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# Moving beyond Mindfulness: Defining Equanimity as an Outcome Measure in Meditation and Contemplative Research

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**Abstract**

In light of a growing interest in contemplative practices such as meditation, the emerging field of contemplative science has been challenged to describe and objectively measure how these practices affect health and well-being. While "mindfulness" itself has been proposed as a measurable outcome of contemplative practices, this concept encompasses multiple components, some of which, as we review here, may be better characterized as equanimity. Equanimity can be defined as an even-minded mental state or dispositional tendency toward all experiences or objects, regardless of their origin or their affective valence (pleasant, unpleasant, or neutral). In this article we propose that equanimity be used as an outcome measure in contemplative research. We first define and discuss the inter-relationship between mindfulness and equanimity from the perspectives of both classical Buddhism and modern psychology and present existing meditation techniques for cultivating equanimity. We then review psychological, physiological, and neuroimaging methods that have been used to assess equanimity, either directly or indirectly. In conclusion, we propose that equanimity captures potentially the most important psychological element in the improvement of well-being, and therefore should be a focus in future research studies.

*Keywords:* equanimity; mindfulness; emotion regulation; meditation; acceptance

## Introduction

In recent years there has been increasing interest in the concept of mindfulness as well as in meditation techniques which can be used to develop it. These practices are directly inspired from the Buddhist tradition. The definition of mindfulness has itself evolved over the course of history and across different Buddhist schools (Bodhi, 2011; Carmody, Baer, Lykins, & Olendzki, 2009; Dreyfus, 2011; Dunne, 2011; Grabovac, Lau, & Willett, 2011; Grossman, 2008; Kang & Whittingham, 2010; Olendzki, 2011; Williams & Kabat-Zinn, 2011). Various attempts have been made to describe what mindfulness is in modern psychological terms, the most frequently cited being from Jon Kabat-Zinn who defined mindfulness as "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 1990). This definition has been frequently used in mental health research. However, scientific and clinical interpretations of mindfulness are not fully aligned with those from the Buddhist tradition (Dreyfus, 2011; Wallace, 2006). Over the last ten years, several components of the practice of mindfulness have been identified. For example, Bishop (2004) proposed a two-component model of mindfulness, in which the first component is self-regulated attention, with the purpose of maintaining attention on present-moment experience ("paying attention in a particular way: on purpose, in the present moment"), and the second component is an attitude of openness and acceptance ("in a particular way… non-judgmentally"). Shapiro, Carlson, Astin, & Freedman (2006) proposed a three-component model which further dissociates attention from intention ("on purpose"), and also includes attitude ("in a particular way") as a third component. Baer et al., (2008) proposed a five-facet model of mindfulness in which two of the facets are "nonjudging of inner experience" and "nonreactivity to inner experience." These definitions all have in common a component corresponding to an "attitude of openness and acceptance." In this paper we propose that this specific component shares similarities with the classical Buddhist description of equanimity, and that it is an important construct for scientific investigation.

In this article we will define and discuss the inter-relationship between mindfulness and equanimity from the perspectives of both classical Buddhism and modern psychology. Our goal is to help clarify the understanding of the concept of equanimity, and also to promote further discussion and exploration of this concept. The emerging field of contemplative science has been challenged to describe and measure the effects of meditation and other related contemplative practices and to explain their relevance for health and well-being. Even though these practices are of great interest to the scientific and medical communities and to society in general, objective measures to assess their beneficial outcomes are lacking. We believe that a clearer distinction between mindfulness and equanimity will not only aid researchers who use various methods to assess the impact of meditation-based interventions and the mechanisms through which they work, but also help clinicians better understand how to teach and use meditative techniques with patients.

## Mindfulness and Equanimity in the Buddhist Tradition

In this section we will review definitions of mindfulness and equanimity in the Buddhist tradition, provide an illustrative example of mindfulness and equanimity in everyday life, highlight important distinctions between equanimity and indifference, and describe some meditative and contemplative methods for cultivating equanimity drawn from the Buddhist traditions. The next section will focus on equanimity from the perspective of Western psychological theory.

### Definitions of Mindfulness and Equanimity

The Buddhist tradition offers a very rich taxonomy of the different states, abilities, and qualities of the mind. According to early Buddhist texts such as the Abhidhamma, what is usually referred to, or experienced, as a unified mental experience is comprised of numerous factors (Bodhi, 2000; Tsering, 2006). One important factor—which may or may not be present at any given moment—is mindfulness (*smrti* in Sanskrit, *sati* in Pali), which is *the quality of mind that one recollects continuously without forgetfulness or distraction while maintaining attention*

*on a particular [mental] object* (Analayo, 2003; Bodhi, 2000; Buddhaghosa, 2003; Dreyfus, 2011; Nyanaponika Thera, 1962; Wallace, 2006, 2011). In other words, mindfulness corresponds to the higher-level awareness of present-moment sensory, affective, and cognitive experiences. Mindfulness can also be described as the ability or *process* of maintaining the object of attention in working memory, whether this object corresponds to an external sensory stimulus, an interoceptive sensation from inside the body, a chain of discursive thoughts going through the mind, or even a memory from the past (Dreyfus, 2011).

In the Buddhist tradition, the term "equanimity" (*upeksha* in Sanskrit, *upekkha* in Pali) is a complex construct that has been given multiple definitions along the development of Buddhist thought. At its heart is the word for 'eye' and 'see', with a prefix suggesting 'gazing upon' or observing without interference. In the Theravadan Buddhist literature (which will be our main focus in this paper due to the prevalence of this particular branch of Buddhism in current mindfulness-based clinical interventions), there are two main usages of the term "equanimity." First, it can refer to "neutral feeling," a mental experience that is neither pleasant nor unpleasant, and that involves neither intensifying nor dampening current mental states (Bodhi, 2000, pages 34, 116). This first usage of the term equanimity corresponds to the Western psychological notion of "neutral valence," and is commonly experienced throughout any ordinary day. The second meaning of equanimity, the one of interest in this paper, corresponds to a mental state or trait that is not easily achieved and typically requires some form of practice. It is "a state of mind that cannot be swayed by biases and preferences" (Bodhi, 2000, page 34), an "even-mindedness in the face of every sort of experience, regardless of whether pleasure [or] pain are present or not" (Thanissaro Bhikkhu, 1996, page 262). This state of equanimity manifests as "a balanced reaction to joy and misery, which protects one from emotional agitation" (Bodhi, 2005, page 154).

In brief, to rephrase this definition in modern terms, *equanimity is an even-minded mental state or dispositional tendency toward all experiences or objects*, *regardless of their*

*affective valence (pleasant, unpleasant or neutral) or source.* Here we use the term even-mindedness in its common definition as a state of being calm, stable and composed. Equanimity also involves a level of *impartiality* (i.e, being not partial or biased), such that one can experience unpleasant thoughts or emotions without repressing, denying, judging, or having aversion for them. Similarly, in a state of equanimity one can have pleasant or rewarding experiences without becoming over-excited (e.g., to the point of mania or hypomania), or trying to prolong these experiences, or becoming addicted to them. Grabovac et al. (2011) describe equanimity as "approaching pleasant, unpleasant and neutral experiences with equal interest." It should be noted that this goes against our habitual tendencies to seek the pleasant and stay away from the unpleasant. In the Buddhist perspective, both of these tendencies are forms of craving (*tanha* in Pali, literally "thirst"), which constitutes the origin of all forms of suffering and dissatisfaction (*dukkha*) (Bodhi, 2000, page 289; Analayo, 2003, chapter 13). In addition, it should be noted that the ideal form of equanimity embraced by Buddhism also includes having an equal attitude towards all beings, without the boundaries that we habitually draw between friends, strangers, and those we consider "difficult people," in other words, "regarding all beings as equal in their right to have happiness and avoid suffering" (Tsering, 2006, page 86) and "treating them free from discrimination, without preferences and prejudices" (Bodhi, 2000, page 87).This aspect of equanimity can be cultivated with specific contemplative practice methods (see section 2.4).

