8

Mindfulness

An Antidote for Wandering Minds

Michael D. Mrazek, James M. Broadway, Dawa T. Phillips, Michael S. Franklin, Benjamin W. Mooneyham, and Jonathan W. Schooler

What's in a Name?

Despite the vast flexibility that language offers us for self-expression, we occasionally encounter the limitations of words as imperfect symbols. The word *red* may trigger something relatively universal, but *burgundy* will likely take on a different meaning for a seamstress and a wine aficionado. Words become particularly clumsy when there is not much agreement as to where they point. Most of us use *love* with some trust that others will understand our meaning, yet the word holds a somewhat different significance for each of us. *Mindfulness* has arrived at a similar fate—received with a sense of growing familiarity, but ultimately varied in its meaning. Fortunately, this fate need not stall the pursuit of the benefits that *mindfulness* offers any more than our lumbering use of *love* prevents us from experiencing intimate connection. After all, there are always love letters and operational definitions to help us convey our meanings more clearly.

Mindfulness as Nondistraction

Mindfulness is interpreted in a variety of ways, with ongoing disagreement as to the most privileged and useful definition of this construct (Grossman & Van Dam, 2011). Some meditative traditions have defined mindfulness as sustained nondistraction (Brown & Ryan, 2003; Dreyfus, 2011; Wallace & Shapiro, 2006), whereas multifactor conceptualizations of mindfulness emphasize additional qualities as well, such as an orientation toward one's experiences characterized by curiosity, openness, and acceptance (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Bishop et al., 2004). Another prominent use of *mindfulness* in psychology pioneered by Ellen Langer uses the word to refer to actively drawing novel distinctions, and thereby having greater

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sensitivity to context and perspective (Langer, 1989; Langer & Moldoveanu, 2002). These definitions are by no means exhaustive, and there are many traditions of mindfulness practice that have evolved over millennia and offer further delineation.

Amid this disagreement, there is nevertheless consensus from meditative traditions that sustained attentiveness represents a fundamental element of mindfulness. Although sustained attentiveness is less central to the social psychological view of mindfulness as making novel distinctions, even this form of mindfulness enhances present-moment awareness given that "actively drawing these distinctions keeps us situated in the present" (Langer & Moldoveanu, 2002). Accordingly, we have largely focused our investigations of mindfulness using nondistraction as an operational definition.[1] Our intention has not been to devalue other qualities espoused to be essential to mindfulness, but rather to avoid confusion when using a single term to refer to a variety of different constructs. For instance, multicomponent definitions of mindfulness must indicate whether the various elements are either necessary or sufficient to represent an instance of mindfulness. If one maintains unwavering attention on the breath for hours with a persisting judgment that breathing is wonderful, does the evaluative nature of that experience disqualify the careful focus as mindfulness? While continued discussion on the most privileged definition of mindfulness will almost certainly continue, it may be that different usages of mindfulness are so entrenched that the most practical solution is to accept the term as a catch-all that can provide a useful but unspecific contextualization, within which everyone must explicitly define what they have measured or trained.

Mind-Wandering as Task-Unrelated Thought

In direct contrast to mindfulness, which entails a capacity to avoid distraction, mind-wandering is characteristically described as the interruption of task-focus by task-unrelated thought (TUT; Smallwood & Schooler, 2006). Unlike the struggle to identify a validated and widely accepted measure of mindfulness, there has been somewhat greater consensus with respect to operational definitions of mind-wandering. The most widely used measure is straightforward: periodically interrupting individuals during a task and asking them to report the extent to which their attention was on the task or on task-unrelated concerns, a procedure known as "thought sampling," which measures "probe-caught" mind-wandering. There is a broad literature validating the self-report measures of mind-wandering obtained through thought sampling by using behavioral (Smallwood et al., 2004), event-related potential (ERP; Smallwood, Beach, Schooler, & Handy, 2008), and fMRI methodologies (Christoff, Gordon, Smallwood, Smith, & Schooler, 2009). Such studies suggest that individuals are able to accurately report whether they have been mind-wandering—and even whether they have been aware of it—as revealed by distinct patterns of task performance and neural activation in association with self-reported mind-wandering. Additionally, studies using retrospective reports of mind-wandering after a task has been finished typically find results that are similar to those obtained with thought sampling during the task (Mrazek et al., 2011). This not only provides convergent validity for thought sampling, but also suggests that in at least some task contexts, asking participants to intermittently

report their mind-wandering does not substantially alter their behavior or performance (Barron, Riby, Greer, & Smallwood, 2011; Mrazek, Smallwood, Franklin et al., 2012).

