigilant attention. In M. S. Gazzaniga (Ed.), *The Cognitive Neurosciences* (pp. 631–640). New York: MIT Press.

Robins, C. J., & Chapman, A. L. (2004). Dialectical behavior therapy: current status, recent developments, and future directions. *Journal of Personality Disorders, 18*, 73–89.

Rogers, C. R. (1961). *On becoming a person*. Boston, MA: Houghton-Mifflin.

Rosch, E. (1997). Mindfulness meditation and the private (?) self. In U. Neisser & D. A. Jopling (Eds.), *The conceptual self in context* (pp. 185–202). New York: Cambridge University Press.

Rothbart, M. K., Posner, M. I., & Kieras, J. (2006). Temperament, attention, and the development of self-regulation. In K. McCartney & D. Phillips (Eds.), *Blackwell handbook of early childhood development* (pp. 338–357). Malden, MA: Blackwell.

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology, 43*, 450–461.

Ryan, R. M. (1995). Psychological needs and the facilitation of integrative processes. *Journal of Personality, 63*, 397–427.

Ryan, R. M. (2005). The developmental line of autonomy in the etiology, dynamics, and treatment of borderline personality disorders. *Development and Psychopathology, 17*, 987–1006.

Ryan, R. M., & Brown, K. W. (2003). Why we don't need self-esteem: Basic needs, mindfulness, and the authentic self. *Psychological Inquiry, 14*, 71–76.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic, motivation, social development, and well-being. *American Psychologist, 55*, 68–78.

Ryan, R. M., & Deci, E. L. (2004). Autonomy is no illusion: Self-determination Theory and the empirical study of authenticity, awareness, and will. In J. Greenberg, S. L. Koole, & T. Pyszcynski (Eds.), *Handbook of Experimental Existential Psychology* (pp. 449–479). New York: Guilford.

Ryan, R. M., & Frederick, C. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality, 65*, 529–565.

Rychlak, J. F. (1997). *In defense of human consciousness*. Washington, DC: APA.

Safer, D. L., Telch, C. F., & Agras, W. S. (2001). Dialectical behavior therapy for bulimia nervosa. *American Journal of Psychiatry, 158*, 632–634.

Schooler, J. W., & Schreiber, C. A. (2004), Experience, meta-consciousness, and the paradox of introspection. *Journal of Consciousness Studies, 11*, 17–39.

Schutte, N. S., Malouff, J. M., & Bobik, C. (2001). Emotional intelligence and interpersonal relations. *The Journal of Social Psychology, 141*, 523–536.

Segal, Z. V., Williams, J. M., & Teasdale, J.D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse.* New York: Guilford.

Shapiro, S. L., Bootzin, R. R., Figueredo, A., J., Lopez, A. M., & Schwartz, G. E. (2003). The efficacy of mindfulness-based stress reduction in the treatment of sleep disturbance in women with breast cancer: An exploratory study. *Journal of Psychosomatic Research, 54*, 85–91.

Shapiro, S. L., Brown, K. W., & Biegel, G. (2007). Teaching self-care to caregivers: The effects of Mindfulness-Based Stress Reduction on the mental health of therapists in training. *Training and Education in Professional Psychology, 1*, 105–115.

Shapiro, S. L., Carlson L. E., & Astin J. A. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62*, 373–386.

Shapiro, S. L., Schwartz, G. E., & Bonner, G. (1998). Effects of mindfulness-based stress reduction on medical and premedical students. *Journal of Behavioral Medicine, 21*, 581–599.

Shear, J., & Jevning, R. (1999). Pure consciousness: Scientific exploration of meditation techniques. In F. J. Varela & J. Shear (Eds.), *The view from within* (pp. 189–209). Thorverton, UK: Imprint Academics.

Sheldon, K. M., & Vansteenkiste, M. (2005). Personal goals and time travel: How are future places visited, and is it worth it? In Strathman, A. & Joreman, J. (Eds.), *Understanding behavior in the context of time: Theory, research, and application* (pp.143–163). Mahwah, NJ: Lawrence Erlbaum.

