Investigating the Effects of Mindfulness Meditation on Motivation

by

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Abstract

Recent research suggests that mindfulness meditation may impair motivation towards

traditional laboratory tasks. The present research explored the effects of meditation on

motivation towards more meaningful pursuits (i.e., personal goals) in contrast to a

traditional laboratory task (i.e., anagrams). In Study 1 ($n = 200$), the mindfulness

condition reported greater goal motivation than the podcast condition but not the filler

questionnaire condition; goal self-concordance did not moderate this effect. Moreover,

goal motivation increased from before to 10 minutes after meditating. In Study 2 ($n =$

120), the mindfulness condition reported greater goal motivation than the podcast

condition; this difference remained 20 minutes later. There were no differences between

conditions in anagram motivation at any time point. Furthermore, goal motivation

increased from before to after meditating, whereas anagram motivation remained the

same. The present research opposes the notion that meditation impairs motivation and

instead suggests that meditation may enhance goal motivation.

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Investigating the effects of mindfulness meditation on motivation

Over the last two decades, mindfulness has received considerable mainstream and empirical attention for its wide-ranging benefits. For example, mindfulness has been associated with greater health and well-being (Brown & Ryan, 2003), better relationships (Karremans, Schellekens, & Kappen, 2017), and even higher job satisfaction (Good et al., 2016). As a result, mindfulness interventions, which include exercises such as mindfulness meditation, have been incorporated into schools (Sibinga, Webb, Ghazarian, & Ellen, 2016), clinical settings (Didonna, 2009), organizational settings (Good et al., 2016), and even the military (Johnson et al., 2014).

While the benefits of mindfulness have been well-documented, researchers have only recently begun to investigate potential limitations of this construct (Hafenbrack & Vohs, 2018; Schindler, Pfattheicher, & Reinhard, 2019; Tangney, Dobbins, Stuewig, & Schrader, 2017; Van Dam et al., 2018; Wilson, Mickes, Stolarz-Fantino, Evrard, & Fantino, 2015). One possible downside that has emerged is that mindfulness meditation impairs motivation. In a series of experiments Hafenbrack and Vohs (2018) found that participants who underwent a brief mindfulness exercise consistently reported lower task motivation (but not performance) than those in a mind-wandering condition. An important limitation to this research is that it only included traditional laboratory tasks, which lack substantial meaning for participants. Thus, the purpose of the present research was to examine the effects of mindfulness meditation on individuals' motivation towards more meaningful pursuits (i.e., personal goals), in contrast to a traditional laboratory task (i.e., anagrams). Given the recent surge in popularity of mindfulness, its pervasiveness in the mainstream media, along with its incorporation into various educational,

organizational, and clinical settings, understanding the relationship between mindfulness meditation and motivation is critical (Choi & Tobias, 2015; Dane, 2015; Good et al., 2016).

Mindfulness

Mindfulness can be understood as an umbrella term used to describe a number of practices, qualities, and processes that relate to attention and awareness (Van Dam et al., 2018). Like other complex psychological constructs (e.g., intelligence), there is little consensus over the technical definition of mindfulness and its various facets. The complexity and breath of mindfulness along with its origins in Buddhist psychology have contributed to a number of existing definitions and operationalizations. While there is still ongoing debate over the precise definition (Nilsson & Kazemi, 2016; Van Dam et al., 2018), a common conceptualization of mindfulness involves paying attention to the present moment, on purpose, in an open and nonjudgmental manner (Bishop et al., 2004; Brown & Ryan, 2003; Kabat-Zinn, 2003). This definition originates from the Eastern meditation-based approach to mindfulness, which was introduced to Western society predominantly by John Kabat-Zinn in the 1970s. According to this perspective, mindfulness can be considered a type of attention that is characterized by qualities such as acceptance and non-judgement. Mindfulness also involves awareness of both our internal and external worlds. Awareness of our internal world consists of our thoughts, feelings, sensations, and emotions (Brown & Ryan, 2003), while our external world constitutes our surrounding environment.