Another common measure of mind-wandering involves asking participants to indicate every time they notice that they have been mind-wandering. This measures "self-caught" mind-wandering, providing a straightforward assessment of mind-wandering episodes that have reached meta-awareness (as an explicit re-representation of the contents of one's own consciousness; Schooler, 2002). By contrast, thought sampling queries participants at unpredictable intervals and does not require participants to attend to their thoughts independently of an external prompt. However, because thought-sampling probes occur at varying and unpredictable times during a primary task, this method can be used in conjunction with the self-catching measure to catch people mind-wandering before they notice it themselves (Schooler & Schreiber, 2004).

Several indirect markers of mind-wandering are also available, including those derived from performance markers of inattention in the Sustained Attention to Response Task (SART; Cheyne, Solman, Carriere, & Smilek, 2009; McVay & Kane, 2009; Smallwood et al., 2004; Smallwood, McSpadden, Luus, & Schooler, 2008; Smallwood, Fishman, & Schooler, 2007). The SART is a GO/NOGO task in which participants are asked to respond with a key press as quickly as possible to frequent non-targets and to refrain from responding to rare targets. Different performance markers in this task, such as response times (RTs) or different kinds of errors, have been associated with varying degrees of task disengagement (Cheyne et al., 2009). For example, failures to respond to rare targets (errors of omission) generally indicate a more pronounced state of disengagement than a large coefficient of variability (CV) for RTs (the CV is the standard deviation of RTs divided by the mean). RT CV has been associated with a state of mind-wandering that emerges from a minimally disruptive disengagement of attention characterized by a periodic speeding and slowing of RTs as attention fluctuates slightly (Cheyne et al., 2009; Smallwood, McSpadden, Luus et al., 2008).

Mindfulness and Mind-Wandering as Opposing Constructs

Many behavioral markers of mind-wandering have a distinctly mindless quality, such as rapid and automatic responding during SART (Smallwood et al., 2004), absent-minded forgetting (Smallwood, Baracaia, Lowe, & Obonsawin, 2003), and eye movements during reading that are less sensitive to lexical or linguistic properties of what is being read (Reichle, Reineberg, & Schooler, 2010). Furthermore, ERP studies have demonstrated that instances of mind-wandering are characterized by a reduced awareness and/or sensory processing of task stimuli and other objects in the external environment (Barron et al., 2011; Kam et al., 2011; Smallwood, Beach et al., 2008). The ability to remain mindfully focused on a task therefore appears to be in direct opposition to the tendency for attention to wander to TUTs. Starting from this observation, we began our ongoing series of investigations into the relationship between mindfulness and mind-wandering by first examining whether we could find empirical support for this intuitive notion that mind-wandering and mindfulness are opposing constructs.

Existing work that links mindfulness and mind-wandering has relied heavily on the Mindful Awareness Attention Scale (MAAS; Brown & Ryan, 2003), the most widely used dispositional measure of mindfulness. This scale addresses the extent to which an individual attends to present experience without distraction (e.g., I find myself listening to someone with one ear, doing something else at the same time). Low self-reported mindfulness as measured by the MAAS is associated with fast and error-prone responding in the SART (Cheyne, Carriere, & Smilek, 2006). An adapted version of the MAAS called the MAAS-LO (lapses only) has also been associated with several performance markers of mind-wandering in the SART (Cheyne et al., 2009). These results show that measurement of trait-mindfulness by scales such as MAAS can predict behavioral concomitants of real-time mind-wandering observed during the performance of a task in the lab.