We would like to emphasize that our proposed definition of equanimity as an even-minded state is both (i) a mental attitude of openness, even-mindedness, and acceptance that one purposefully cultivates (e.g., during formal meditation practice and/or throughout daily activities), and (ii) an enduring state or trait that is the end result of this form of training. Indeed the Buddhist tradition proposes that with practice, equanimity (along with the other "boundless qualities" of love, compassion and sympathetic joy) becomes effortless and need no longer be purposefully invoked (Thrangu Rinpoche, 2002).

**Illustrative Example of Mindfulness and Equanimity**

To illustrate these concepts of mindfulness and equanimity with a simple example from everyday life, let us consider what happens when we are driving a car. It is possible to get in the car and arrive at our destination, lost in thought the whole time and completely unaware of what our hands and feet were doing, or of what we saw or heard along the way. Through learning and habit we keep the car on the road and respond to other vehicles, but conscious awareness is otherwise engaged. Such an extreme (but not uncommon) case of mind-wandering corresponds to the absence of mindfulness. Alternatively, if we are mindful while driving, we can direct our attention to what is happening as we drive—our posture, the speed of the car, the cars around us, pedestrians, etc. We might also be aware of thoughts or emotions that may pass through our mind without getting lost in them. As we drive we can choose to actively note these events as they pass through our field of awareness. In this case, we are experiencing the flow of sensory and mental objects with an impartial yet caring attitude (equanimity) and mindful awareness.

If another driver suddenly cuts in front of us in a dangerous way, we might get scared or angry and yell or honk our horn as we hit the brakes, in which case our mindfulness and equanimity are disrupted by the intrusion of emotions such anger or fear. Without mindfulness, we do not realize that these emotions are affecting our behavior and mood, causing perhaps road rage or panic. With mindfulness, we might gain awareness that our emotional state has changed, that our voice has gotten louder, that our muscles are more contracted, and that negative thoughts about the other driver are now passing through our mind. Being thus mindful of the arising of anger, we may (or may not) be able to maintain a state of equanimity and watch the experience of anger unfold and pass on its own accord. In the absence of equanimity, the experience of anger may become overwhelming or persist for a significant amount of time after the situation is over.

It is important to note that Buddhist psychology clearly distinguishes between mindfulness and equanimity. Each brings a different quality of mind to bear upon experience. Mindfulness emphasizes the ability to remain *consciously aware* of what is happening in the field of experience, while equanimity allows awareness to be *even and unbiased* by facilitating an attitude of non-attachment and non-resistance.

For the beginning meditator confronted with an emotionally charged situation, a non-judging equanimous attitude is fleeting or often absent, even when mindfulness is present. This stage of the training may become discouraging to novices as they become increasingly aware of their disruptive thought patterns and impulsive—often maladaptive—actions, but do not yet have the equanimity to simply let the emotions pass through without reacting to them. A beginning meditator may then turn to other forms of regulation by actively suppressing or avoiding the emotions. An understanding of mindfulness and equanimity as separate skills that may develop at different rates might therefore be helpful to novices and teachers: the cultivation of mindfulness can be seen as the foundation on which equanimity will gradually develop.

**Equanimity versus Indifference in Buddhist Psychology**

Buddhist psychology draws clear distinctions between equanimity and indifference. We review these distinctions in this section, and will discuss further below related views from within the framework of modern Western psychology.

Equanimity is sometimes described in the Buddhist literature as *a perspective shift,* or a *sense of [temporal] detachment from the ongoing experience* (Bodhi, 2000; Gunaratana, 2002; Wallace, 2006). Because of some connotations of the word “detachment” in English, which can imply “indifference,” this has generated confusion. In a common misunderstanding of contemplative practices, equanimity is assumed to imply the absence of emotional reactivity, if not the absence of emotions themselves. In the above quote, “detachment” refers instead to elimination of craving or clinging to the objects of desire or discontent. Buddhist texts clearly distinguish between equanimity and indifference, where the latter implies a certain degree of

apathy or lethargy. From the perspective of Buddhist philosophy, indifference is an "unwholesome" (i.e., detrimental, or harmful) mental state which is due to ignorance of the true nature of things (Bodhi, 2000). Indifference is explicitly warned against as the "near-enemy" of equanimity, which indicates that these two notions can seem deceptively similar at first but should be considered very different (Bodhi, 2000, page 87). The notion that equanimity includes a sense of care and attentiveness rather than indifference is illustrated in the following metaphor from the classical Buddhist tradition. Loving-kindness (*metta*) is likened to the sentiment felt by a mother toward a newborn infant (May she be well! May he thrive!); compassion (*karuna*) is the feeling extended to a sick child (May she be free from pain and suffering!); sympathetic joy (*mudita*) is how a mother feels toward a grown boy who leaves home to marry (Though it may be painful for me, I feel joy for him!); and equanimity is how a mother might feel on hearing about her grown child's business dealings—she is attentive and caring about his welfare (not disengaged or indifferent), yet has no emotional entanglement to the content of the news she hears (Nanamoli, 1991, page 314). Therefore, equanimity is "not an attitude of cold indifference, but rather of mental imperturbability" (Thanissaro Bhikkhu, 1996, page 263). Indifference may even be considered a subtle form of aversion (Salzberg, 1995, page 150; Gunaratana, 2002, page 128).

*Importantly, having equanimity does not mean suppressing emotions or giving up the affective coloring of our life experiences.* When we are driving, for example, experiencing fear as another driver dangerously cuts in front of us is a more adaptive response than remaining indifferent to it. This fear is useful for stimulating a quick reaction to hit the brakes and avoid collision. However, once the danger has passed, it is more adaptive to bring attention back to current experience rather than continue to dwell in disruptive emotions. With equanimity the transgression of the other driver is noted, but without the automatic seasonings of judgment, blame, resentment, and anger, much of which is driven by taking the incident as a personal insult. An even more skillful response, Buddhists would say, might be to forgive the person,

have compassion for whatever conditions are compelling them to act so rudely, and even wish them well! Taking another example, being indifferent to the loss of a loved one could be considered pathological, because the experience of grief, although a disruptive and difficult emotion, is a healthy response of adjustment—as long as it does not persist indefinitely.

In the Buddhist view, the fundamental distinction between equanimity and indifference is also important in the context of equanimity towards people. Remaining indifferent to other people's needs or their suffering is certainly not considered a form of equanimity, and is contrary to the Buddhist teachings. Buddhist masters recommend practicing equanimity towards beings by contemplating how all beings are similar to ourselves in that they, too, wish to gain happiness and be free of suffering, regardless of whether we would consider them our friends, enemies, or strangers (e.g., Dalai Lama, 2001). It follows that all beings should be treated with a very deep sense of care. Here we can see the link between equanimity, loving-kindness, and compassion. For more on the Buddhist practices for cultivating equanimity, see section 2.4.

It is important to recognize the distinction between the affective tone of pleasure or pain, and one's emotional response to it. There are many situations in which it is entirely appropriate to feel joyful, and we naturally welcome this experience because it involves pleasure. It can also be appropriate to feel sad, such as when grieving the loss of a loved one. From a Buddhist perspective, what determines our degree of "suffering" or dissatisfaction (*dukkha*) is our emotional response to joyfulness and sadness. For example, if we crave for the continuation or intensification of a joyful experience, then when it inevitably changes we will experience dissatisfaction in direct proportion to the strength of our craving. Similarly, psychological suffering occurs when an experience of sadness, for example, is amplified by aversion, resistance, denial, and other forms of unhealthy or unskillful emotional responses. Just as stress is defined not by what is happening in the world but by one's response to what is happening (Lazarus, 1991), so also suffering results not from the content of experience but from the emotional disposition with which it is experienced. Equanimity enables a skillful emotional

response to the full range of feeling tones. Feeling happy without interfering with the mental pleasure by trying to grasp hold of it, or feeling unhappy and being able to 'gaze upon' it with equanimity rather than trying to change it into something other than it is, are both skills that can be developed. Mindfulness is the first stage of this learning process by means of which one is able to focus attention upon the flow of experience without distraction. With practice, one will develop a greater ability to respond to this flow with equanimity.

