

MINDFULNESS, BY ANY OTHER NAME . . . : TRIALS AND TRIBULATIONS OF *SATI* IN WESTERN PSYCHOLOGY AND SCIENCE

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The Buddhist construct of mindfulness is a central element of mindfulness-based interventions and derives from a systematic phenomenological programme developed over several millennia to investigate subjective experience. Enthusiasm for 'mindfulness' in Western psychological and other science has resulted in proliferation of definitions, operationalizations and self-report inventories that purport to measure mindful awareness as a trait. This paper addresses a number of seemingly intractable issues regarding current attempts to characterize mindfulness and also highlights a number of vulnerabilities in this domain that may lead to denaturing, distortion, dilution or reification of Buddhist constructs related to mindfulness. Enriching positivist Western psychological paradigms with a detailed and complex Buddhist phenomenology of the mind may require greater study and long-term direct practice of insight meditation than is currently common among psychologists and other scientists. Pursuit of such an approach would seem a necessary precondition for attempts to characterize and quantify mindfulness.

Defining mindfulness

Foreground

Mindfulness is the 'heart' of the Buddha's teachings (Hanh 1998) and is the core of, and namesake to, a class of intervention aimed at alleviating common forms of suffering—Mindfulness-Based Interventions (MBI's; originally, Mindfulness-based Stress Reduction [MBSR], Kabat-Zinn 1990; later Mindfulness-Based Cognitive Therapy [MBCT], Segal, Williams and Teasdale 2002; and other related programmes). Among Buddhist scholars and Western scientists, both separately and communally, there is a lack of agreement about the specific definition of mindfulness (Baer 2011; Dreyfus 2008; Gethin 1998; Grossman 2008). However, a common basis of understanding exists among Buddhist scholars, although interpretations and descriptions of mindfulness range in emphasis. Some, for example, accentuate aspects of attention, whereas others more explicitly acknowledge the complex and

dynamic interplay of numerous factors including the cognitive, emotional, social and ethical.

Mindfulness within Western psychology is generally assumed to reflect the Buddhist construct. However, definitions of the term vary greatly from that of a simple therapeutic or experiential technique (Hayes and Plumb 2007) to a multi-faceted activity, which requires practice and refinement (Grossman 2010). Certainly, a more elaborated definition appears to have greater support from contemplative texts (Dreyfus 2008), modern explanations of consciousness (Thompson 2007), and the functioning of the nervous system (Thompson and Varela 2001; Varela et al. 1991).

When attempts are made to integrate its traditional roots with modern theories of consciousness and psychological function, mindfulness is also promoted in the West as part of a broad set of practices embedded in a transitional path away from ordinary modes of everyday functioning (Grossman 2010; Hanh 1998; Kabat-Zinn 2005). It is within the context of this transitional path, which includes affective, behavioural, cognitive, ethical, social and other dimensions, that mindfulness is believed to contribute to the promotion of wellbeing and amelioration of suffering. Given this contextual complexity, it may be difficult, if not impossible, to separate mindfulness from the other components woven together into the fabric of this transitional path. Conventional scientific methods may not easily lend themselves to a refined exploration of mindfulness. As Christopher and Gilbert (2007) wrote, based on the writings of the Thai monk and teacher Buddhadasa Bhikkhu (1988) wrote: 'Western psychology mandates that constructs must be explicated and operationalized to be accurately assessed. However, most Buddhist traditions dictate that mindfulness cannot be easily extracted and analyzed in isolation from inherently interrelated concepts.' If this is true, scientists need to embrace new approaches for studying mindfulness, and merely linear, additive models that sum putative markers related to mindfulness will not suffice. Thus, attempts to delineate discrete components of mindfulness (for examples, see the three-factor model of Buchheld, Grossman and Walach 2001; or the five-facet model of Baer et al. 2006) are not likely capture the inherent interrelationships mentioned by Christopher and Gilbert (2007), seen as synergistic and mutually reinforcing.

We examine here current trends in empirical mindfulness research, confining our discussion to a few limited, but, to our minds, crucial questions, namely: (1) how do psychologists and other scientists currently characterize mindfulness; (2) are these characterizations compatible with original Buddhist teachings about mindfulness; and (3) do scientific characterizations of mindfulness meet the empirical standards of contemporary scientific methodology?

Denotations and connotations of mindfulness

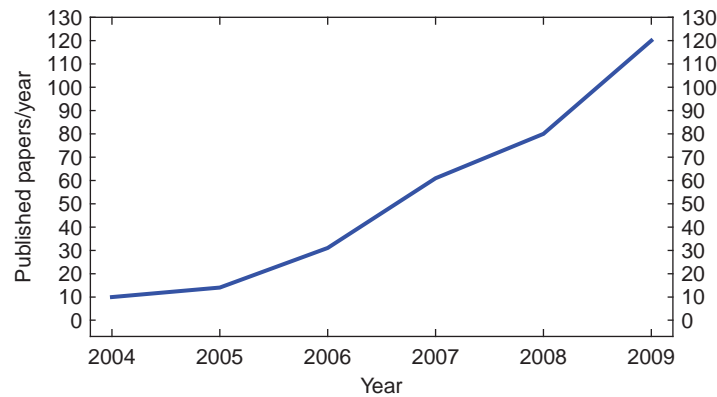
'Mindfulness' is the translation of the Pali term *sati*, which also conveys the meaning 'to remember,' possibly as to remember to maintain awareness (Batchelor 1997). The term *sati* is, perhaps, best translated 'to be mindful,' in stark

contrast to the use of the word 'mindfulness,' which is, of course, a noun and easily implies a fixed trait. Simple as this distinction may seem, it may have substantial implications for conceptualizations of the term *mindfulness*.