We recently conducted a more comprehensive investigation into the relationship between the MAAS and several convergent measures of mind-wandering (Mrazek, Smallwood, & Schooler, 2012). All participants completed the MAAS, a 10-min mindful breathing task with thought-sampling probes, a 10-min mindful breathing task requiring self-catching of mind-wandering, a 10-min SART, and a self-report measure of trait daydreaming that has been widely used to study mind-wandering (Mason et al., 2007). We found that individuals who reported high levels of mindfulness during daily life also reported less daydreaming. Furthermore, high levels of trait-mindfulness were also associated with less mind-wandering as measured by self-reported TUT during mindful breathing, fewer errors of commission during the SART, and lower RT variability. These results provide converging evidence suggesting that—at least based on their most common operational definitions—mindfulness and mind-wandering are indeed opposing constructs.

Mindfulness as a Tool for Reducing Mind-Wandering

If mindfulness and mind-wandering are inversely related, this suggests that mind-wandering and its disruptive effects on task performance (e.g., Reichle et al., 2010; Smallwood et al., 2003, 2004, 2007) should be reduced by interventions that increase mindfulness. While mindfulness training has been demonstrated to improve executive attention, perceptual sensitivity, and sustained attention (MacLean et al., 2010; Tang et al., 2007), the direct impact of mindfulness training on mind-wandering has until recently been less carefully examined. In fact, to date, there has been little progress in developing empirically proven strategies for reducing mind-wandering.

We recently examined whether a brief mindfulness exercise can reduce mind-wandering, thereby potentially introducing both an effective antidote to mind-wandering and establishing a causal relationship between the presence of mindfulness and the absence of mind-wandering. This expectation is consistent with the many well-documented benefits of mindfulness training (for a review, see Brown, Ryan, & Creswell, 2007). However, many prior studies have utilized intensive meditation training lasting months or years, limiting the applicability of observed improvements for most societal and educational contexts (Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007; MacLean et al., 2010). Furthermore, from

a methodological perspective, mindfulness intervention studies typically include so many different aspects in their intervention that it is difficult to discern which specific element is responsible for any observed changes. What is needed in order to discern the causal role of mindfulness in mitigating mind-wandering is a simple manipulation that directly and specifically targets individuals' ability to remain mindful. Accordingly, we used an 8-min mindful breathing intervention that provides a simple and widely accessible intervention that also affords a high degree of experimental control.[2]

In this investigation, participants were randomly assigned to conditions in which they completed 8 min of mindful breathing, or else in two control conditions, passive relaxation, or reading. Expectation effects and demand characteristics were minimized by informing all participants that they were participating in a study designed to examine effects of relaxation on attention. In the mindful breathing condition, participants were instructed to sit in an upright position while focusing their attention on the sensations of their breath without trying to control the rate of respiration. Participants were asked to return their attention to the breath anytime they became distracted. Participants in the reading condition were asked to browse a popular local newspaper, while those in the passive rest condition were asked to relax without falling asleep. Subsequently, all participants completed a 10-min version of the SART. Relative to the two control conditions, those who first completed 8 min exhibited enhanced performance as measured by behavioral markers of inattention commonly associated with mind-wandering (fewer errors of commission and lower RT variability). The effectiveness of this intervention establishes a causal relationship between the cultivation of mindfulness and subsequent reduction in mind-wandering.[3]

Mind-Wandering and Mental Aptitude

Given the robust relationship between mind-wandering and impaired task performance, the benefits of strategies for reducing mind-wandering clearly have great practical significance. Indeed, mind-wandering is a ubiquitous phenomenon associated with reduced awareness of task stimuli and the external environment (Barron et al., 2011; Kam et al., 2011; Smallwood, McSpadden, & Schooler, 2008), impaired vigilance (Cheyne et al., 2009; McVay & Kane, 2009; Smallwood et al., 2004), absent-minded forgetting (Smallwood et al., 2003), deficits in random-number generation (Teasdale et al., 1995), and poor reading comprehension (Reichle et al., 2010; Schooler et al., 2004; Smallwood, 2011; Smallwood, McSpadden, & Schooler, 2008).