An alternative, Western approach to mindfulness was introduced by Langer and her colleagues in the early 1970s. They conceptualized mindfulness as an active, effortful

mode of conscious awareness that involves attending to the present moment with a

heightened state of involvement and wakefulness (Langer & Moldoveanu, 2000). Thus,

while the Eastern and Western conceptualizations of mindfulness differ in certain

respects (e.g., sense of effort), they both emphasize attention and awareness of the

present moment. Importantly, the term mindfulness is also sometimes used to refer to the

formal practice of meditation, where one may sit in a specific posture and attend to the

breath (or some other focal object). Others have described mindfulness as a mental

faculty that relates to awareness, attention, discernment and/or memory (Davidson &

Kasziniak, 2015).

Researchers have proposed a number of different aspects that characterize

mindfulness, including: acting with awareness, observing and attending to experiences,

non-judgment and acceptance of experiences (i.e., non-striving), non-avoidance,

insightful understanding, non-reactivity, self-acceptance, labeling and describing, non-

identification with one's experiences, the ability to let go of thoughts, feelings, and

experiences, as well as an attitude characterized by flexibility, compassion, generosity,

and gratitude (Baltzell, 2016; Bergomi et al., 2013; Ryan & Deci, 2017). While some

scholars argue that many of these aspects are fundamental components of mindfulness,

others suggest that certain aspects (e.g., compassion) are better thought of as

consequences of mindfulness (Ryan & Deci, 2017). Disagreement over the

conceptualization of mindfulness is reflected in the numerous instruments that have been

developed to investigate this construct.

To date, at least nine different instruments have been developed to measure

mindfulness in its various conceptualizations (Van Dam et al., 2018). Some examples of

mindfulness measures include the Mindful Attention Awareness Scale (MAAS; Brown & Ryan 2003), the Freiburg Mindfulness Inventory (FMI; Buchheld, Grossman, & Walach, 2001; Walach et al. 2006), the Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008), the Southampton Mindfulness Questionnaire (SMQ; Chadwick et al. 2008), the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007; Hayes & Feldman 2004), the Kentucky Inventory of Mindfulness Scale (KIMS; Baer, Smith, & Allen, 2004), the Toronto Mindfulness Scale (TMS; Lau et al. 2006), and the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney 2006). While there is no comprehensive measure that assesses all facets of mindfulness, each instrument possesses unique advantages and disadvantages (see Bergomi et al., 2013). While most measures include core aspects of mindfulness, such as attention and awareness, they tend to differ in terms of their emphasis on "secondary" facets. For example, the MAAS (Brown & Ryan, 2003) focuses almost exclusively on acting with attention and awareness. Other mindfulness scales, such as the Five Facet Mindfulness Questionnaire (Baer et al., 2006) emphasize facets such as nonreactivity to inner experience, observing (thoughts, sensations, perceptions, feelings), acting with awareness, describing with words, and nonjudging of experience. Some scales are more oriented towards the investigation of clinical populations (CAMS-R; Feldman et al. 2007; Hayes & Feldman 2004) and others focus on those with extensive meditation experience (FMI; Buchheld et al. 2001; Walach et al. 2006). Still others have been designed to investigate state mindfulness (TMS; Lau et al. 2006).

While there are several instruments for measuring mindfulness, considerable

heterogeneity exists between these scales, and correlations between them typically range from .21 to .67 (Baer et al., 2006; Cardaciotto et al., 2008). Thus, researchers must be careful to select mindfulness measures that appropriately reflect their research questions, designs, and samples. The multifarious conceptualizations of mindfulness pose considerable challenges to the design and interpretation of mindfulness research (see Van Dam et al., 2018 for other methodological challenges).

For the purpose of the present research, mindfulness can be understood as paying attention to the present moment, on purpose, in an open, accepting and nonjudgmental manner (Bishop et al., 2004; Brown & Ryan, 2003; Kabat-Zinn, 2003). As previously alluded to, the concept of mindfulness can be conceptualized as both a trait and a state. While the two constructs are related (Brown & Ryan, 2003), they are also theoretically and operationally distinct (Thompson & Waltz, 2007). Trait mindfulness corresponds to an individual's general tendency to deploy mindful attention in daily life, whereas state mindfulness implies being mindfully attentive in the present moment. These two constructs are related in that people with greater levels of trait mindfulness tend to experience state mindfulness more frequently (Brown & Ryan, 2003) and dispositional mindfulness can be cultivated through regular engagement with mindfulness exercises that induce state mindfulness (Adair, Frederickson, Castro-Schilo, Kim, & Sidberry, 2018; Brown & Ryan, 2003). Cultivating trait mindfulness through mindfulness interventions is a common approach for enhancing well-being outcomes in clinical and non-clinical populations (Biegel, Brown, Shapiro, & Schubert, 2009; Donald et al., 2019; Grossman, Niemann, Schmidt, & Walach, 2004; Gu, Strauss, Bond, & Cavanagh, 2015).