**Methods from the Buddhist Traditions for Cultivating Equanimity**

The even-mindedness that characterizes equanimity can be cultivated in various ways. In its most basic and accessible form, equanimity can be practiced in any situation when one is mindful of an object without being attracted to or repelled by it. One notices its presence without an intentional stance of either favoring or opposing it, in other words, non-judgmentally. Further development of this skill can proceed by either concentration (*samatha*) or insight (*vipassana*) practices, and the early Buddhist texts describe both paths in some detail (Buddhaghosa, 2003; Wallace, 2010). For example, in Theravadan Buddhism, Vipassana meditation leads the practitioner through progressive stages of understanding the conditioned nature of all experience, culminating in an abiding and sustainable equanimity toward all phenomena which breaks the bonds of craving (for what one likes to continue or for the ending of what one does not like) that cause suffering. The path of concentration (*shamatha*) proceeds through four successive stages of intensifying meditative states, wherein a practitioner uses one-pointed focused concentration as a means to train the mind gradually from ordinary conceptual modes of operation to greater stillness and equanimity. According to the classical Buddhist literature, when one can maintain single-pointed concentration in the absence of mind-wandering for some amount of time, one will first experience a great physical and mental pleasure that naturally arises as the mind suspends the construction of negative emotions; next the rapture of this mental pleasure deepens as the mind lets go of conceptual thinking entirely and becomes even more absorbed in single-pointed concentration; then the exuberance of this pleasure matures

and mellows into a subtle but profound sense of happiness; while in the fourth and final stage all pleasure is abandoned and an abiding mental equanimity is established. It is a process analogous to the purification of gold by burning off its contaminants, and a mind thus "purified" is said to be simultaneously bright, calm, steady, and flexible (Buddhaghosa, 2003; Wallace, 2010).

The advanced meditative states described above are usually achieved by practicing so-called nonreferential or nonconceptual forms of meditation, which have also been referred to as open presence, open awareness, non-dual awareness, or non-dual experience (Austin, 2009; Dunne, 2011; Josipovic, 2010; Lutz, Dunne, & Davidson, 2007). These practices are central to several branches of Buddhism such as Theravada, Zen, Mahamudra, and Dzogchen, and somewhat similar practices can also be found in non-Buddhist traditions such as the Vedic tradition and Chinese Qigong (Travis & Shear, 2010). These meditative practices are said to make the mind more sensitive and flexible, which in turn facilitates the cultivation of beneficial states and traits such that the meditator becomes less easily disturbed by emotional states (Lutz et al., 2007). In the words of the Dalai Lama:

> "[The experience of Dzogchen] will give you the ability to prevent yourself from being overwhelmed by circumstances, good or bad. You will not fall into extreme states of mind: you will not get over-excited or depressed. Your attitude toward circumstances and events will be as if you were someone observing the mind, without being drawn away by circumstances…You are not preoccupied by what arises in the mind, nor does it cause you any distress. You are free from conceptuality or any form of objectifying. And so it really does help you, in allowing you to be free from being caught up in the play of emotions" (Dalai Lama, 2001c, page 162).

The interested reader is referred to the extensive literature on this topic from the contemplative traditions, which is beyond the scope of the present review.

In other Buddhist texts, including those from the Mahayana traditions, more accessible forms of equanimity practice are introduced in the early stages of meditation training. These methods are analytical (or conceptual) contemplations, also called "relative" practices, and can be used to complement the more advanced non-conceptual meditative practices mentioned above (Makransky, 2007). Some of these contemplations are described in detail in the classic *Intermediate Stages of Meditation* by Kamalashila, an Indian master who wrote several treatises on introductory Buddhist practices (Dalai Lama, 2001a; Thrangu Rinpoche, 2002). One of the techniques for developing equanimity consists in trying to develop an impartial attitude toward all beings by reflecting on the "very simple truth" that "all of us, including the most despicable people, do the things we do because we're seeking happiness and want to be free of suffering" (Wallace, 2010, page 155). A more detailed contemplation would be: "All beings are the same as ourselves in three basic ways. (1) They all want to be well, happy, and free of suffering. (2) They are all lost in self-centered reactions to their own narrow thoughts of self and others. (3) They all possess an innate capacity of goodness that has been obscured by the self-centered reactions" (Makransky, 2007, page 113; see also Dalai Lama, 2001a, 2001b).

Another classic analytical contemplation for developing equanimity presented by Kamalashila consists in reflecting upon the mind's automatic classification of other people as "friends," "enemies," and "strangers," and realizing that these categories are rather arbitrary and subject to change following life circumstances. In order to do so, it is considered effective to meditate on three particular individuals personally known by the meditator: one who has done him harm ("enemy" or "difficult person"), one who has benefited him directly ("friend"), and one neutral person ("stranger"). Observing how the mind reacts to thinking about each, the practitioner notices that, upon thinking of the enemy, the mind becomes irritated, resentful, or hateful; upon thinking of the friend, the mind becomes relaxed, comfortable, delighted; upon thinking of the stranger, there is neither irritation nor delight. The next step is to look for the reasons the mind might have for these types of responses. The practitioner will find that "these

reasons are in fact superficial and based on narrow, self-serving attitudes." At this point, "when we view things from a broader perspective with more farsightedness, equanimity will dawn in our minds, enabling us to see the futility of hostility and clinging desire" and to "equalize our feelings toward those three individuals." The next step in this technique is to "gradually extend the scope of this meditation" to our neighbors, our fellow citizens, and eventually "all the beings in the world" (Dalai Lama, 2001a, page 53; see also Wallace, 2010, pages 157–161, and Makransky, 2007, pages 95–130). We should note that this practice is not unique to the Tibetan tradition, as it can also be found in Theravadan texts such as (Buddhaghosa, 2003, page 310).

## Equanimity in Western Psychology and Psychophysiology

Equanimity has not been discussed much in the context of Western psychological theory. However, it appears in related concepts such as acceptance, non-judgment, non-striving, and non-reactivity—especially in the context of mindfulness meditation practice. Equanimity has also been conflated with emotional control and emotional suppression, which understandably can create confusion. Here we attempt to clarify the concept of equanimity using the (Theravadan) Buddhist framework, but in the context of modern psychology and neuroscientific processes. We specifically propose and discuss the following: 1) Equanimity is associated with a critical change in relation to one's perceived experience; 2) Equanimity shares some common effects with emotion regulation strategies; 3) Equanimity affects the time course of emotional and physiological responding to a stressor.

### Equanimity: A Relation to One's Perceived Experience

Even though the concept of equanimity is not explicitly introduced in Western psychoanalytical theory, it can be found as an important, rather implicit concept within the psychoanalytical approach, where it is believed that 1) it is important for emotions to be seen by the patient with an *even-minded* attitude, without condemning them, and 2) the therapist should welcome the patient's free associations by encountering them with free floating attention. Psychoanalysis is focused on acknowledgement and acceptance of emotions. For example,

Sigmund Freud advised psychoanalysts to instruct patients to "report to us whatever internal perceptions... feelings, thoughts, memories [without] exclud[ing] any of them, whether on the grounds that it is too disagreeable or too indiscreet... or nonsensical" (Freud, 1966, page 287). Freud's radical proposal was that, without therapy, thoughts or feelings that are unacceptable to the individual are either repressed or suppressed into the unconscious, or projected onto another person (Freud, 1966). These defense strategies of "hiding" emotionally challenging experiences have detrimental psychological consequences, since they still exist and can cause psychopathological symptoms. In line with this view, Swiss psychiatrist Carl Jung reportedly declared that "the foundation of all mental illness is the unwillingness to experience legitimate suffering." This view is supported by many years of psychology research suggesting that "experiential avoidance," which can be conceptualized as unhealthy efforts to escape and avoid emotions, thoughts, memories, and other private experiences, contributes to the development and maintenance of many forms of psychopathology (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; Purdon, 1999). So while the early psychoanalysts did not promote equanimity practices in the form of formal meditation, the idea that all forms of emotions should be held in awareness with an attitude of acceptance in order to be healthy is the essential foundation of psychoanalytic theory.