We recently examined whether mind-wandering also impairs performance on measures of mental aptitude—such as working-memory capacity (WMC) and fluid intelligence (gF)—that are predictive of performance in real-world contexts such as academic achievement and job performance (Deary, Strand, Smith, & Fernandes, 2007; Kane, Hambrick, & Conway, 2005; Rohde & Thompson, 2007; te Nijenhuis, van Vianen, & van der Flier, 2007). We conducted four studies employing complementary methodological designs embedding thought sampling into popular measures of these constructs and determined that mind-wandering was consistently associated with worse performance (Mrazek, Franklin, Phillips, Baird, & Schooler, 2013). Indeed,

nearly 50% of the shared variance among WMC, fluid intelligence, and performance on the Scholastic Aptitude Test (SAT) was explained by the mind-wandering that occurred during cognitive assessment. These results strongly implicate the capacity to avoid mind-wandering during demanding tasks as an important source of success on measures of general aptitude. Furthermore, mind-wandering during testing may help explain the reliable correlations between measures of mental aptitude as well as their broad predictive utility. In fact, a substantial proportion of what makes tests of general aptitude sufficiently general could be that they create a demanding task context in which mind-wandering is highly disruptive.

Mindfulness Training and Mental Aptitude

Given that the ability to attend to a task without distraction underlies performance in a wide variety of contexts, training this ability should in principle result in a similarly broad enhancement of performance. In a recent randomized controlled investigation, we examined whether a two-week mindfulness training course would be more effective than a comparably demanding nutrition program in decreasing mind-wandering and improving cognitive performance (Mrazek et al., 2013). We found that mindfulness training improved performance on measures of WMC as well as reading comprehension, as measured on the Graduate Record Examination (GRE), while also reducing mind-wandering during these tasks. Notably, improvements in WMC and GRE performance following mindfulness training were mediated by reduced mind-wandering specifically for those who were most prone to distraction at pretesting. This suggests that mindfulness-based interventions benefit individuals who are already proficient at attentional control, and that training to enhance attentional focus may be a key to unlocking latent cognitive skills that were until recently viewed as immutable.

Mindfulness, Mind-Wandering, and Meta-Awareness

Another process that is important to consider in understanding the relationship between mindfulness and mind-wandering is meta-awareness. Meta-awareness is the process of reflecting on the current contents of consciousness (Schooler, 2002). This can serve an important corrective function by reinstating task focus whenever attention becomes diverted to a TUT. As such, meta-awareness is often seen as a tool for minimizing the detrimental effects of mind-wandering (Schooler et al., 2011). This raises the intriguing question of whether strategies exist that might improve attention by enhancing people's awareness of their mind-wandering. One promising direction for exploring this question entails the cultivation of mindfulness through meditative practices.

When mindfulness is defined as nondistraction, it can be clearly distinguished from meta-awareness. It is possible to be fully aware of the sensations of breathing without metaconscious reflection about these sensations. One could even argue that in any given moment, mindfulness and meta-awareness are mutually exclusive: being fully

attentive to a given sensation may preclude the possibility of simultaneously reflecting on it. Yet while nondistraction is distinct from conscious reflection about that nondistraction, meta-awareness may nonetheless be a crucial element in the cultivation of mindfulness. For instance, meditative practices designed to cultivate nondistraction in beginners typically require focused attention to a single aspect of sensory experience (e.g., the sensations of breathing) despite the frequent interruption of focus by unrelated distractions or personal concerns. Meta-awareness of each distraction thus promotes meditative focus by providing an opportunity to redirect attention to the object of meditation after a lapse of concentration. How and why this awareness of mind-wandering arises, and the determinants of its frequency of occurrence, remain items in need of investigation.

Recently, Hasenkamp, Wilson-Mendenhall, Duncan, and Barsalou (2012) outlined a model of the temporal sequence of mental events that occur during the practice of meditation: *sustained attention* is periodically interrupted by *mind-wandering* until *awareness of mind-wandering* initiates the *shifting of attention* back to the perceptual target of meditation. In an fMRI investigation of mind-wandering during meditation among experienced meditators, Hasenkamp and colleagues (2012) found that sustained attention and shifting of attention were associated with regions well-established as elements of an attentional control network in the brain, including dorsolateral prefrontal cortex (PFC) and posterior parietal cortex. In contrast, they found that mind-wandering was associated with activation in medial PFC and posterior cingulate cortex, as well as posterior parietal and temporal regions including the hippocampal formation, regions widely associated with a "default network" that is active during rest (Buckner, Andrews-Hanna, & Schachter, 2008) as well as during mind-wandering (Christoff et al., 2009).