Buddhist texts primarily refer to mindfulness not as a mental function or trait (see early translated texts: Bodhi 2000; Ñāṇamoli and Bodhi 2001), but as a *practice* or process involving at least four distinct phases, as mentioned in the *Satipaṭṭhāna Sutta* (one of the oldest Buddhist discourses on mindfulness), ranging from mindfulness of bodily sensations to awareness of more expansive mental content and processes, such as emotion and altered view of self (Ñāṇamoli and Bodhi 2001). It connotes several features: (1) deliberate, open-hearted awareness of moment-to-moment perceptible experience; (2) a process held and sustained by such qualities as kindness, tolerance, patience and courage (as underpinnings of a stance of nonjudgmentalness and acceptance); (3) a practice of nondiscursive, non-analytic investigation of ongoing experience; (4) an awareness markedly different from everyday modes of attention; and (5) in general, a necessity of systematic practice for its gradual refinement (Bodhi 1994; Hanh 1998; Ireland 1997; Kabat-Zinn 2005; Ñāṇamoli and Bodhi 2000).

The current trend in Western psychology, in contrast, is to define and operationalize mindfulness as a relatively stable trait in a manner that takes little account of the developmental and contextual aspects inherent in the Buddhist formulation (e.g. Mindfulness Attention Awareness Scale [MAAS], Brown and Ryan 2003). The range of definitions of mindfulness varies widely between different questionnaires, from how commonly individuals *think* they experience lapses of attention (Brown and Ryan 2003) to how well they *believe* they can express themselves in words ('Describing' subscale, of the Five-Facet Mindfulness Questionnaire [FFMQ], Baer et al. 2006), but also includes self-attributions of non-judgmental attitudes, openness to experience, attention to the present moment, and personal identification with present experience (Freiburg Mindfulness Inventory [FMI], Buchheld, Grossman and Walach 2001; and FFMQ). As just noted, the trait of mindfulness in psychological research has become defined by, and associated with, people's *descriptions of themselves*, based on very brief paper-and-pencil questionnaire responses. This appears to be problematic, because a substantial body of evidence documents that perceptions of one's own behaviour are often dramatically at odds with documented actions (see Baumeister, Vohs and Funder 2007), perhaps especially in regard to desirable behaviours.

Therefore, definitions of mindfulness in present academic psychology, on the one hand, often rely upon self-description of a supposedly stable trait rather than upon concrete evidence that one is actively engaged in mindfulness practice (see Figure 1). On the other hand, mindfulness is divergently defined and operationalized by different groups of investigators, often dependent upon the specific psychological specializations of the authors (Grossman 2008). Our reading of the literature, furthermore, leads us to believe that developers of mindfulness questionnaires commonly imply that their own questionnaires largely reflect a Buddhist definition of mindfulness, albeit in Western terms (FMI, Buchheld,

**FIGURE 1**

Number of published papers with citations per year referring to validation studies of three of the most popular questionnaires purporting to measure 'mindfulness': Kentucky Inventory of Mindfulness Skills (KIMS), and Five Facets of Mindfulness Questionnaire (FFMQ) (Baer et al. 2004, 2006); Mindfulness Attention Awareness Scale (MAAS) (Brown and Ryan 2003). A total of 350 studies during 2009 were found in websites indexing scientific publications (PubMed, eb of Science, Google Scholar)

Grossman and Walach 2001; Kentucky Inventory of Mindfulness Skills [KIMS], Baer et al. 2004; MAAS, Brown and Ryan 2003). We believe that developers of these inventories have insufficiently addressed distinctions between their own characterizations of mindfulness and general Buddhist definitions. Even when certain caveats regarding this theme are stated in publications, they are often only briefly mentioned, which may contribute to their being overlooked by other scientists who later employ the questionnaires.

The state of affairs regarding the measurement of mindfulness also needs to be placed within the general context of current tendencies in psychological research. In recent years, questionnaire data have become extremely popular in contemporary psychological research, perhaps because they are quick to administer and easy to obtain. Baumeister et al. (2007) provide evidence suggesting that up to 80% of current research in social and personality psychology may rely upon such indirect assessments of behaviour. This penchant for indirect measurement is also clearly evident in mindfulness investigations (see Figure 1) and may have serious consequences for the future of mindfulness in psychology. One possibility is a situation in which large numbers of individual researchers—unfamiliar with basic knowledge of Buddhist constructs about mindfulness—employ disparate questionnaires to 'measure' mindfulness, believing their results closely approximate the original Buddhist construct of mindfulness.

Yet another potentially important issue is that some psychologists have promoted a highly restricted interpretation of mindfulness, narrowing in on the

cognitive capacities of attention and awareness (Hayes and Plumb 2007). A lone focus upon specific cognitive capacities, of course, limits the scope of what is investigated. From the traditional Buddhist perspective, the notions of attention (from the Pali term *manasikāra*) and awareness (from the Pali term *citta*) have separate originations from that of *sati*, or mindfulness. In the Buddhist interpretation, attention and awareness are part of any discriminative mental state (Dreyfus and Thompson 2007). Minimally, this indicates that attention and awareness are at most *aspects that serve as preconditions*, rather than *equivalents*, of mindfulness.