While psychoanalysis focuses on the process of bringing unconscious emotions into awareness during the therapeutic encounter, more recent developments in psychotherapy more explicitly teach patients to alter their relationships to their inner experience in general. Buddhist theory has critically inspired "third wave" forms of cognitive and behavioral therapies such as Acceptance and Commitment Therapy (ACT), Dialectical Behavioral Therapy (DBT), and Mindfulness-based Cognitive Therapy (MBCT). In this clinical context, equanimity is still not explicitly mentioned, but is implied in the form of a certain set of attitudes on how to relate to experience, which can be taught in the form of contemplative practices during the therapeutic encounter. These attitudes include non-judging, non-aversion, non-attachment (or letting-go),

and acceptance (Kabat-Zinn, 1990; Segal, Williams, & Teasdale, 2001). A non-judging attitude consists in "assuming the stance of an impartial witness to one's own experience," which involves suspending judgment and simply "watching whatever comes up," including observing one's automatic judgments of "like," "dislike," and "don't-care," without "judging the judging." It also involves recognizing one's thoughts as "just thoughts" without pursuing them any further. Acceptance is the "willingness to see things as they are" (Kabat-Zinn, 1990), "not merely tolerance" but rather "the active nonjudgmental embracing of experience in the here and now," with "undefended 'exposure' to thoughts, feelings, and bodily sensations as they are directly experienced" (Hayes, Follette, & Linehan, 2004). Here "exposure" is understood in a similar fashion as in exposure therapy, in that it aims at extinguishing conditioned associations. This exposure must be "undefended," i.e., in the absence of habitual defense mechanisms such as avoidance or suppression, which are more costly (e.g., Alberts, Schneider, & Martijn, 2012) and less effective in the long term (Hayes et al., 2004). The goal is to revert the domination of habitual responses, verbal rules and evaluations over here-and-now experience, and thereby to facilitate adaptive, flexible responding to environmental contingencies—as opposed to more rigid, rule-governed patterns of responding that are not based in current circumstances (Borkovec, 2006; Hayes, Strosahl, & Wilson, 1999).

The attitudinal factors listed above are conceptually related to each other (Kabat-Zinn, 1990, page 33), and have been operationalized as a single component of "Attitude" in multi-component psychological models of mindfulness (Bishop et al., 2004; Shapiro et al., 2006). This component can be summarized as "adopting a particular orientation toward one's experiences in the present moment, an orientation that is characterized by curiosity, openness, and acceptance" (Bishop et al., 2004). We propose that this attitudinal component corresponds to a shift in perspective toward all experiences or objects, regardless of their affective valence (pleasant, unpleasant or neutral) or source.

This shift in perspective, in which one watches one's thought process as if from the outside, like a "fly on the wall" (Ayduk & Kross, 2010), facilitates insight towards one's inner mental landscape and habitual patterns of behavior and has long been acknowledged as an important aspect of psychotherapy in general (Beck, Rush, Shaw, & Emery, 1979). This process has been called psychological self-distancing, decentering, cognitive defusion, reperceiving, de-reification, or meta-cognitive insight (Bishop et al., 2004; Chambers, Gullone, & Allen, 2009; Mason & Hargreaves, 2001; Shapiro et al., 2006; Teasdale, Segal, & Williams, 1995; Teasdale, 1999). For example, Safran & Segal (1990) define decentering as the process of observing one's thoughts and feelings as passing events in the mind, rather than as valid reflections of reality or central aspects of the self. Similarly, Alford & Beck (1997) describe distancing as "the ability to view one's own thoughts (or beliefs) as constructions of 'reality' rather than as reality itself", and identify this ability as a critical prerequisite for enabling effective therapeutic change. Overall, psychological self-distancing can be said to change one's relationship to thought rather than attempting to alter the content of thought itself (Hayes et al., 1999).

This perspective shift in relation to one's experience is by no means limited to psychotherapy or mindfulness practice, but rather is an extension of a fundamental aspect of psychological development and growth across the lifespan (Kegan, 1982), also known as "the observing self" (Deikman, 1983) or as "meta-awareness" (Chin & Schooler, 2010; Schooler et al., 2011). This process allows the individual to uncouple the sensory, directly experienced self from the "narrative" self—the reflective process that maintains continuity of identity across time (Gallagher, 2000; Northoff & Bermpohl, 2004; Northoff et al., 2006; Williams, 2010). In the absence of meta-awareness, the narrative self and other pervasive cognitive processes of "mental simulation" tend to aggravate emotional response (e.g., in the form of prolonged sympathetic arousal), cognitive elaboration, or rumination (Williams, 2010). These tendencies are reminiscent of the Buddhist notion of "grasping" or "clinging" mentioned earlier (Analayo, 2003; Bodhi, 2000) and can become pathological. For example, poor meta-awareness skills

increase the risk of recurrence of major depression (Teasdale et al., 2002). Conversely, psychological self-distancing has been shown to have beneficial effects such as facilitating adaptive self-reflection, decreasing emotional and physiological reactivity, and protecting the individual from negative outcomes associated with rumination over time (Ayduk & Kross, 2008, 2010; Kross, Ayduk, & Mischel, 2005; Kross & Ayduk, 2008).

It has been proposed that mindfulness practice promotes and accelerates the development of this shift in perspective towards an "observing attitude," and yields greater capacity for objectivity about one's own internal experience and a disidentification from the content of one's mind (e.g., thoughts, feelings, self-concepts, memories) (Kerr, Josyula, & Littenberg, 2011; Shapiro et al., 2006). This process of disidentification results in greater clarity, perspective, and objectivity (Shapiro et al., 2006). In summary, we propose that this change of perspective—in relation to one's perceived experience—is a fundamental aspect of equanimity.

**Equanimity: An Emotion Regulation Strategy**

In concert with the cultivation of an impartial attitude in response to all experience, equanimity involves the skillful process of "maintaining calm and mental equilibrium in the face of provocative stimuli" (Carmody et al., 2009). Such a process fits into traditional conceptualizations of emotion regulation. Emotion regulation (also called self-regulation) refers to any process that influences the onset, offset, magnitude, duration, intensity, or quality of one or more aspects of the emotional response (Gross, 1998). Here we describe equanimity as an emotion regulation strategy that can change both the magnitude and quality of responses. Different kinds of emotion regulation strategies have been identified (Gross & Thompson, 2006; f, Ochsner, & Gross, 2010; Ochsner & Gross, 2005; Parkinson & Totterdell, 1999). Based on findings from cognitive neurosciences, Gross and colleagues have suggested a distinction between *behavioral* emotion regulation and *cognitive* emotion regulation (Ochsner & Gross, 2005). Behavioral strategies can be antecedent-focused, in which case the appraisal process is controlled through selection or modification of context to avoid the emotion altogether or to

modify the emotional impact (e.g., by performing a secondary distracting task). Behavioral strategies can also be response-focused, in which case it is the emotional expression (e.g., smiling, frowning) that is regulated. Cognitive strategies include stimulus-response reversal/extinction, reappraisal (i.e., the reinterpretation of the meaning of a stimulus to change one's emotional response to it), and attentional control. Of note, these strategies all involve some form of effortful control, unlike equanimity.