Notably, Hasenkamp and colleagues found that *awareness of mind-wandering* was associated with greater activation of bilateral anterior insula (AI) and dorsal anterior cingulate cortex (ACC). These results were interpreted as reflecting the operation of a *salience network* for detecting relevant or salient events—in this case the occurrence of mind-wandering. Although the poor temporal resolution of fMRI makes it difficult to discern the brain regions involved in mental events that occur quickly in succession, these results tentatively suggest that bilateral AI and dorsal ACC may contribute to meta-awareness of mind-wandering in a manner that allows attention to be redirected back to a given task.

In a subsequent article, Hasenkamp and Barsalou (2012) compared individuals with differing amounts of meditation experience in terms of the functional connectivity displayed at rest between brain regions associated with the four phases identified previously during mindfulness meditation. Comparing individuals with high levels of experience to those with low levels, the authors found increased functional connectivity among regions associated with the attentional control network, as well as between these areas and medial PFC, associated with the default network. This suggests that in contrast with the currently dominant view in which the attentional control and default networks are antagonistically related, mindfulness meditation practice may indeed enhance the extent of cooperative functioning between these brain systems (see, e.g., Smallwood, Brown, Baird & Schooler, 2011), perhaps in service of increased meta-awareness of mind-wandering.

The suggestion of a possible relationship between mindfulness and meta-awareness raises the intriguing possibility that cultivating mindfulness might enhance meta-awareness (or vice versa). Existing research regarding the impact of mindfulness training on meta-awareness is mixed. On the one hand, individuals with extensive meditation experience show a stronger association between subjective emotional experience and physiological markers of emotion (i.e., heart period; Sze, Gyurak, Yuan, & Levenson, 2010). The fact that experienced meditators have enhanced meta-awareness of emotions is certainly consistent with the notion that mindfulness training might also improve meta-awareness of mind-wandering. However, Khalsa and colleagues (2008) have shown that advanced meditators do not have any greater interoceptive awareness of heartbeat detection, even though they believe their interoceptive awareness is superior.

In the context of meta-awareness of mind-wandering, it is useful to consider what degree of meta-awareness would be most useful in cultivating mindfulness. While meta-awareness is pivotal to the cultivation of nondistraction, conscious reflection on one's focus is not always necessary or desirable. Before attention has lapsed, meta-awareness is not needed—and in some cases could itself serve as a distraction. It follows that in the course of cultivating mindfulness, the frequency of meta-awareness may resemble an inverted u-shaped function: initially increasing to allow for redirection from distractions, but eventually diminishing when attentional stability makes frequent meta-awareness unnecessary.

Although this would suggest that brief mindfulness training programs should result in increased meta-awareness, demonstrating this change may not be straightforward. For example, as described earlier, we recently found that two weeks of mindfulness training led to reduced mind-wandering during a GRE test (Mrazek et al., 2013). However, we observed that mindfulness training reduced both probe-caught *and* self-caught mind-wandering. This result points to a challenge in establishing whether mindfulness training increases meta-awareness: If mindfulness training reduces mind-wandering, it likewise reduces opportunities to observe meta-awareness of mind-wandering. Thus, in the training experiment just described, it is possible that mindfulness training indeed led to enhanced meta-awareness (of mind-wandering), but that this change was rendered invisible to measurement by overall decreases in mind-wandering. A related challenge is that extensive practice in detecting mind-wandering in the context of meditation might lower an individual's threshold for what subjectively constitutes an instance of mind-wandering. These difficulties indicate that a promising direction for future research would include measuring changes in meta-awareness of mental processes that are themselves unaffected by mindfulness training.

The Ironic Nature of Nondistraction

When telling someone that you research mind-wandering, one of the most common responses is "I would be your perfect participant." It seems that many of us have an intuitive appreciation for how frequently our minds are adrift—as much as half of our waking lives (Killingsworth & Gilbert, 2010). Yet at the same time, many of us are familiar with other contexts in which our minds do not wander at all. We are

sometimes completely focused—perhaps on an engrossing film or conversation—in a way that belies our usually wandering minds. Similarly, a child with attention deficit hyperactivity disorder can sometimes attend to a video game for hours despite an inability to remain attentive for even a few minutes in a classroom. Our understanding of what allows mind-wandering to turn off so dramatically in these situations is only just emerging, and the occasional presence of this apparently effortless nondistraction raises an important question regarding the cultivation of mindfulness.