Attempts to understand and measure mindfulness can, consequently, be hampered by methodological and practical approaches that neglect to take into account the unique composition of multifarious interacting factors involved in the Buddhist construct (see Grossman 2008, 2010; Van Dam, Earleywine and Danoff-Burg 2009; Van Dam et al. 2011). Discussing mindfulness without including other integral aspects of Buddhist practice, the noble Eightfold Path and Four “Immeasurables” (that is *brahmavihāra*; compassion, loving kindness, sympathetic joy and equanimity), may lead to significant denaturing of mindfulness. Although a denatured approach may, nevertheless, yield some health benefits, such a tact is more in line with implementing limited components of a broad, not easily dissected, process, rather than exploring the process as a whole (Gethin 1998).

Developing mindfulness

Buddhist and common psychological approaches

The classic Buddhist method for developing mindfulness is by means of meditation, progressing from a practice of refining attention and awareness to one of deep analytical probing and insight, within the broader context mentioned above (Bodhi 1994). The process of refinement is typically engendered using a type of practice called *samatha* (or calm abiding) meditation (see Bodhi 1994; Hanh 1998), whereas insight and understanding are engendered through *vipassanā* (or insight) meditation (see Rosenberg 1998). According to Buddhist views, only insight (*vipassanā*) can truly generate wisdom, but progress cannot be made without first developing mental focus through *samatha* (Bodhi 1994). Refined attention and developed concentration are considered prerequisites for insight (Gethin 1998), partially explaining why so many contemplative practices start with the seemingly simple (but, in fact, considerably challenging) goal of sustaining attention on the breath.

A brief description of the role that awareness of breathing sometimes plays in mindfulness practice may illustrate how central features of meditation practices are compatible with, and comprehensible within, scientific disciplines like psychology. It may also point to the complexity of the process of mindfulness

practice and underline the gradual nature of the acquisition of 'right' concentration, 'right' mindfulness and insight (Gethin 1998).

The breath often serves as a very practical object of, and anchor to, consciousness in meditation. Respiration is the one vital physiological function continuously accessible to sensation and perception during awake states. Although people rarely pay attention to their breathing during ordinary, healthy states, it is both experientially and empirically apparent that (given intact mental capabilities) we are able to turn attention to the breath in all situations and at all times, until respiration is finally extinguished at death. The breath is available to all the core senses—taste, touch, smell, sound, and vision—as well as to other internal perceptual processes tightly bound to conscious experience of the self (interoception, proprioception and kinesthetic experience). Additionally, the lungs represent the largest and most powerful pumping system (and physiological oscillator) in the body. As a consequence, other vital functions (the heartbeat, blood pressure, central nervous system activity) often synchronize with the rhythm of the breath (Grossman 1983). The breath is also exquisitely sensitive to numerous emotional, cognitive and behavioural activities (Grossman and Wientjes 2001). Furthermore, breathing can alternatively function almost entirely under unconscious control or almost completely under conscious control (Phillipson et al. 1978), placing this physiological process precisely at the juncture of conscious and unconscious experience. For all these reasons and more (see Grossman 2010), awareness of the breath can put us in touch with experiences below the threshold of usual conscious experience and may serve as a powerful tool to refine and broaden understanding of one's own thoughts, feelings, and other mental states.

The apparent 'simplicity' of awareness of breathing is contradicted by the actual experience of practicing mindfulness of the breath: the meditator is confronted with the wandering, clutching, aversive and judging mind. A committed engagement with the practice of mindfulness of breathing quickly makes clear that the process is challenging and complex, and that the learning curve is steep and long. The 'simple' breath becomes a microcosm of experience, with constantly changing textures, pleasures and discomforts, allures and aversions, mental presence in one moment and its utter absence in the next. Contrast this *lived experience* of mindfulness of breathing as a practice with a psychological *concept* of 'mindfulness of breathing' that might, for example, be based upon a 10-minute 'mindfulness of breathing' taped exercise aimed at relaxation. By making this comparison, one may gain appreciation of the chasm often occurring between Western academic psychology's understanding of mindfulness and that derived from a more deeply experiential and existential Buddhist orientation (Rosenberg 1998).

Nothing in the above example of mindfulness of breathing—its utility, practical application, complexity, empirical basis, and particularly its very gradual course—should be difficult for scientists and psychologists to understand. However, even cursory examination of the academic literature indicates that current psychological thinking is oriented toward quite short-term interventional

approaches. Perhaps that may, at least partially, account for the fact that understanding of mindfulness among psychologists tends not to be explicitly developmental and does not seriously factor in lengthy practice and experience over years. We believe that a greater emphasis upon considering the very gradual nature of cultivation of mindfulness may benefit efforts to define, operationalize and even measure mindfulness. We return to this issue later in another context.