A large portion of the mindfulness research to date has focused on trait mindfulness, which has been positively associated with a number of desirable outcomes, including well-being and self-awareness (Brown & Ryan, 2003), emotion regulation (Corcoran, Farb, Anderson, & Segal, 2010), and a number of interpersonal benefits such as relationship satisfaction (Barnes, Brown, Krusemark, Campbell, & Rogge, 2007; Wachs & Cordova, 2007). Nonetheless, mindfulness as a mental behaviour is fundamentally a psychological state (Bishop et al., 2004) and a smaller body of research is beginning to emerge that supports the benefits of inducing state mindfulness through exercises such as mindfulness meditation (Heppner & Shirk, 2018; Leyland, Rowse, & Emerson, 2019).

State Mindfulness

Disagreement about the definition of mindfulness is also reflected in the conceptualizations and operationalizations of state mindfulness. For example, certain conceptualizations and operationalizations include mindful awareness of bodily sensations (e.g., State Mindfulness Scale; Tanay & Bernstein, 2013) whereas others focus more exclusively on awareness of mental events (TMS; Lau et al., 2006; state MAAS; Brown & Ryan, 2003). In addition, mindful states can be induced through mindfulness exercises (Heppner & Shirk, 2018), but they can also arise naturally in everyday life (Brown & Ryan, 2003; Friese & Hofmann, 2016). Accordingly there are measures of state mindfulness that are used to investigate mindful states immediately after undergoing a mindfulness induction (e.g., State mindfulness scale; Tanay & Berstein, 2013; TMS; Lau et al., 2006), and there are others that were designed to investigate the experience of mindful states in everyday activities (State MAAS; Brown & Ryan, 2003).

Although mindful states can arise naturally in everyday life (Brown & Ryan, 2003; Friese & Hofmann, 2016), the present research focused on state mindfulness as induced by mindfulness exercises. State mindfulness is often studied in experimental settings, wherein participants are randomly assigned to engage in either a mindfulness exercise or a time-matched comparison condition prior to engaging in some sort of cognitive or behavioural task. The most common type of mindfulness exercise that is used in this type of research is mindfulness meditation (Arch & Craske, 2006); participants typically listen to an audio recording that guides them through the exercise. Nonetheless, body scans (Jordan, Wang, Donatoni, & Meier, 2014) and mindful eating exercises have also been used (Hong, Lishner, & Han, 2014). On the other hand, a wide variety of comparison conditions have been paired with mindfulness inductions. They are typically characterized as engaging but without a mindful component (Heppner & Shirk, 2018). They often involve listening to some sort of audio recording, such as an educational recording (e.g., natural history; Cropley, Ussher, & Charitou, 2007; Lueke & Gibson, 2015), excerpts from public radio (Erisman, & Roemer, 2010), or clips from a story (McCrary & Heppner, 2015; Mirams, Poliakoff, Brown, & Lloyd, 2013; Zeidan et al., 2010). Less frequently, researchers have had participants engage in a mind-wandering induction (Arch & Craske, 2006; Hafenbrack & Vohs, 2018), a focusing task (without a mindfulness component; Tan, Lo, & Macrae, 2014) or a relaxation control (Jordan et al., 2014).

By randomly assigning participants to either a mindfulness condition or a comparison condition, causal inferences can be made with regards to the effects of a brief (i.e., generally 20 min. or less) mindfulness exercise (Keng, Smoski, & Robins, 2011).