One might think that the key to cultivating nondistraction would be to provide individuals with frequent opportunities to practice nondistraction in those contexts in which it is most natural. After all, 16-year-olds learn how to drive in quiet neighborhoods and empty parking lots, not on crowded highways. Yet mindfulness is commonly trained in contexts where it is particularly difficult: sustaining attention on something of little inherent interest like the sensations of breathing. We suggest this is no accident. There are several possible reasons why tasks characterized by frequent distraction are well suited for mindfulness training. For instance, practicing mindfulness in these contexts may reduce the actual occurrence of TUTs. Attending to a simple stimulus, such as the breath, provides fertile ground for distracting thoughts to arise, but such thoughts may lose their disruptive salience when they are continually ignored. A second possibility is that tasks that are not intrinsically engaging require—and therefore train—greater cognitive control. Yet a third possibility is that continuously monitoring one's wandering attention leads to enhanced metacognitive regulation, perhaps increasing awareness of mind-wandering and thereby allowing attention to be redirected from off-task thoughts more quickly. These differing explanations—which are not mutually exclusive—provide an exciting direction for future research.

Mind-Wandering in Relation to Broader Conceptualizations of Mindfulness

We have focused our investigations on mindfulness as nondistraction, which we believe represents the element most central to the concept of mindfulness in meditative traditions and also most directly linked to mind-wandering (Brown & Ryan, 2003; Wallace & Shapiro, 2006). However, more encompassing definitions of mindfulness emphasize additional features of the experience that may also be related to mind-wandering. For example, Bishop and colleagues (2004) have formalized a two-factor theory of mindfulness that emphasizes not only nondistraction but also an attitude of curiosity, openness, and acceptance toward one's experience.[4]

One possibility is that mind-wandering has a similar inverse relationship with both nondistraction and a nonjudgmental orientation. Indeed, being fully attentive to a given sensation may reduce the possibility of being simultaneously evaluative of it. Yet it is also possible that it is the *content* rather than the *occurrence* of mind-wandering that is most strongly associated with the nonjudgmental orientation toward one's experience. Future research should investigate how the actual content of mind-wandering episodes relates to the various subprocesses of multifaceted conceptualizations of mindfulness.

Mind-Wandering in Relation to Western Social Psychological Views of Mindfulness

There is yet another prominent conceptualization of mindfulness also worth considering in relation to mind-wandering: an active state of mind characterized by drawing novel distinctions that results in being (1) situated in the present, (2) sensitive to context and perspective, and (3) guided (but not governed) by rules and routines (Langer, 1975, 1989; Langer & Abelson, 1972; Langer, Blank, & Chanowitz, 1978). This characterization describes a state of active attention to and engagement with one's environment that in some ways stands in contrast to our notion of mind-wandering. For instance, actively drawing novel distinctions can anchor awareness in the here and now. This enhanced awareness of present experience is the opposite of what typically occurs during mind-wandering. As described above, ERP studies have demonstrated that instances of mind-wandering are characterized by a reduced awareness and/or sensory processing of task stimuli and other objects in the external environment (Barron et al., 2011; Kam et al., 2011; Smallwood, Beach et al., 2008). In fact, mindfulness interventions grounded in drawing novel distinctions have been shown to improve attention (Langer, 2000). Several demonstrations have shown that asking participants to notice new things about a stimulus results in better performance than simply asking them to pay attention to the stimulus (Bodner & Langer, 1995; Carson, Shih, & Langer, 2001; Levy, Jennings & Langer, 2001). Although growing evidence suggests that training participants to pay attention to a stimulus can be effective (Mrazek et al., 2013), it may be that a particularly effective way for enhancing sustained attentiveness is combining both attention training and novel distinction drawing.