Towards greater value of the subjective

It is worth considering that different understandings of mindfulness in Western science vs. Buddhist psychology may reflect deep cultural differences in the extent to which subjective experience is valued as a source of inquiry within traditions. A surgeon in the US or Europe is not necessarily likely to place great value upon the benefit to her surgical skill that may be gained from being the subject of surgical procedures. Neither is she ordinarily systematically trained toward greater sensitivity of her own immediate, inner experience, nor that of her patients. Medical science has historically emphasized intellectual knowledge and concrete experience as surgical qualifications—not investigation of subjective inner life by the physician during consultations or surgery. Behaviourist and other positivist movements in psychology have similarly promoted the value of intellectual knowledge of cognitive and behavioural states, and of the systematic techniques used to alter them, often to the neglect of self-inquiry (Grossman 2010).

An inclination to short-cut the self-experiential foundations of mindfulness practice may, consequently, seem natural to many psychologists who may have known little in the way of self-investigation in their studies. Exploration of one's own subjective experience even tends to play a minor role in the training of many psychotherapists. Therefore, it may, in fact, be difficult for psychologists—when first considering this unfamiliar way of approaching experience—to fathom a type of understanding that does not exclusively or very predominately rely upon the intellectual and conceptual (see Bush 2011). This lack of experience is bound to have serious consequences for the understanding, definition and transmission of mindfulness. Batchelor (1997) points out, 'Experience cannot be accounted for by simply confining it to a conceptual category. Its ultimate ambiguity is that it is simultaneously knowable *and* unknowable. No matter how well we may know something, to witness its intrinsic freedom impels the humble admission: *I don't really know it.*' In other words, phenomenological understanding cannot solely rely upon intellectual knowledge or upon popular contemporary scientific methods of assessment and experimentation and the thinking behind them.

The value placed upon investigation of accessible inner experience may also have consequences for how mindfulness is applied in MBIs. A high value would imply the need for teachers who are, themselves, highly experienced in inner exploration and who are able to embody this experience in their teaching. Within this perspective, the teacher (and perhaps even the therapist and researcher) will

be unable to address what he, himself, has not yet explored (Kabat-Zinn 2003; Segal et al. 2002). One can recite passages from books and give prepared responses to questions, but the fundamental shift in experience cannot be simulated (Teasdale et al. 2002).

Another related point, rarely considered in the psychological literature, is whether benefits to wellbeing of MBIs are importantly related to participants learning to *value* aspects integral to the cultivation of mindful awareness, for example appreciation of stillness, attentiveness and patience. Conceivably, such changes in value system may play a far larger role in clinical outcomes than actual mastery of mindfulness during everyday life. This topic seems worthy of investigation.

Measuring mindfulness

Mindfulness is a difficult concept—or perhaps more accurately, percept—to pin down, as should be apparent from the above discussion. Therefore, two questions logically seem to arise: (1) How can we know when someone becomes more mindful; and (2) should we even be asking such this question at such an early phase of scientific inquiry? Some argue that in order to validate MBIs within psychological and basic science, a way must be found to measure the construct and determine that the proposed mechanism of change is responsible for what has changed (for example, Baer 2011).

Those who research mindfulness have, in our opinion, made laudable strides towards identifying features that may be *related to* mindfulness. However, as we hope later to make clear, many quantification efforts confuse discrete psychological characteristics with a definition and quantification of mindfulness. We find this confusion unhelpful to this area of investigation. We believe preliminary self-report questionnaires may lead to oversimplified representations of mindfulness that at times may hardly represent the general idea. This problem is compounded by the fact that widely disparate working definitions of mindfulness are found in the current psychological literature, and there is no external ‘gold standard’ referent to validate measures. Additionally, some popular questionnaires seem marked by inconsistent psychometric properties. A further issue is that understanding of questionnaire items may also greatly vary between different groups (for example meditators vs. non-meditators), which would make comparisons invalid.

One serious consequence, we see, of the enthusiasm for measurement is that self-report questionnaires may come to define mindfulness in psychology (see Figure 1). The iterative process of refinement and reevaluation within the scientific method, often seen as a self-correcting process, may, in fact, end up not correcting fundamental conceptual misunderstandings about mindfulness, but rather serving to perpetuate and fortify them. The ease and quickness of administration of these scales to large numbers of people, as well as the large number of researchers who may embrace them, could facilitate proliferation of

publications about 'mindfulness' in relation to other psychological phenomena. In other words, these scales may take on a life of their own to define and reify mindfulness in the psychological literature. Additionally many scientists with limited or no experience in mindfulness practice may confuse psychological and Buddhist characterizations of mindful awareness. Vested interests (defence of previous studies that used these scales or novel funding possibilities engendered by a popular new approach) are, in turn, likely to exert significant effects upon the direction that the development of such assessment techniques takes. Given these concerns, the rest of this paper will address potential shortcomings of the current attempts to quantify mindfulness by paper-and-pencil questionnaires.

What can mindlessness tell us about mindfulness?

Some have suggested that employment of items assumed to reflect the opposite of mindfulness (operating on 'automatic pilot') can serve as a useful index of mindfulness (employing a little mathematical manipulation, namely, reverse-scoring of items; see Baer 2011; Brown and Ryan 2003). One example is asking people how often they drift off or do not pay attention, and then inverting their responses such that a response of 'My mind doesn't wander off very often' (that is, the low end of the scale) is taken to suggest something like 'My mind stays focused on the task at hand most of the time.' While items employing this reversed scoring procedure are often useful in a questionnaire for identifying participants who are not giving full attention and may be responding carelessly during completion, the majority of items in questionnaires are typically positive formulations that directly assess the idea of interest.