Single-session mindfulness inductions have been found to lead to cognitive, emotional, social, and health-related benefits (see Heppner & Shirk, 2018 for a review). For example, previous research has found that a brief, single-session mindfulness induction can improve reading comprehension (Clinton, Swenseth, & Carlson, 2018), increase empathy (Winning & Boag, 2015), bolster self-esteem (Pepping, O'Donovan, & Davis, 2013), reduce aggressive behaviour (Heppner et al., 2008; Yusainy & Lawrence, 2015), promote healthier eating (Jordan et al., 2014), improve executive attention (Kuo & Yeh, 2015; Gorman & Green, 2016), reduce the sunk cost bias (Hafenbrack, Kinias, & Barsade, 2014), reduce implicit race and age bias (Lueke & Gibson, 2015), decrease mind-wandering (Mrazek, Smallwood, & Schooler, 2012), reduce thought suppression (Brunyé et al., 2013), counteract self-control depletion (Friese, Messner, & Schaffner, 2012), and promote emotional resilience when faced with distressing images (Arch & Craske, 2006) and affectively-mixed film clips (Erisman & Roemer, 2010). These findings appear to produce a robust picture of the positive effects of inducing state mindfulness.

Despite these wide-ranging benefits, recent research has begun to shed light on some potential downsides of inducing state mindfulness. For example, Schindler et al. (2019) found that, compared to participants in a mind-wandering condition, those who underwent a short mindfulness exercise showed reduced reconciliatory intentions after having read a scenario in which they lost their friend's bicycle. Similarly, they found that meat-eaters, when confronted with information about the negative consequences of meat consumption, reported less of a guilty conscious, and in turn, weaker intentions to reduce meat consumption after they had undergone an 8-minute mindfulness exercise (again, in

comparison to a mind-wandering condition). Other recent research suggests that inducing state mindfulness may impair motivation.

Hafenbrack and Vohs (2018) conducted a series of experiments using a number of tasks to investigate the effects of state mindfulness on motivation and performance. The tasks included anagrams, copying out large chunks of text, cover-letter editing, and brainstorming uses for a brick. For most of the experiments the researchers measured motivation with two items. They asked participants how motivated they were to engage in the task and how much time they were willing to spend on the task. These two items were standardized and summed to create a composite score for motivation. (For Experiment 3 the composite score was made up of five items. In addition to the two aforementioned items, participants were asked how much effort they would spend on the task, how much they wanted to complete the task, and how much they felt like doing the task.) The results of these experiments indicated that a brief (8-15 min.) mindfulness induction consistently led to lower levels of task motivation, but not performance, compared to a mind-wandering condition (p values for motivation ranged from .014 to .042).

Although Hafenbrack and Vohs (2018) found no corresponding impairments in performance in their experiments, this may be explained in part by the nature of the tasks and the time frames allotted for engaging in them. For example, participants had five minutes to complete the anagram task – a very difficult task, as evidenced by the small number of successfully completed puzzles (i.e., 2-3 out of 10 on average). Differences in performance might have emerged if participants had been given a less demanding task and more time to complete it. Participants were also asked to complete the tasks right

away. In less structured settings, where people have more freedom to choose how to spend their time, impaired motivation could lead to procrastination (Rakes & Dunn, 2010), which could in turn affect performance, particularly on larger tasks that require more time and effort to complete (e.g., academic assignments). Repeated dips in motivation over time could be especially harmful for long-term projects. Motivation is typically regarded as an important precursor to performance (Locke & Latham, 2006); thus, investigating momentary levels of motivation is important since they could affect how individuals choose to spend their time in less structured settings and ultimately impact performance in the context of longer-term goals.

From the results of their experiments, Hafenbrack and Vohs (2018) concluded that mindfulness meditation impairs motivation. Given that mindfulness involves adopting an attitude of acceptance towards the present moment and motivation encompasses the desire to attain a future state that is generally better than the present, it is possible that mindfulness is incompatible with motivation (Hafenbrack & Vohs, 2018). Nonetheless, given that this was the first study to investigate the effects of mindfulness meditation on motivation, more research is needed corroborate this potential demotivating effect.