While equanimity has some overlap with the emotion regulation strategies described above, it is not identical with them, and in some cases may be opposite (Chambers et al., 2009). For example, in Ochsner & Gross's (2005) taxonomy, attentional control is regarded as an emotion regulation strategy when attention is guided *away* from the emotion-triggering stimulus. Importantly, while attentional control is also a central aspect of mindfulness practice, in this case the focus of attention is not guided away from the emotion-triggering stimulus, but rather *toward* the stimulus, and also toward the internal emotional experience in response to it—such as the habitual experiences of wanting positive states to last, negative states to end, and neutral states to be less boring (Williams, 2010). Mindfulness practice involves bringing sustained attention to the body and resting awareness on sensation during an emotional experience, which leads to a situation of exposure. Equanimity leads to non-reactivity, which then naturally prevents habitual maladaptive response behavior. Engaging the emotional stimulus in this manner regulates the magnitude and duration of the emotional response. Rather than being stuck in the habitual reactions to the external and internal environment, one can experience the transitory nature of all related perceptions, emotions, or cognitions in each moment of experience. Once the purely sensory aspects of the emotional stimulus are recognized, one can choose to disengage from the mental elaborations that usually follow it. In contrast to the response-focused reappraisal strategy, equanimity does not modify the cognitive interpretation of an external stimulus, but rather facilitates the recognition of such thoughts as transient, insubstantial mental events rather than accurate representations of reality (Chambers et al., 2009). The awareness of the

transitory nature of one's momentary experience contributes to a dispositional perspective change in relation to one's thoughts. In other words, narrative, self-referential processing (i.e., the narrative of the relevance of the stimulus for oneself) becomes diminished, while the present-moment experience of sensory and mental events becomes enhanced. Thus, continued equanimity practice is predicted to yield the same outcome as stimulus-response reversal methods, where stimuli that formerly provoked reactivity are being responded to with an equanimous state and habitual patterns of maladaptive behavioral response are extinguished. Equanimity can also indirectly promote cognitive flexibility in response to new and unexpected conditions, such that an optimal response can be chosen based on the current situation, instead of getting "stuck" on habitual thought patterns that may not be the most adaptive response. Cognitive flexibility has been proposed as an indicator of good psychological health (Kashdan & Rottenberg, 2010). Both mental balance and cognitive flexibility are important for effective management of stressful emotional events. A balanced state of arousal between hyperexcitability and torpor helps conserve expenditure of mental and physical energy in the face of emotional challenge, while cognitive flexibility broadens the repertoire of possible behavioral responses. Both skills can be enhanced by mindfulness training (Moore & Malinowski, 2009).

**Equanimity Impacts the Time Course of Emotional Responses**

Thoughts and emotions in response to a real or imagined stressor stimulate a coordinated set of bodily responses involving the interaction between the nervous, endocrine, and immune systems (McEwen, 1998; Sternberg, 2000). Under ideal circumstances, these coordinated responses allow the person to effectively cope with stress, such that when the stressful stimulus has passed, the body gradually returns to its regular state of rest. However, if there is a failure in coping, habituation, or recovery (e.g., blunted or perseverative responses), long-term damage may occur—a phenomenon known as "allostatic load" (Karatsoreos & McEwen, 2011; McEwen & Seeman, 1999; McEwen, 1998, 2008; Sterling & Eyer, 1988).

Equanimity can aid in the recovery from emotional or physical stress, helping the individual return rapidly back to a state of balance.

As indicated above, the timing of recovery from a stimulus is a crucial component of emotion regulation. Many strong emotions have evolved to function as signaling mechanisms sensitive to the onset and offset of environmental threats towards the individual. These mechanisms have had clear advantages for survival during the course of evolution; however, they are not necessarily adapted to the circumstances of modern life, in which they can lead to chronic stress.

It has been proposed that individuals differ in their emotional style, and that these individual differences can manifest as variations in physiological responses to emotional challenge (Davidson, 2003). In Davidson's six-dimensional framework of emotional style, how quickly or slowly one recovers from stressors corresponds to the "Resilience" dimension (Davidson & Begley, 2012). Davidson (2003) proposed that specific parameters of physiological response to emotional challenge can be objectively measured, including the threshold to respond, the magnitude of the response, the rise time to the peak of the response, the recovery function of the response, and the duration of the response (see Figure 1). The last three parameters correspond to different aspects of affective chronometry, or time course for emotional responding (Davidson, 2003). We propose that these parameters could be used to measure certain aspects of equanimity. For example, one could hypothesize that increased equanimity manifests as a reduction in magnitude and/or duration of certain emotions (especially those considered maladaptive), while not affecting other ones, or even amplifying some of them: in the context of specific Buddhist meditation practices aimed at cultivating compassion for others' suffering, the magnitude of emotional response was found to increase in expert meditators, who presumably have high equanimity (Lutz, Brefczynski-Lewis, Johnstone, & Davidson, 2008).

We propose that a primary "signature" of equanimity is in the temporal domain, in the form of a more rapid disengagement from initial emotional response and faster return to baseline. For example, in response to a loud noise, there may be a similar initial startle response, but with equanimity it is less likely to be followed by anxiety and the person will quickly return to their regular state. Furthermore, in our opinion equanimity does not necessarily entail a complete lack of physiological response to emotional challenges. A lack of emotional response in circumstances when it is normally expected is usually considered a mark of psychopathology. As discussed above, mere indifference is very distinct from equanimity.

## Measuring Equanimity

Assessing equanimity, both subjectively and objectively, presents several challenges. For instance, as discussed above, equanimity may be difficult to distinguish from apathy, as both can lead to diminished emotional responses to a given stimulus or context. However, in the case of equanimity, one still experiences care and interest in the situation. Therefore, a scientific measure of equanimity will ideally be able to distinguish it from apathy. Below we review previous studies that have used a variety of psychological, physiological, and neuroimaging methods to assess equanimity or emotional responding, either in experienced meditation practitioners or in longitudinal studies with novices, and suggest ways that these measures could be further developed towards a more complete measure of equanimity.

### Self-Report Measures of Equanimity

A number of researchers have proposed self-report scales that target equanimity in the sense of resilience or effective management of stressful life events (Kraus & Sears, 2009; Lundman, Strandberg, Eisemann, Gustafson, & Brulin, 2007; Mack et al., 2008); however, most scales lack a theoretical framework and reveal the lack of a common agreement for the construct of equanimity.

Kraus and Sears (2009) developed a questionnaire to measure the four "immeasurable qualities" at the heart of Buddhist teachings: loving-kindness, compassion, appreciative (or

sympathetic) joy, and equanimity. However, equanimity was only represented by one item, namely "acceptance."

Mack et al. (2008) developed the Peace, Equanimity, and Acceptance in Cancer Experience (PEACE) scale. Equanimity was not explicitly defined but items on this questionnaire address "acceptance of diagnosis," "sense of inner peace and harmony," "having made peace with it," and "sense of inner calm and tranquility."

Buessing, Ostermann, and Matthiessen (2007) developed a questionnaire to measure distinct expressions of spirituality. One of the seven factors is equanimity, which is comprised of three items ("trying to practice equanimity," "trying to achieve a calm spirit," and "meditate"). These items are measuring the subject's attempts or efforts towards equanimity, rather than measuring equanimity directly.

In an assessment of the psychometric properties of a Resilience Scale, Lundman et al. (2007) conceptualized equanimity as one of the factors of resilience. They define equanimity as "a balanced perspective of one's life." Sample items of this scale include: "I take things one day at a time," "I do not dwell on things that I can't do anything about," "I usually take things in stride," "I seldom wonder what the point of it all is," "It's okay if there are people who don't like me," and "When I'm in difficult situations, I can usually find my way out of it." Not only do these questionnaire items conflate multiple constructs (such as self-worth and rumination), but the conceptualization of equanimity overall does not differentiate equanimity from apathy. Tongeren & Green (2010) propose that psychological equanimity is related to the integrity of the self, or the integrity of one's own world-views. They suggest that in order to maintain psychological equanimity, sources of meaning have to be preserved. Whenever an individual experiences disruption to one domain of self-meaning, alternative sources of meaning are being bolstered to regain equanimity. This understanding of the term suggests an evaluative process equating equanimity with a state of alignment or balance between one's world view and one's

personal experience. This definition is at odds with the one that we propose here based on the Buddhist tradition.