Consider a popular depression inventory that includes four items (out of a total 20) that reflect positive mood instead of depression, and the fact that these positive items may correlate poorly with other items in the scale. Reflecting upon this issue, two prominent psychological statisticians recently emphasized that endorsement of the low end of a trait scale does not imply the strong presence of its opposite, for example low endorsement of depressive symptoms does not necessarily suggest happiness, or endorsing the low end of a scale of physical impairment does not suggest physical fitness (Reise and Waller 2009). This is not to say that such reverse-scored items are never useful, rather that inclusion of such items in questionnaires is a complex process.

An entire scale comprised of reverse-scored items is considerably more problematic. Suppose, in fact, that an individual responded to all items about his current level of physical impairment by endorsing the lowest response (not at all). Could we necessarily label him as physically fit on the basis of his responses? He may not be physically impaired, but that is quite different from being very fit. So what then are we to make of a mindfulness scale that measures perceived inattentiveness? The most commonly administered scale that putatively measures mindfulness (MAAS; Brown and Ryan 2003) relies completely on such negatively formulated items based on self-attributions of inattentiveness (see Grossman,

forthcoming, for an indepth discussion). Several investigations, however, suggest that this scale may relate more to propensity to experience lapses of attention than it does to positive qualities possibly associated with mindfulness (Carriere, Cheyne and Smilek 2008; Cheyne, Carriere and Smilek 2006). Additionally, more recent analyses also go in the same direction by suggesting that the MAAS reflects the experience of general inattentiveness, not mindfulness (Van Dam, Earleywine and Borders 2010).

Can we know when we have lapses of attention?

Almost everyone has had the experience of ‘awakening’ from a daydream or arriving somewhere only to realize they paid no attention to how they got there. Such observations suggest that we all know what lapses of attention feel like. But how good are we, on the whole, at identifying our general disposition towards acting in this fashion? In other words, does our experience or self-attribution of inattentiveness during everyday life accurately reflect just how inattentive we really are? Can we accurately estimate how much time we generally spend in inattentive states or how typical such states are for us, as some mindfulness questionnaires suggest (Brown and Ryan 2003)?

Research suggests that mind-wandering (akin to daydreaming) is often associated with a lack of meta-awareness (or awareness that one is aware; see Schooler 2002). Furthermore, experiments in cognitive neuroscience suggest that individuals process very little of their external environment when their minds wander (Smallwood et al. 2008), creating a lack of reference for states of lapsing attention. Other research has, additionally, shown that expert meditators use fewer cognitive resources to return their attention to the task at hand and are better able to prevent their minds from wandering (Pagnoni et al. 2008). These findings create a conceptual conundrum for the self-report of absent-mindedness: Individual differences in psychological or other characteristics may importantly influence people’s accuracy to assess extent of their own inattentiveness. Therefore, it is plausible that the MAAS may not even be a very accurate instrument for assessing actually occurring lapses of attention, much less mindfulness. On the other hand, it may accurately assess how poorly respondents *think* they pay attention in everyday life. A similar argument might also pertain to other self-report measures described as ‘mindfulness’ questionnaires, which may emphasize abilities other than those of the MAAS (for details, see Grossman, Forthcoming).

Mind the bias

Mindfulness questionnaires avoid arcane language in favour of simple words and statements that *appear to be* equally accessible to everyone (even those without mindfulness training). This simple language, however, is commonly based on the wording involved in the MBIs themselves (MBSR and MBCT).

Accordingly, many phrases used in 'mindfulness' questionnaires (operating on 'automatic pilot,' focusing on the present moment), are more readily accessible after participating in a MBI than before. Mere accessibility does not necessarily mean individuals are more likely to endorse the items, although there is evidence that it may (Mayo, White and Eysenck 1978).

The extent to which the participants value the ideas that the items represent may, additionally, have an impact on the extent to which they endorse an item (Grossman 2008). Someone who has gone through an eight week intervention requiring 45 minute daily meditation practice, or someone else who has spent the last 15 years regularly meditating, is likely to attribute some importance to the values that are part of this practice, especially if he has come to internalize those values. Accordingly, individuals might want to demonstrate (unconsciously or consciously) to themselves or others that they possess, at least to some extent, the qualities that the questionnaire describes. Alternatively, they might just confuse aspirations toward certain attributes with actual achievement. There is a substantial literature related to other questionnaires that supports the likelihood of such biases influencing outcomes.

Baer (2011) suggests that bias is not a problem because participants in MBIs are willing to report home practice times that are less than recommended amounts, potentially painting the participants in a negative light. While, on the surface, this may seem to deal with the issue of bias (participants are in fact willing to be perceived negatively), it is more likely that *unconscious* bias presents a problem, rather than *conscious* bias.