Motivation

Motivation has to do with what "moves" people to act. Many theories of motivation concentrate on what *energizes* and *gives direction* to behaviour (McClelland, 1988), and thus have attempted to predict performance, learning, and behaviour change (Ryan & Deci, 2017). Such theories have typically regarded motivation as a unitary entity and investigated it in terms of its amount or strength. For example, expectancy-valence

theories predict attitudes and behaviours from the amount of motivation, which can be determined by the psychological value of an outcome and the likelihood of attaining that outcome (e.g., Feather, 1990; Vroom, 1964). Similarly, cognitive-behavioural theories use the strength of one's beliefs about being able to attain an outcome to predict amount of motivation (Bandura, 1977, 1996; Seligman, 1975). These theories generally contrast this unitary conception of motivation with a lack of motivation. Thus, cognitive theories have largely investigated motivation in terms of its overall amount or strength and this approach continues to be used by contemporary scholars (e.g., Hafenbrack & Vohs, 2018; Wilcox, Laran, Stephen, & Zubcsek, 2016).

Self-Determination Theory

One theory that diverges from this traditional conceptualization of motivation is self-determination theory (Ryan & Deci, 2017). Self-determination theory focuses on different types and sources of motivation, and suggests that the type of motivation is more important than the amount when it comes to the prediction of important outcomes such as health, well-being, and performance (Deci & Ryan, 2008). An important feature of self-determination theory is the autonomy-control continuum, which is used to differentiate various types of motivation in terms of the extent that they reflect autonomous versus controlled regulations. Goals and behaviours are considered autonomously motivated to the degree that an individual experiences them as volitional and fully endorses them; they are thought to reflect an expression of one's true self. For example, autonomous reasons for pursuing a goal may include: because the goal is interesting or enjoyable (i.e., intrinsic), because the goal is inherently important to the individual (i.e., identified), and because the goal represents one's values (i.e., integrated).

Conversely, controlled motivation is characterized by internal or external pressure. Individuals might experience controlled motivation as feeling coerced or forced to act in a manner that may be incongruent with their authentic selves. Controlled reasons for pursuing a goal might include doing so to avoid feelings of shame or guilt (i.e., introjected) and to get a concrete reward, such as money (i.e., external). Thus, self-determination theory presents a more nuanced account of motivation and suggests that autonomous and controlled motivation are linked to different outcomes. For example, compared to controlled motivation, autonomous motivation tends to lead to greater mental health and well-being, more persistence, and enhanced performance (Deci & Ryan, 2008). Another important component of self-determination theory that is linked to autonomous motivation, and enhanced motivational qualities in general, is mindfulness (Brown & Ryan, 2003; Deci & Ryan, 1980; Donald et al., 2019).

Mindfulness and Motivation

Although Hafenbrack and Vohs (2018) suggest that mindfulness meditation impairs motivation, this notion contrasts with considerable research that links mindfulness with more adaptive motivational properties (Donald et al., 2019). For example, a recent meta-analysis reported that mindfulness was negatively associated with amotivation, which is characterized by a lack of motivation and/or intentionality (Ryan & Deci, 2017). In a similar vein, mindfulness has been associated with greater vitality (Visser, Hirsch, Brown, Ryan, & Moynihan, 2015) and greater interest in day-to-day activities such as work tasks (Shiba, Nishimoto, Sugimoto, & Ishikawa, 2015), interactions with romantic partners (Karremans & Papies, 2017), and connecting with nature (Wolsko & Lindberg, 2013). Thus, in certain contexts mindfulness may actually

buffer against amotivation and help individuals connect with important aspects of life (Donald et al., 2019).

Similarly, substantial research generated in the context of self-determination theory supports the notion that mindfulness is associated with adaptive motivational qualities. According to self-determination theory, mindful awareness has long been posited as a foundational element to eudaimonic living because it facilitates the selection of goals and behaviours that are consistent with people's values, interests, and needs (Deci & Ryan, 1980; Shapiro, Carlson, Astin, & Freedman, 2006). Considerable research supports a link between mindfulness and autonomous motivation – the drive to pursue goals because they are meaningful, interesting, and/or consistent with individuals' values (Deci & Ryan, 1980; Donald et al., 2019). In fact, the extent to which a goal or behaviour is autonomously motivated is thought to be dependent on the degree to which a person has mindfully and reflectively integrated it (Ryan & Deci, 2017). Brown and Ryan (2003) provided empirical support for this idea in an experience sampling study where participants completed measures of trait mindfulness and autonomy and then reported on their levels of state mindfulness and autonomous motivation three times per day for two weeks (with students) or three weeks (with working adults). They found that trait mindfulness was positively associated with both dispositional autonomy and autonomous activity in daily life. In addition, findings showed that participants were more likely to be acting in line with their values and interests (i.e., autonomously) when they were in a mindful state. The researchers also reported that trait and state mindfulness both had significant and independent effects on autonomy, suggesting that experiences of state

mindfulness are linked to more autonomously motivated activity even among individuals with low levels of trait mindfulness.