Other scales have recently been developed that assess constructs closely related to equanimity. In the Nonattachment Scale (NAS), informed by classic and contemporary Buddhist scholarship, nonattachment is described as psychological flexibility, nonreactivity, mindedness, more quickly recovering from upsets, allowing, releasing, supporting others' capacity to choose, and a sense of ease (Sahdra, Shaver, & Brown, 2010). Phenomenologically, nonattachment is described as having the subjective quality of not being stuck or fixated on ideas, images, or sensory objects and not feeling an internal pressure to acquire, hold, avoid, or change. This description corresponds well to the Buddhist definition of equanimity we have described here. Example items include: "I can accept the flow of events in my life without hanging onto them or pushing them away," "I can let go of regrets and feelings of dissatisfaction about the past," and "I can remain open to what life offers me regardless of whether it seems desirable or undesirable at a particular time." Sahdra et al. (2010) address the distinction between nonattachment and indifference and demonstrate that the scale is inversely related to avoidant attachment, dissociation, alexithymia, and impersonal motivational orientation. While the scale includes an array of related constructs (e.g., the willingness to view difficulties as challenges, and the capacity to take joy in others' achievements), we feel that many of its items would be well-suited to assess the subjective aspects of equanimity.

Another construct that is related to equanimity is the concept of decentering. Earlier we elaborated on how this change in relation to one's experience is essential for the development of equanimity (see 3.1). The Experience Questionnaire developed by Teasdale, Segal and Williams assesses decentering, along with rumination. Studies have demonstrated good psychometric properties and construct validity of the scale and showed that the relevant items load on a single factor of decentering (Fresco et al., 2007). The construct is negatively related to experiential avoidance and positively related to emotion regulation. Sample items include "I can

observe unpleasant feelings without being drawn into them" and "I can separate myself from my thoughts and feelings." Future research could employ this scale to test the assumption that decentering is an important process for developing equanimity, and could be used to further reveal the relationship between the two constructs.

Finally, it should be noted that any self-report measure of equanimity is likely to face the same problems that the existing mindfulness questionnaires are facing, namely: (1) experts may disagree about what the construct is, (2) questionnaire designers may lack a deep theoretical and experiential understanding of the construct, (3) items may be differently interpreted, depending on the development and meditation practice of respondents, (4) there may be discrepancies between self-report and reality, (5) biases may occur in meditation practitioners due to their large investment of time and effort in the practice, and (6) the validation of instruments may be compromised by choosing inappropriate populations (Grossman, 2008). While a number of these issues can be addressed, some are inherent to all self-report measures.

**Physiological Measures Indicative of Equanimity**

In addition to the inherent limitations of self-report measures, study participants may not recognize their own equanimity if some emotions are still present, albeit transient and short-lived. Some of these emotions may even have a high intensity, especially in individuals who had a tendency for blunted emotions before meditation training. Therefore, we propose that objective measures should be pursued to provide a more meaningful and accurate metric of equanimity. Physiological measures that may be relevant to measure equanimity objectively include autonomic, endocrine, and inflammatory markers.

Indices of autonomic function have been used for decades in the field of psychophysiology to assess how emotions manifest in the body (Ledoux, 1996). Popular indices include skin conductance, heart rate, respiratory rate, and heart rate variability (HRV). For example, skin conductance varies with sympathetic nervous system activation and can be used

as an indication of psychological or physiological arousal. It is well known that the "fight-or-flight" response elicits increases in heart rate and breathing rate, indicative of higher sympathetic activation (Cannon, 1915). Conversely, the "relaxation response" is characterized by a decrease in heart rate and breathing rate and an increase in HRV, consistent with increased parasympathetic activation (Benson, 1975). Many studies to date have investigated how these autonomic indices relate to emotion regulation (e.g., Chapman, Woltering, Lamm, & Lewis, 2010; Demaree, Robinson, Everhart, & Schmeichel, 2004; Dikecligil & Mujica-Parodi, 2010; Geisler, Vennewald, Kubiak, & Weber, 2010; Gyurak & Ayduk, 2008; Ohira et al., 2006; Porges, 2007, 2011; Pu, Schmeichel, & Demaree, 2010; Ruiz-Padial, Vila, & Thayer, 2011; Smith et al., 2011; Thayer & Lane, 2000; Thayer, Åhs, Fredrikson, Sollers III, & Wager, 2011; Vohs & Baumeister, 2010; Volokhov & Demaree, 2010; Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Driscoll, Tranel, & Anderson, 2009; Najström & Jansson, 2007; Robinson & Demaree, 2009; Sheppes, Catran, & Meiran, 2009). We propose that these indices may also be used to assess equanimity from a physiological perspective. For example, one component of HRV (namely, respiratory sinus arrhythmia, which measures vagal cardiovascular reactivity) was used as a measure of emotional equanimity in a study on emotional and motivational orientation towards academic performance in college students (Gramzow, Willard, & Mendes, 2008). Emotional equanimity in this context was defined as a "calm and composed state," and as "keeping a cool head when thinking about academic performance (i.e., a challenge)". Another potentially relevant index is heart rate deceleration, a physiological response that has been associated with orienting toward and engaging with others (Dunn, Billotti, Murphy, & Dalgleish, 2009; Eisenberg et al., 1989; Goetz, Keltner, & Simon-Thomas, 2010; Stellar, Manzo, Kraus, & Keltner, 2012).

Other physiological markers relevant to emotion include stress hormones and immune markers such as cortisol and inflammatory cytokines, which affect the brain and are influenced by it in a bi-directional fashion (Sternberg, 2000). These markers are sometimes measured

during an emotional or stress challenge such as the Trier Social Stress Test (TSST), in which the subject is asked to deliver a speech and perform a challenging mental arithmetic task in front of an audience (Kirschbaum, Pirke, & Hellhammer, 1993). The TSST induces increases in cortisol and inflammatory cytokines over the course of several hours following the stressor (Steptoe, Hamer, & Chida, 2007; Yamakawa et al., 2009). However, responses vary across individuals, and it has been proposed that this variability may correspond to differences in emotion regulation skills across individuals (Pace et al., 2006; von Känel, Kudielka, Preckel, Hanebuth, & Fischer, 2006; Wirtz et al., 2007). In the context of a stress test, equanimity could be operationalized as a lower overall level of stress hormones and/or a shorter time course for the return to baseline, presumably mirroring subjects' inner process of self-distancing and decentering. For example, Pace et al. (2009) found a post-hoc association between compassion meditation practice time and decreased levels of interleukin-6, a pro-inflammatory cytokine, although there was no difference between the meditation group and the control group overall. In other work, Hoge and colleagues found lower levels of adrenocorticotrophin hormone (the hormone that stimulates cortisol release) during the TSST in a Mindfulness-Based Stress Reduction (MBSR) group, compared to an active control group (Hoge, Bui, Metcalf, Pollack, & Simon, 2012).

Another measure of emotion response that could be applied to the study of equanimity is the activation of the facial muscles involved in facial expressions (Ekman & Rosenberg, 2005). In one case study, an experienced Buddhist monk showed a smaller startle response to a loud noise (as measured by electrical activity of the muscles controlling eye blinks) during meditation than during distraction. In addition, the startle response was smaller in a meditative state of equanimity called "Open Awareness" (*rig pa cog gzhag* in Tibetan) than in a meditative state of focused concentration on an external object (Levenson, Ekman, & Ricard, 2012). This case study suggests that external physiological measures can be indicative of different levels of equanimity.

The above two sections describe complementary methods that could be used to measure equanimity. While physiological measurements may give more objective assessments, supplementary psychological self-reports could be used in combination with laboratory measures to help distinguish equanimity from apathy or other forms of top-down emotional regulation (e.g., reappraisal, suppression, or distraction), which may also manifest as a lower-amplitude physiological response to a stimulus. After meditation training, subjects tend to provide more detailed phenomenological reports of their moment-by-moment experience, which can be of great value for the scientific investigation of mental processes (Varela, Thompson, & Rosch, 1992).

**Putative Neural Mechanisms of Equanimity**

A number of recent neuroimaging studies have revealed possible neural mechanisms underlying equanimity, using various forms of emotional challenges, including pain. While these studies were not explicitly designed to investigate equanimity *per se*, we believe that they offer important insights into how equanimity might manifest in the brain in various experimental contexts.