Sherman, D. K., & Cohen, G. (2002). Accepting threatening information: Self-affirmation and the reduction of defensive biases. *Current Directions in Psychological Science, 11*, 119–123.

Sloan, D. M. (2004). Emotion regulation in action: Emotional reactivity in experiential avoidance. *Behaviour Research and Therapy, 42*, 1257–1270.

Smith, H., & Novak, P. (2004). *Buddhism: A concise introduction*. New York: Harper San Francisco.

Sogyal, R. (1992). *The Tibetan book of living and dying*. P. Gaffney & A. Harvey (Eds.). San Francisco, CA: Harper San Francisco.

Speca, M., Carlson, L. E., Goodey E., & Angen M. (2000). A randomized, wait-list controlled clinical trial: the effect of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients. *Psychosomatic Medicine, 62*, 613–622.

Sternberg, R. J. (2000). Images of mindfulness. *Journal of Social Issues, 56*, 11–26.

Strathman, A., Gleicher, F., & Boninger, D.S. (1994). The consideration of future consequences: Weighing immediate and distant outcomes of behavior. Journal of Personality and Social Psychology, 66, 742–752.

Suls, J., & Fletcher, B. (1985). The relative efficacy of avoidant and nonavoidant coping strategies: A meta-analysis. *Health Psychology, 4*, 249–288.

Tacon, A. M., McComb, J., Caldera, Y., & Randolph, P. (2003). Mindfulness meditation, anxiety reduction, and heart disease: a pilot study. *Family & Community Health, 26*, 25–33.

Tangney,J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success.*Journal of Personality, 72*, 271–322.

Tart, C. T. (1994). *Living the mindful life.* Boston, MA: Shambhala.

Taylor, S. E., Kemeny, M. E., Reed, G. M., Bower, J. E., & Gruenewald, T. L. (2000). Psychological resources, positive illusions, and health. *American Psychologist, 55*, 99–109..

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin, 103*, 193–210.

Taylor, S. E., & Brown, J. D. (1994). Positive illusions and well-being revisited: separating fact from fiction. *Psychological Bulletin, 116*, 21–27.

Taylor, S. E., Lerner, J. S., Sherman, D. K., Sage, R. M., & McDowell, N. K. (2003a). Are self-enhancing cognitions associated with healthy or unhealthy biological profiles. *Journal of Personality and Social Psychology, 85*, 605–615.

Taylor, S. E., Lerner, J. S., Sherman, D. K., Sage, R. M., & McDowell, N. K. (2003b). Portrait of the self-enhancer: Well adjusted and well liked or maladjusted and friendless? *Journal of Personality and Social Psychology, 84*, 165–176.

Teasdale, J. D. (1999). Emotional processing, three modes of mind and the prevention of relapse in depression. *Behaviour Research and Therapy, 37*, 53–77.

Teasdale, J. D., Moore, R. G., Hayhurst, H., Pope, M., Williams, S., & Segal, Z. V. (2002). Metacognitive awareness and prevention of relapse in depression: empirical evidence. *Journal of Consulting and Clinical Psychology, 70*, 275–287.

Teasdale, J. D., Segal, Z. V., & Williams, J. M. G. (1995). How does cognitive therapy prevent depressive relapse and why should attentional control (mindfulness) training help? *Behaviour Research and Therapy, 33*, 25–39.

Teasdale, J. D., Segal, Z. V., Williams, J. M. G., Ridgeway, V. A., Soulsby, J. M. & Lau, M. A. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *Journal of Consulting and Clinical Psychology, 68*, 615–625.

Tedeschi, R. G., & Calhoun, L. G. (2004). Post-traumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry, 15*, 1–18.

Telch, C. F., Agras, W. S., & Linehan, M. M. (2001). Dialectical behavior therapy for binge eating disorder. *Journal of Consulting and Clinical Psychology, 69*, 1061–1065.