The aforementioned meta-analysis, which included both correlational and intervention studies, also provides support for the notion that mindfulness is positively associated with autonomous motivation (Donald et al., 2019). Moreover, the intervention studies included in this meta-analysis offer insight into the direction of the relationship between mindfulness and autonomous motivation and suggest that mindfulness interventions promote a more autonomous motivational orientation (Donald et al., 2019). In addition, among the correlational studies, mindfulness was negatively related to controlled motivation and (as previously mentioned) amotivation (Donald et al., 2019).

Trait mindfulness has also been linked to a greater tendency to set and pursue personal goals that reflect one's core sense of self and authentic values and interests (i.e., self-concordant goals; Sheldon & Elliot, 1999). For example, Grégoire, Bouffard, & Vezeau, (2012) reported that individuals higher in trait mindfulness were more likely to be pursuing self-concordant goals (i.e., goals that are relatively more autonomous and less controlled), which in turn predicted greater psychological and subjective well-being. More recently, Smyth, Werner, Milyavskaya, Holding and Koestner (submitted) reported that mindful individuals were more likely to set self-concordant goals, which in turn predicted greater goal progress. Trait mindfulness also predicted becoming more self-concordant over the course of individuals' goal pursuit. That is, mindful individuals were more likely to internalize their goals (i.e., rate them as more autonomous and less controlled) over time. These findings lend further support to self-determination theory's

proposition that mindfulness facilitates the selection and pursuit of meaningful goals and behaviours that are aligned with individuals' values and interests.

Self-determination theory also postulates that mindfulness decreases automatic behaviours – that is, behaviours that are controlled by forces outside of awareness (Deci, 1980; Deci & Ryan, 1980). While there are some pragmatic benefits to acting automatically or nonconciously (e.g., reduced use of cognitive resources; Aarts & Custers, 2012), there are also potential risks. For example, acting automatically may lead individuals to engage in habitual behaviours even when they are not in alignment with their self-endorsed values (Levesque & Brown, 2007). Mindfulness enhances individuals' awareness of both the external and internal stimuli that influence their behaviours as well as their conditioned or automatic responses to these stimuli. This enhanced awareness, in turn, enables them to reflect on their responses and select behaviours that are more congruent with their goals (Brown, Ryan, & Creswell, 2007).

Levesque and Brown (2007) provided empirical support for this idea in an experience sampling study. They investigated trait mindfulness as a moderator between implicit regulation (using the Implicit Association Test; Greenwald, McGhee, & Schwartz, 1998) and explicit regulation in daily life. The extent to which participants' regulation was autonomous or controlled was assessed using both the implicit and explicit measures. Results showed that individuals with low levels of trait mindfulness exhibited daily regulation that was predicted by their implicit regulation style. This finding suggests that behaviour is more likely to be influenced by nonconscious forces (i.e., processes outside of awareness) for individuals with low dispositional mindfulness. Thus, mindful awareness appears to be an important factor in the disruption of automatic

responses and their replacement with more autonomously motivated behaviour. Taken

together, a large body of research suggests that mindfulness is linked to adaptive

motivational qualities and that mindfulness may increase peoples' tendency to engage

with meaningful pursuits.

Does mindfulness impair motivation?

The existing research on the relationship between mindfulness and motivation

raises the question of whether mindfulness enhances or undermines motivation (Good et

al., 2016). On the one hand, mindfulness is often characterized by a sense of "non-

striving" and acceptance of one's current state (Bishop et al., 2004). According to

Hafenbrack and Vohs (2018) "there is an inherent tension between being accepting of

one's present experience and motivated to achieve something new" (p. 2). To the degree

that mindfulness encourages acceptance of the present moment and draws attention away

from the future, it may reduce motivation (Hafenbrack & Vohs, 2018; Oettingen et al.,

2009).