It was previously found that compared to novices, long-term meditators had a significant reduction of self-reported unpleasantness—but not intensity—of painful stimuli while practicing open-presence meditation (Perlman, Salomons, Davidson, & Lutz, 2010). In a recent study of experienced Vipassana meditators, these findings were replicated and extended with a neuroimaging investigation of the underlying neural mechanisms (Gard et al., 2012). The reduction in pain unpleasantness while in a meditative state of mindfulness was accompanied by increased brain activation in sensory areas (the posterior insula/secondary somatosensory cortex) and decreased activation in an area that mediates executive control (the lateral prefrontal cortex). This suggests that this meditative state corresponds to a decrease in cognitive control of the pain, rather than a decrease in the pain sensation *per se*. Another study investigated pain processing in experienced Zen meditators who were explicitly instructed *not* to

enter a meditative state (Grant, Courtemanche, & Rainville, 2011). In response to pain (heat) stimulation, the experienced meditators exhibited lower pain sensitivity together with greater activation in primary pain sensory processing regions (insula, thalamus, and anterior cingulate cortex) and less activation in executive, evaluative, and emotion-related areas (prefrontal cortex, amygdala, and hippocampus) compared to controls. Importantly, the lower pain sensitivity in meditators was strongly predicted by decoupling between activity in the cognitive-evaluative prefrontal areas and sensory pain areas (Grant et al., 2011). This decoupling may correspond to the neural substrate of the meditators' capacity to view painful stimuli more neutrally, which is one aspect of equanimity.

Other neuroimaging studies have investigated the neural correlates of emotion regulation in the context of meditation. As reviewed below, these studies point to an important, if complex, role of the amygdala – a brain region centrally involved in the perception and appraisal of emotional (negative as well as positive) stimuli and in orienting attention towards emotionally significant stimuli (Vuilleumier, 2005; Whalen & Phelps, 2009; Whalen, 1998). Previous studies indicate that emotional regulation strategies such as cognitive distancing and reappraisal promote decreased amygdala activation (Beauregard, Lévesque, & Bourgouin, 2001; Lévesque et al., 2003; Ochsner et al., 2004; Ochsner, Bunge, Gross, & Gabrieli, 2002), and conversely, the instruction to ''maintain'' the emotional state elicited by negative-valence stimuli causes an increase in amygdala activation (Schaefer et al., 2002).

In one of several recent neuroimaging studies of meditation, experienced Zen meditators perceived emotional pictures as less intense while being in a state of mindfulness than during rest, but that this happened without increased activity in modulatory prefrontal brain areas and without down-regulation of the amygdala, suggesting that it was not just a standard case of top-down control over low-level affective cerebral systems from higher-level cortical brain regions (Taylor et al., 2011). In contrast, in the same study, novice meditators (20 min/day for 7 days) instructed to be in a state of mindfulness showed increased activation in regulatory prefrontal

brain areas and decreased activation in the amygdala when successfully down-regulating emotional intensity. The difference between experienced and novice meditators indicate that emotion regulation strategies may shift dramatically with extensive meditation experience, following the development of greater equanimity that no longer requires active down-regulation of emotions.

Another recent fMRI study suggests that, after eight weeks of *shamatha* (focused attention) meditation training, novice meditators exhibited a longitudinal decrease in amygdala activation in response to emotion-evoking stimuli, compared to before training (Desbordes et al., 2012). Importantly, throughout the experiment subjects remained in an ordinary, non-meditative state. This finding suggests that eight weeks of meditation training may affect emotional processing in everyday life, and not just during meditation. In another recent fMRI study, generalized anxiety disorder patients exhibited a reduction in amygdala activation in response to neutral facial expressions following participation in an MBSR course (Hölzel et al., 2013). In addition, these patients also showed altered functional connectivity between the amygdala and regions of the prefrontal cortex which are known to be involved in the monitoring of arousal. While studies on emotion regulation typically show a negative correlation between prefrontal regions and the amygdala when subjects down-regulate emotional responses, this study found a positive correlation between amygdala and prefrontal activation following mindfulness training, suggesting that the typical down-regulation of reactivity through the prefrontal cortex may have been replaced with a mere monitoring of arousal (amygdala activation) through the prefrontal cortex. These findings appear in line with our conceptualization of equanimity as the observance rather than suppression of emotional responses.

In line with the above findings, patients with social anxiety disorder who had completed an eight-week MBSR course showed decreased negative emotional experience, decreased amygdala activation, and decreased activation in other brain regions involved in attention deployment, when contrasting a condition of mindful breath awareness with a condition of

reacting to phrases expressing negative self-beliefs (Goldin & Gross, 2010). Interestingly, this study also showed a longitudinal difference in the timing of amygdala activation during the initial reaction to negative self-belief phrases (a form of emotional challenge), when comparing before and after MBSR. Before MBSR training, the amygdala response to negative self-belief phrases slowly rose throughout the 12-second stimulus presentation (see Figure 2, "React" phase). After MBSR training, the amygdala response initially rose quickly, but then reverted after 4.5 seconds and decreased significantly, several seconds before the subjects were instructed to enter a state of mindful breath awareness (see Figure 2). This finding is in agreement with our proposition of a faster return to baseline in response to emotional stressors that would correspond to greater equanimity. Of note, the time course of amygdala activity in response to negative emotion stimuli has been linked to trait measures of affective style: Schuyler et al. (in press) found that a slower amygdala recovery was associated with greater trait neuroticism, which is characterized by a decreased ability to regulate emotion and greater perseveration following negative events (Kokkonen & Pulkkinen, 2001; Suls & Martin, 2005), i.e., low equanimity as defined here.

A few other studies have investigated the temporal aspect of emotional reactivity and engagement with emotion. One study employing an emotional interference task showed that participants of a mindfulness intervention disengaged more rapidly from the unpleasant interfering stimulus than participants of a relaxation intervention or waitlist controls (Ortner, Kilner, & Zelazo, 2007). In a sample of female fibromyalgia patients, a preliminary study of mindfulness meditation on attentional bias revealed decreased avoidance at early stages of attention towards pain-related cues and more rapid disengagement from threat at later stages of cognitive processing in those patients exposed to eight weeks of mindfulness training (Vago & Nakamura, 2011). In another study, Zen practitioners had a reduced duration of neural response associated with conceptual processing in regions of the default network as compared to matched controls during a lexical decision task, suggesting reduced elaboration or reactivity

to stimuli (Pagnoni, Cekic, & Guo, 2008). In addition, the time course of activation in the brain's attention network was more strongly correlated with the time course of the task itself in meditators than in controls (Guo & Pagnoni, 2008). These studies indicate that subjects trained in meditation show higher equanimity as defined by a faster disengagement from a stimulus once it has become irrelevant.

Most studies discussed above indicate that experienced meditators, who purportedly have high levels of equanimity, show decreased activation in evaluative and regulatory brain regions but increased activation in sensory brain regions in response to emotion-evoking stimuli. The above studies suggest that while experienced meditators exhibit neural activation patterns indicative of equanimity, beginner meditators tend to show patterns reflecting increased cognitive control and regulation. This is consistent with our hypothesis above that equanimity may take a longer time to develop than purely attentional skills. In this regard, we should note that it would be particularly beneficial for future studies to include expert meditators as full-fledged collaborators (rather than simple experimental subjects) as their personal experience with meditation practice may provide invaluable information towards study design and hypotheses—especially if they are also trained in scientific methods (Desbordes & Negi, 2013).