Thrash, T. M., & Elliot, A. J. (2002). Implicit and self-attributed achievement motives: Concordance and predictive validity. *Journal of Personality, 70*, 729–755.

Tickle-Degnan, L., & Rosenthal, R. (1990). The nature of rapport and its nonverbal correlates. *Psychological Inquiry, 1*, 285–293.

Trapnell, P. D., & Campbell, J. (1999). Private self-consciousness and the five factor model of personality: Distinguishing rumination from reflection. *Journal of Personality and Social Psychology, 76*, 284–304.

Tsoknyi, D. (1998). *Carefree dignity: Discourses on training in the nature of mind*. Hong Kong: Rangjung Yeshe Publications.

Turner, R. M. (2000). Naturalistic evaluation of dialectical behavior therapy-oriented treatment for borderline personality disorder. *Cognitive and Behavioral Practice, 7*, 413–419.

Uchiyama, K. (2004). *Opening the hand of thought*. Somerville, MA: Wisdom Publications.

van den Bosch, L. M., Koeter, M. W., Stijnen, T., Verheul, R., & van den Brink, W. (2005). Sustained efficacy of dialectical behavior therapy for borderline personality disorder. *Behaviour Research and Therapy, 43*, 1231–1241.

Verheul, R., Van Den Bosch, L. M., Koeter, M. W., De Ridder, M. A., Stijnen, T., & Van Den Brink, W. (2003). Dialectical behavior therapy for women with borderline personality disorder: 12-month, randomized clinical trial in The Netherlands. *British Journal of Psychiatry, 182*, 135–140.

Vohs, K. D., & Baumeister, R. F. (2004). Ego depletion, self-control, and choice. In J. Greenberg, S. L. Koole, & T. Pyszczynski (Eds.), *Handbook of experimental existential psychology* (pp. 398–410). New York: Guilford.

Walach, H., Buchheld, N., Buttenmuller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness—the Freiburg Mindfulness Inventory (FMI). *Personality and Individual Differences, 40*, 1543–1555.

Way, B. M., Creswell, J. D., Eisenberger, N. I., & Lieberman, M. D. (2006). Associations between dispositional mindfulness and genetic variation of MAOA. Unpublished raw data, University of California, Los Angeles.

Wegner D., & Zanakos S. (1994). Chronic thought suppression. *Journal of Personality, 62*, 615–64.

Welwood, J. (1996). *Love and awakening*. New York: HarperCollins.

Wenk-Sormaz, H. (2005). Meditation can reduce habitual responding. *Alternative Therapies in Health and Medicine, 11*, 42–58.

Westen, D. (1999). *Psychology: Mind, brain, & culture, 2nd ed.* New York: Wiley.

Williams, J. M. G., Duggan, D. S., Crane, C., & Fennell, M. J. V. (2006). Mindfulness-based cognitive therapy for prevention of recurrence of suicidal behavior. *Journal of Clinical Psychology, 62*, 201–210.

Williams, K. A., Kolar, M. M., Reger, B. E., & Pearson, J. C. (2001). Evaluation of a Wellness-Based Mindfulness Stress Reduction intervention: A controlled trial. *American Journal of Health Promotion, 15*, 422–432.

Wilson, T. D. (2002). *Strangers to ourselves: Discovering the adaptive unconscious*. Cambridge, MA: Harvard University Press.

Zimbardo, P. G., & Boyd, J. N. (1999). Putting time in perspective: A valid, reliable individual-differences metric. *Journal of Personality and Social Psychology, 77*, 1271–1288.

Zylowska, L., Ackerman, D. L., Yang, M. H., Futrell, J. L., Horton, N. L., Hale, T. S., Pataki, C., & Smalley, S. L. (in press). Behavioral and cognitive changes in Attention Deficit Hyperactivity Disorder using a mindfulness meditation approach. *Journal of Attention Disorders*.