On the other hand, while mindfulness is characterized by acceptance and non-

striving, these qualities should not be confused with passivity or apathy (Good et al.,

2016). As previously noted, both trait and state mindfulness are positively associated with

autonomous motivation, which involves pursuing goals because they are meaningful and

engaging (Brown & Ryan, 2003). In addition, the finding that mindfulness is negatively

associated with amotivation (Donald et al., 2019) is particularly problematic for the

proposition that mindfulness impairs motivation. Moreover, mindfulness is associated

with enhanced performance in a variety of domains, including the workplace (Shiba et

al., 2015), athletics, and the arts (Baltzell, 2016), and motivation is thought to be an important predictor of performance (Locke & Latham, 2006).

Although Hafenbrack and Vohs (2018) suggest that mindfulness meditation reduces motivation, there were some important limitations to this research. First, the studies only included traditional laboratory tasks that lacked substantial meaning for their participants (e.g., copying out blocks of text). Thus, it is unclear whether mindfulness meditation would have a similar effect on motivation towards more meaningful pursuits. Second, the researchers did not use a pre-post design. Although participants in the mindfulness condition reported lower motivation than those in the mind-wandering condition, without a pre-post design it is unclear whether mindfulness meditation actually *decreased* motivation. It is possible that the between-group difference in motivation was due to an increase in the mind-wandering condition rather than a decrease in the mindfulness condition (or some combination of changes in each condition). The use of a mind-wandering induction as the comparison condition could be another limitation; researchers have suggested that mind-wandering may reflect a mental state that is the *opposite* of mindfulness and therefore might not be an ideal comparison (Heppner & Shirk, 2018). It is also unclear whether previous meditation experience was taken into account. The effects of a brief bout of mindfulness meditation may vary depending on one's meditation experience (Vidrine et al., 2016). Finally, the effects of mindfulness meditation on motivation were only investigated immediately after the mindfulness induction; thus, the duration of the motivational effects are unknown (i.e., does meditation have a temporary or persistent effect on motivation?).

It is worth noting that many of these limitations, as well as some additional limitations (e.g., failure to include manipulation checks, failure to provide information about exclusions; Leyland et al., 2019), apply to the existing experimental research on state mindfulness more generally, which is still in its infancy (Heppner & Shirk, 2018). These limitations have led researchers to question the quality of this research and recommend more rigorous approaches (Leyland et al., 2019).

Some of the aforementioned limitations allude to an alternative explanation for the findings in Hafenbrack and Vohs (2018) – one that the authors, themselves, also expressed. Since mindfulness facilitates the insight and self-reflection necessary to ensure that individuals' goals and behaviours are consistent with their values (Ryan & Deci, 2017), inducing state mindfulness may have enhanced participants' awareness of the insignificance of the laboratory tasks. This, in turn, may have led them to report lower motivation compared to participants in the mind-wandering condition, who may have been acting on "autopilot" (i.e., automatically; Levesque & Brown, 2007) and therefore did not recognize the triviality of the tasks. Given that individuals are more likely to act in accordance with their values and interests when they are in a mindful state (Brown & Ryan, 2003), inducing state mindfulness may encourage, or *motivate*, engagement in meaningful pursuits. This proposition has yet to be empirically tested.

Another issue that has yet to be investigated is how mindfulness meditation affects motivation over time. As previously noted, without the use of a pre-post design it is impossible to know whether mindfulness meditation actually *decreases* motivation from before to after meditating. The importance of employing a pre-post design becomes even more apparent when considering the challenges of selecting an appropriate

comparison condition to pair with a mindfulness induction (Heppner & Shirk, 2018).

Investigating the effects of mindfulness meditation on motivation over time can also

provide insight into the duration of the motivational effects. Although Hafenbrack and

Vohs (2018) investigated motivation immediately after their manipulation, the actual

effect of mindfulness meditation on motivation may increase or decrease, or simply

persist, over time. For example, other research has reported that inducing state

mindfulness led to improvements in reading comprehension on a task that participants

had up to 20 minutes to complete (Clinton et al., 2018), suggesting that certain effects of

meditation may continue for a given amount of time after meditating. In the event that

mindfulness meditation impairs or enhances motivation, it is possible that the impairment

or enhancement is only temporary and that motivation levels return to baseline shortly

after meditating. Alternatively, it is possible that the motivational effects of mindfulness

meditation remain for some time after meditating. These possibilities have yet to be

examined.