Beyond the emotional response to specific stimuli, recent neuroimaging studies have begun to look at spontaneously occurring brain states in expert meditators, who may have overall greater equanimity than non-meditators. The investigation of spontaneous brain activity is a particularly promising approach for studying equanimous states because it may reveal underlying changes in connectivity between brain regions and synchrony within neuronal assemblies that are thought to shape our moment-by-moment responses to stimuli. For example, Brewer et al. (2011) found lower activation in the brain's default mode network, which is associated with mind-wandering and self-referential processing, in experienced meditators compared to meditation-naïve controls. In addition, the same group found that, in experienced meditators, deactivation in a core region of the default mode network (the posterior cingulate

cortex) was related on a moment-by-moment basis to subjective reports of "not efforting," "contentment," and other descriptions consistent with the experience of an equanimous state (Garrison, Santoyo, et al., 2013; Garrison, Scheinost, et al., 2013). Other recent studies also found differences in functional connectivity in the default mode network between meditators and controls (Jang et al., 2011; Kilpatrick et al., 2011). Overall, these findings are consistent with the hypothesis that the cultivation of specific meditative states, which are relatively short-term, can result in enduring changes in mental function, i.e., in the long-term development of certain traits such as equanimity (Slagter, Davidson, & Lutz, 2011).

## Conclusions and Future Directions

In summary, we introduced equanimity as a fundamental concept in meditation practice that we propose captures an essential psychological element in the improvement of well-being, and therefore should be a focus in future research studies of meditation and other contemplative practices.

Dissociating equanimity from mindfulness is a critical step in dismantling the neurocognitive, psychological, physiological, and behavioral mechanisms that enable the transformation of maladaptive processes into more adaptive ones. Here, we describe equanimity as a state and dispositional tendency that can be developed over time through specific contemplative practices. Equanimity transforms our sensory-perceptual and cognitive-emotional systems to widen our perspective on experience, more readily engage incoming sensory information, and more efficiently disengage cognitive-evaluative and emotional-reactive behaviors when appropriate. Generally, this transformation is more gradual than the development of enhanced meta-awareness. Identifying mindfulness and equanimity as separate mental factors also facilitates a more cohesive and accurate nomenclature. Terms such as "distancing," "accepting," "non-judging," and "non-attachment" describe certain aspects of equanimity, but are incomplete and often misleading, causing confusion and misunderstanding in the psychological literature.

Understanding the distinction between mindfulness and equanimity will also facilitate the development of more precise quantitative tools to assess each. Given the significant difficulties with previous self-report psychometrics in meditation research, we also propose that equanimity should be measured objectively in the laboratory instead of constricting this dynamic process into a solely self-report questionnaire. While a self-report component will be useful for developing and validating the interpretation of objective metrics such as brain activity or physiological markers, most individuals will not be able to accurately assess their own levels of equanimity. In particular, in some instances the emotional response to a given stimulus may become larger, though more transient, with the development of equanimity, which could be confusing and counter-intuitive for many novice practitioners. It should also be noted that although we have described how equanimity can be developed through the practice of meditation techniques, this does not exclude the development or expression of equanimity within other contexts, such as traditional psychotherapeutic techniques or mind-body practices (e.g. yoga, tai-chi, etc.). We hope this article will stimulate research into developing new laboratory measures of equanimity that more comprehensively capture this important, multi-dimensional construct.

Perhaps this is a small contribution to a larger shift in orientation around the whole issue of well-being and human flourishing, which so often seems to aim at maximizing pleasure and sustaining happiness while avoiding or eliminating pain and ameliorating the effects of emotional discomfort. It may be that overall well-being is better served by learning to cultivate equanimity, both as an effective state for responding skillfully to whatever is arising in the present moment, and as a healthy trait that can be strengthened over time and integrated into one's character.

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**Figure Captions**

**Figure 1. Generic representation of a typical physiological response to an emotional stimulus.** Different parameters of affective style and chronometry are depicted. The magnitude of response corresponds to the height of the response at its peak. Duration is the time from the onset of response to the return to baseline. In this example, an equanimous response involves a rapid recovery function (solid line), in contrast to one that is either low in magnitude ("blunted," dotted line) or prolonged ("perseverative", dotted line).

**Figure 2: Right dorsal amygdala blood oxygenation level-dependent (BOLD) contrast signal time series during reacting to negative self-beliefs and breath-focused attention in social phobics (SP) at both pre- and post mindfulness-based stress reduction (MBSR).*** $p<0.05$. Rate: negative emotion rating; React: reacting to the negative self-belief; Breath-Focus: instruction to focus attention on breath sensation. Reproduced from (Goldin & Gross, 2010).

Figure 1
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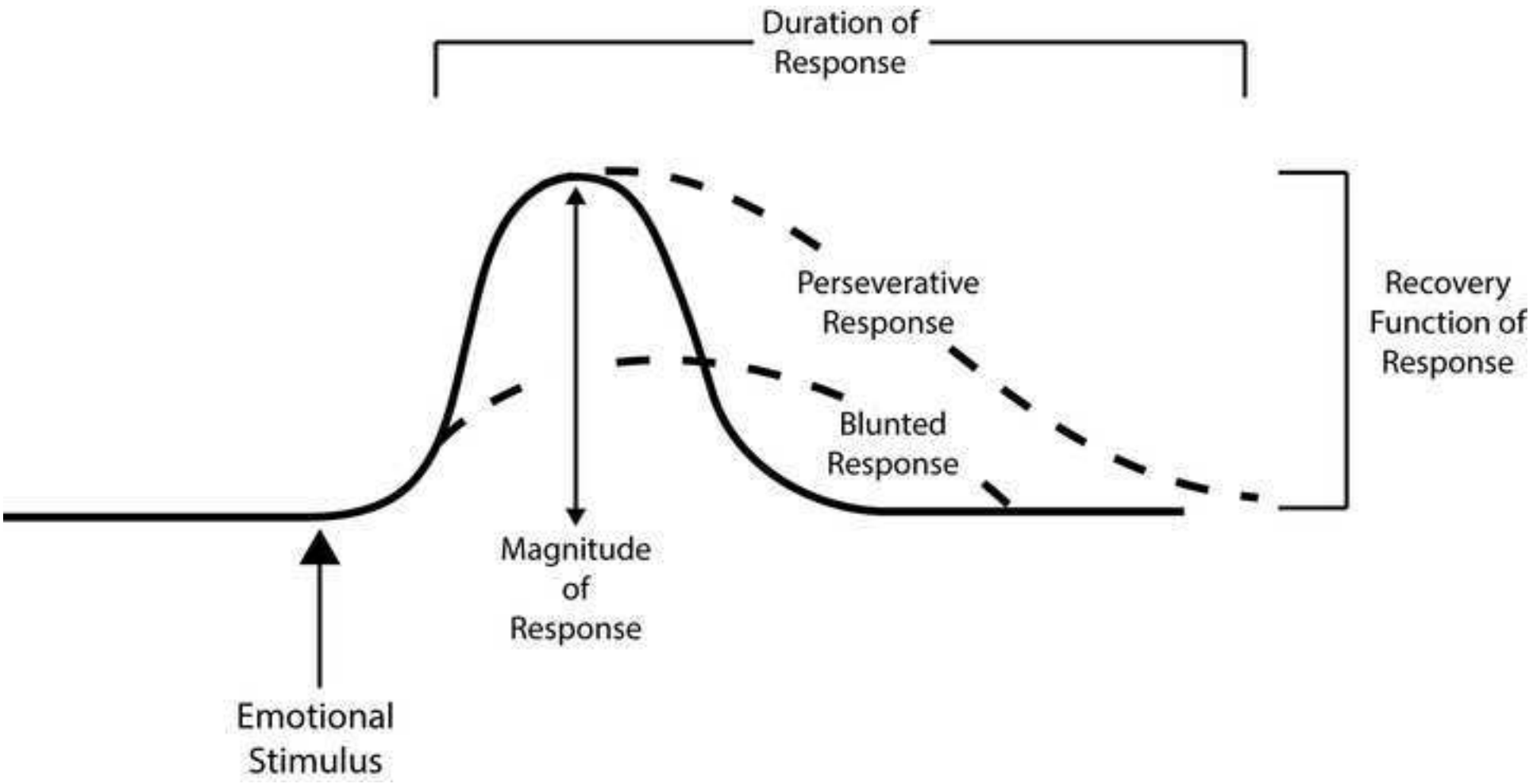

Figure 2
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