Another way that mind-wandering can be contrasted with the Western social psychological view of mindfulness is with regards to automatic and habitual responding. Langer contrasts mindfulness with the opposing construct of mindlessness. Mindlessness is a state of mind "characterized by an overreliance on categories and distinctions drawn in the past," "context-dependent and … oblivious to novel (or simply alternative) aspects of the situation," and in which "rigid invariant behavior" occurs with little awareness (Langer, 1992). As discussed above, many behavioral markers of mind-wandering have a distinctly mindless quality, such as rapid and automatic responding during SART (Smallwood et al., 2004), absent-minded forgetting (Smallwood et al., 2003), and eye movements during reading that are less sensitive to lexical or linguistic properties of what is being read (Reichle et al., 2010). From this perspective, mind-wandering can be construed as a form of mindlessness.

The foregoing discussion suggests that Langer's conceptualization of mindfulness places the construct in opposition to mind-wandering, but this Western social psychological view of mindfulness is not intrinsically distinct from mind-wandering. For instance, TUTs can actively draw novel distinctions while simultaneously distracting attention from a primary task. For this reason, mind-wandering is more clearly distinct from mindfulness when it is defined as nondistraction than when defined as drawing novel distinctions. However, little empirical research has addressed the relationship between mind-wandering and Langer's conceptualization of mindfulness. Future work should explore whether the Mindfulness/Mindlessness Scale (Bodner & Langer,

2001) is associated with validated behavioral and thought-sampling markers of mind-wandering, and whether the positive outcomes associated with mindfulness as measured by this scale are mediated by reduced mind-wandering.

Future Directions: Mindfulness and the Potential Benefits of Mind-Wandering

Given the opposing conceptual relationship between mindfulness and mind-wandering, our understanding of mindfulness will evolve as we discover more about how attention lapses. Yet future research must also keep potential benefits of mind-wandering in view. After all, the human capacity to plan the future and reflect on past experiences has clear adaptive value (Baars, 2010; Smallwood, 2010). There are circumstances in which diverting attention away from the "here and now" is beneficial. Indeed, recent findings suggest that under some circumstances mind-wandering can promote future planning (Baird, Smallwood, & Schooler, 2011) and enhance creative incubation (Baird et al., 2012). Yet the accumulating evidence for the positive outcomes of mindfulness might be interpreted to suggest that mind-wandering is of no benefit, especially within a framework that places these constructs in direct opposition. In contrast, the potential benefits of mind-wandering could be interpreted to suggest a downside to mindfulness. For instance, a practice of mindfulness that eliminated mind-wandering might lead to neglect of distal goals like retirement planning. It may therefore be that mindfulness is most helpful when it affords a degree of control over mind-wandering that allows for its benefits while minimizing its costs.

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Notes

1. Although perhaps obvious, it is worth noting that when we refer to mindfulness as nondistraction, this nondistraction is in the context of a particular activity. For example, if your goal is to engage in a task, but instead you become deeply focused on off-task concerns, this would not be an example of mindfulness, even though your off-task focus may be undistracted.
2. Mindful breathing is a technique that is widely taught in mindfulness training programs around the world, including both modern ones and those based on more traditional approaches. The authors have themselves participated in courses and retreats where these traditional methods were taught to them by qualified teachers holding formal qualification and authorization. This is mentioned here to illustrate the fact that similarity exists between the concise methodologies employed by ongoing research programs and the instructions of longstanding traditions of mindfulness practice.

3. Two unpublished studies have found evidence that meditation training courses are associated with reduced markers of inattention during the SART (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2009; Wong et al., 2008).
4. Within our framework of defining mindfulness more narrowly as nondistraction, these additional qualities might be understood as precursors, concomitants, or consequences of mindfulness, rather than aspects of mindfulness per se. For example, many meditative traditions teach that the capacity for mindfulness is supported by lessened attachment to experiences, accompanied by a sense of "letting go" of the habitual pursuit of pleasurable experiences and avoidance of painful or boring ones. It is taught that in turn, as mindfulness becomes itself more habitual, attachment to experiences becomes even more diminished, and one is concerned less and less with "getting one's way" all the time. Thus, nondistraction and the attitude of openness and acceptance toward one's experience may arise together in a mutually supportive manner.

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