There are numerous factors that contribute to bias in self-report measures (Van Dam et al. 2011), and these biases have been repeatedly observed in the psychological literature. Research evidence, specifically related to mindfulness questionnaires, also suggests that biases may play an important role in self-reports. In a comparison of a small group of meditators to students with no meditation experience, evidence was found that people with comparable overall scores were likely to endorse entirely different response options based on their group membership (Van Dam, Earleywine and Danoff-Burg 2009). Meditators were equally likely to endorse options that suggested mindfulness and absent-mindedness, whereas students were more likely to reject absent-mindedness statements than to endorse items that positively purport to reflect mindfulness. This research indicates that even though a long-term meditator and a college student might have the same total score on a scale of 'mindfulness,' that score might be attained in entirely different ways (see Van Dam, Earleywine and Danoff-Burg 2009). This suggests differential interpretations of the meaning of items between groups.

In response to the above study, Baer et al. (2011) suggest that a recent study of their own, using comparable analyses with a demographically well-matched group of meditators and non-meditators, shows 'very little evidence for differential interpretation of items.' However, the statistical methods Baer et al. (2011) chose to use may unduly favour the position that differential

interpretations of items are not a problem, that the threshold for proof of evidence they chose may, itself, preclude finding such differences. We performed alternative statistics on the same data set using conventional levels of probability to evaluate each item, and found that on two subscales of their questionnaire ('Observing' and 'Acting with Awareness'), half of the items in one subscale and three-quarters of the items in the other showed evidence of such problems—exceeding what would be expected by chance. At best, the Baer et al. (2011) study may suggest that using samples well matched for demographic variables (age, gender and education), may modestly reduce these kinds of problems with mindfulness scales, but it also underscores the fact that different groups are likely to interpret the meaning of the same items differently. In some cases, those differences might be due to demographics, and in other cases, to mindfulness training. This is not an optimal state of affairs for a questionnaire aiming to compare different populations. Furthermore, evidence from Baer et al. (2008) indicates that a central aspect of mindfulness ('Observing'; also one of the two subscales showing evidence of differential item functioning) could not be reliably assessed so that meditators and nonmeditators might be validly compared: items in this subscale seem to have had different meanings for each group.

Varying interpretations by nonmeditators and meditators (Baer et al. 2008; Grossman 2008; Van Dam, Earleywine and Danoff-Burg 2009) suggest that ordinary language may not do justice to the complexity of mindfulness, because the words used in the assessment instrument will be understood differently by the different groups. If meditation practice entails a qualitative rotation in subjective experience (Kabat-Zinn 2005), then choice of wording will continue to be problematic when comparing those with vs. those without exposure to meditation.

One example indicates that differences between groups in item interpretation can lead to absurd conclusions when mindfulness self-reports are employed (Grossman 2008): FMI¹ scores of binge-drinking and normal college students (Leigh, Bowen and Marlatt 2005) were compared with those of experienced meditators immediately following a multi-day meditation retreat (Buchheld, Grossman and Walach 2001). Figure 2 shows that binge-drinking students scored significantly higher than experienced meditators on 'mindfulness,' with normal healthy students in the middle. Interestingly, Leigh, Bowen and Marlatt (2005) conclude that constructs of mindfulness 'can be measured reliably through self-report and may assist in identifying an important relationship between substance use and mindfulness.' Hence, implications of this study should be clear: excessive alcohol intake is conducive to mindfulness, but mindfulness meditation is not. In a more serious vein, one way in which these paradoxical findings might be explained is that binge-drinking students interpreted the meaning of items (relating to awareness of bodily sensations) very differently than the meditators.

Similar issues, if somewhat less frivolous, have arisen in other research as well. Another study of the MAAS and KIMS across a Thai population (where Buddhist beliefs are predominant) and US sample (where Buddhist beliefs are in

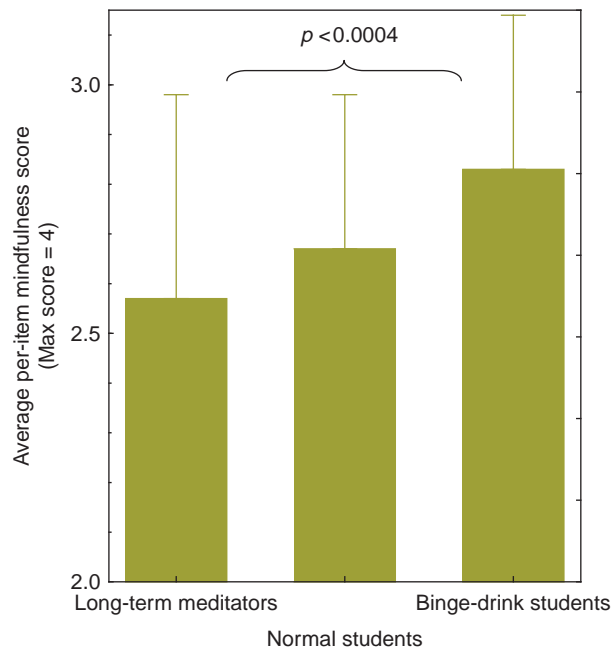


FIGURE 2

Mindfulness scores (Freiburg Mindfulness Inventory [FMI]); means (whiskers, standard deviations) of long-term experienced insight meditators, healthy non-meditating students, and binge-drinking, non-meditating students. Difference between meditators and binger drinkers ($p < 0.0004$); differences between meditators and normal students approached significance ($p < 0.06$)

the minority) found no overall differences on the MAAS (even though rates of meditation in the two groups were substantially different); also the KIMS exhibited inconsistent relationships among its items across the groups (Christopher et al. 2009). Such findings bring into question what psychologists are actually measuring with these questionnaires and whether there is adequate scientific support for their continued use, if characterized as measures of mindfulness.

Diversity of definition in mindfulness scales

There exists no gold standard of reference that can be used to evaluate questionnaires purporting to measure mindfulness. Thus we cannot know whether a questionnaire reliably measures some aspect of mindfulness. Unlike testing mathematical skills, there is no litmus test for mindfulness, no telltale growth or activity in the brain, nor are there any behavioural referents that have been documented as *specific* to mindfulness. This situation opens the door for definitions of mindfulness that are in danger of losing any relationship to the

practices and teachings that gave rise to MBSR and MBCT. It may sometimes result in hybrid definitions and operationalizations of mindfulness possibly far afield from the original Dharmic roots of this way of being (Grossman 2008).

We have already provided the example of the MAAS, items of which assess the perception of attentional lapses in daily life. Nevertheless, the authors of this scale clearly assume that they are measuring mindfulness and refer to it as such when MAAS findings are presented. The FFMQ (Baer et al. 2006) directly adopts many items of the MAAS into one of its subscales, Act with Awareness. However, these authors do not label these responses 'mindfulness' but rather, 'acting with awareness,' one of five facets of mindfulness. This alone is a source of significant confusion. Is 'MAAS mindfulness' only a facet of 'FFMQ mindfulness' or merely a measure of experienced lapses of attention, as still other studies indicate (Carriere, Cheyne and Smilek 2008; Cheyne, Carriere and Smilek 2006)?

Baer et al. (2006) also include another subscale that seems to evaluate how well respondents think they can verbally express themselves. Baer (2011) justifies such a subscale by claiming it reflects the labeling, or noting, technique sometimes employed in insight meditation. However, as we understand it, such verbal labelling primarily serves as a mnemonic aimed to sustain moment-to-moment awareness. The goal is not to investigate experience on a verbal level but to employ labelling to aid *seamless* contact with momentary experience, a process often, in fact, characterized as preverbal or nonverbal, but certainly nowhere described as a rich, running monologue of momentary experience. A mental sequence—such as 'in-breath, out-breath, itch, warmth, discomfort, out-breath, thinking, thinking'—is not, itself, the essence of the meditation experience. Also the practice of such verbal labelling during meditation is unlikely to be importantly associated with evaluations of how well one thinks one can generally express oneself. This subscale possibly derives from the authors' own interest and work in dialectical behaviour therapy (DBT; Linehan 1993), because verbal expressiveness is often deficient in the targeted population of DBT, and a technique promoting verbal description has been termed a 'mindfulness' skill in DBT. Thus, its inclusion seems to indicate that this five-subscale inventory provides a hybrid definition of mindfulness, and at least some subscales bears little resemblance to the original Buddhist construct (see first section). The FFMQ contains: (1) one verbal expressiveness subscale that appears to have little to do with a traditional understanding of mindfulness; (2) another subscale that assesses *perceived* lapses of attention; (3) a third scale reflecting how well people *believe* they can observe or pay attention to experience (however, as mentioned earlier, this subscale performs very differently among meditators and nonmeditators); and (4) two additional subscales that assess self-reports of emotional nonreactivity and non-judgmentalness. Thus, two of the five subscales may not reflect mindfulness at all. A third, although aimed at one of the central features of mindfulness (observing/noticing/attending), is not methodologically valid to use across different groups of people (Baer et al. 2008) and is probably highly susceptible to variations in semantic interpretation. Nevertheless, this

five-facet scale is quite popular, employed by many psychologists to measure extent of mindfulness.

We do not wish here to single out this scale but use it as an example of the types of problems that arise with self-report questionnaires claiming to measure mindfulness. Virtually all available questionnaires have similar shortcomings, including the FMI, with which the first author has been intimately associated. Also they often correlate poorly—or at best moderately—with each other (Baer et al. 2004, 2006; Grossman 2008, forthcoming), which means that a person might easily be high in ‘mindfulness’ on one scale and low on another. Without some reliable external criteria to evaluate such claims, it is impossible to say what such findings actually mean.

Is everyone mindful?

Several mindfulness questionnaires have been developed with the sole intent of measuring mindfulness in individuals who have meditation experience (FMI, Buchheld, Grossman and Walach 2001; Developmental Mindfulness Questionnaire (DMS), Solloway and Fisher 2007; Toronto Mindfulness Scale (TMS), Lau et al. 2006), although two have subsequently been adapted by a few of the original authors for use as trait measures (e.g., FMI, Walach et al. 2006; TMS, Davis, Lau and Cairns 2009). Other questionnaires have been developed with the idea that mindfulness is accessible to, and understood by, everyone in the general population, regardless of exposure to meditation (see Baer 2011). Recently, scales have even been developed that purport to measure mindfulness in children. This general approach, therefore, assumes that it is possible and meaningful to measure mindfulness in almost everyone.

Revisiting an earlier discussion, the development of greater mindfulness is understood, from the earliest Buddhist discourses to modern-day teachings, as an extremely gradual developmental process. It is assumed that people unfamiliar with mindfulness practice possess incipient qualities of mindful awareness, characterized as elementary, undeveloped, and immature (in a contemporary vein [Kabat-Zinn 2005]: ‘... these capacities need to be uncovered, developed, and put to use’). Only slow and gradual cultivation by means of continual mental training is presumed to result in a deepening of mindfulness and its comprehension. Thus in one of the earliest Buddhist treatises (Ireland, translation 1997): ‘Just as the great ocean gradually shelves, slopes, and inclines, and there is no sudden precipice, so also in this doctrine and discipline there is a gradual training, a gradual course, a gradual progression, and there is no sudden penetration...’ More recently, Rosenberg (1998) wrote: ‘Mindfulness is the observing power of the mind, a power that varies with the maturity of the practitioner.’

From this perspective, individuals without meditation experience are almost inevitably going to respond to the word ‘mindfulness’—and questionnaire items purporting to measure it—radically differently from people with meditation experience. As one prominent meditation teacher (Khema 1989) wrote about

effects of meditation training: 'The difference between the trained and untrained mind is the understood experience.' And even those at varying levels of mental training are likely to have divergent understandings. Definitions and operationalizations of mindfulness that do not take into account the gradual nature of training attention, the gradual progression in terms of greater stability of attention and vividness of experience or the enormous challenges inherent in living more mindfully, are very likely to misconstrue and banalize the construct of mindfulness, which is really not a construct as we traditionally understand it in Western psychology, but at depth, a way of being.

Conclusions on understanding mindfulness

Within a relatively short period of time, notable progress has been made toward integrating strikingly unfamiliar concepts into Western paradigms of psychology. Not long ago, it seemed unimaginable that mainstream psychology might so quickly come to acknowledge the inner world as a legitimate topic of study, even opening itself to investigation of such qualities as compassion, loving-kindness and equanimity. Because this area is in its infancy, caution and patience would, therefore, seem helpful when pursuing these matters at this phase, lest we reify and trivialize concepts that may have a richness of which we cannot yet be fully aware.

What are some of the possible quantitative strategies that might be appropriate to this phase of scientific investigation of mindfulness? We do not presume to have all the answers. However, we can suggest a number of plausible approaches that avoid the various limitations and potential pitfalls of self-administered rating scales discussed above.

1. One might be to evaluate, in similar self-report format as current inventories—not how skilled people think they are in specific qualities or behaviours—but the extent to which they value those characteristics, that is examining whether mindfulness practice is associated with differences or changes in value system. For example, how valuable do different people find the act of just sitting still; noticing what sensations, thoughts and/or emotions arise from moment to moment; or examining momentary experiences whether pleasant, unpleasant or neutral? Such questions would have to be carefully formulated but could provide significant information about *what is important* to people who do and do not practice mindfulness meditation. Additionally, this approach might shed light on how mindfulness practice influences people's perspectives on life's challenges and uplifting experiences. Such scales may remain subject to many of the same biases as other self-report measures, but at least they would be less likely to conflate achievement with aspiration.

2. One viable option for preserving the integrity and richness of the Buddhist understanding of mindfulness might be to call those various qualities now purporting to be mindfulness by names much closer to what they actually represent ('experienced lapses of attention' in the case of Brown and Ryan 2003;

'perceived self-competency of verbal expressiveness' in the case of one subscales of Baer et al. 2006). Names could be fully descriptive of what the individual scales actually assess, and full disclaimers in published studies might state that these scales do not directly assess mindfulness. Relationships between these measures and aspects of mindfulness practice could still be evaluated, but there would be clear distinction between the characteristics measured ('experienced lapses of attention') and mindfulness. Such a careful approach is, indeed, already followed by some researchers ('de-centering', Fresco et al. 2007; meta-cognitive awareness (Hargus et al. 2010; Teasdale et al. 2002). Greater employment might serve to increase insights into psychological mechanisms beyond those gained when investigators globally term their measures 'mindfulness.'

3. Interview approaches (Teasdale et al. 2002; Hargus et al. 2010), although more labour intensive, are likely to provide greater insight into psychological mechanisms and characteristics associated with mindfulness than five minute self-report inventories, especially because semantic complexities and response biases may be better addressed in one-on-one interactions (especially with skilled and knowledgeable interviewers).

4. Because mindfulness practice has been hypothesized to contribute to alleviation of suffering, outcome measures could be emphasized that test specificity of effects, even dimensions based on ancient constructs like the seven factors of awakening (energy, joy, concentration, calmness, interest and equanimity, and mindfulness). Although such qualities may also often be difficult to equate with Western terms, they may offer an approach to measurement that evaluates specific effects of mindfulness interventions, provide a basis for testing Buddhist assumptions about consequences of mindfulness practice, and have potential for bridging the gap between paradigms. This strategy can also be applied to examination of behavioural change after MBIs (Singh et al. 2004).

5. Efforts should also continue to be expended that carefully examine the psychological and physiological changes that accompany the *practice and process* of mindfulness; such a strategy is much more likely to reveal commonalities with Western empirical concepts and to build sounder bridges between Buddhist and Western psychologies than employing *a priori* assumptions about mindfulness.

In conclusion, the beginning of a paradigm shift seems evident in new forms of concurrent scientific exploration of the subjective and objective (Thompson 2007; Varela, Thompson and Rosch 1991). Perhaps one of most important benefits that mindfulness itself can contribute to mindfulness research is that we may learn to cultivate a patient, intentional awareness of the present moment and of our own minds in the very work that we are conducting.

NOTE

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