The Present Research

The purpose of the present research was to provide a more complete picture of the

effects of mindfulness meditation on motivation. Study 1 examined the effects of

mindfulness meditation on motivation towards meaningful pursuits (i.e., personal goals).

Study 2 replicated and extended Study 1 by investigating the effects of mindfulness

meditation on motivation towards individuals' personal goals and a traditional laboratory

task (i.e., anagrams) over time. The hypotheses, data collection plan, and analyses for

both studies were preregistered.

Study 1

As a first step. Study 1 investigated the effects of mindfulness meditation on amount of motivation towards individuals' personal goals. Study 1 also investigated goal self-concordance, the degree to which goals reflect individuals' authentic selves and are pursued for autonomous relative to controlled reasons (Sheldon & Elliot, 1999), as a moderator of the relationship between condition and amount of goal motivation. In addition, exploratory analyses were conducted to: (1) compare the effects of mindfulness meditation on goal motivation and anagram motivation, and (2) investigate changes in goal motivation over time.

Hypotheses

For the first research question, two competing hypotheses were proposed. First, consistent with suggestions from previous research (Hafenbrack & Vohs, 2018), inducing state mindfulness should lead to lower goal motivation compared to the podcast condition (H1a). Conversely, in line with self-determination theory, inducing state mindfulness should lead to greater goal motivation compared to the podcast condition (H1b). It was also hypothesized that goal self-concordance would moderate the relationship between state mindfulness and amount of motivation. In the event that state mindfulness led to lower levels of motivation towards personal goals, it was hypothesized that higher goal self-concordance would buffer against the "reduced motivation effect" of state mindfulness (H2a). In the event that state mindfulness led to higher levels of motivation towards personal goals, it was hypothesized that state mindfulness would enhance motivation to a greater degree for goals that were more self-concordant in nature (H2b).

Finally, it was hypothesized that there would be no differences between conditions in amount of goal motivation at the follow-up time point (H3).

Method

Participants

Participants were recruited through Carleton University's SONA system to participate in a laboratory study on personal goals and motivation. Participants were offered 1% course credit for participating. In order to be eligible to participate, participants had to be fluent in the English language and without any auditory impairment. Sample size was determined using a power analysis to detect a small to medium effect ($f = 0.18$) with 80% power for an ANOVA, which suggested approximately 100 participants per cell. Once the desired sample size was nearly collected, it was decided that data collection would continue until the fall reading break. This led to over-recruitment, which helped to account for failed attention checks. In total, 353 university students participated. In accordance with the exclusion criteria outlined in the preregistration, 79 participants were removed from analyses.[1] The final sample size consisted of 274 participants (mean age = 21.51, 74% female, 55% Caucasian).

Procedure

After clearance was granted from the research ethics board, participants were recruited to participate in a laboratory study entitled "Personal Goals and Motivation." After providing informed consent, participants set three personal goals that they planned

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[1] Participants ($n = 8$) in the mindfulness condition were removed from analyses for reporting extensive meditation experience (i.e., two or more years of regular practice). Participants ($n = 32$ in the mindfulness condition; $n = 36$ in the podcast condition) were excluded from analyses if they reported doing something else while they were supposed to be listening to the audio recordings. Participants ($n = 2$ in the mindfulness condition; $n = 1$ in the podcast condition) were removed because they could not recall what the audio recording was about.

to pursue for the upcoming week. Next, they reported on their motivation (type and amount) for each goal and completed a demographics questionnaire with questions related to age, gender, and ethnicity. Participants were then assigned to one of three conditions: a mindfulness condition, a podcast condition, or a filler questionnaire condition. In the mindfulness condition, participants were instructed to listen to a 10-minute abbreviated version of a guided meditation that was created by a professional mindfulness meditation instructor and has been used in previous research (Arch & Craske, 2006; Hafenbrack et al., 2014; Hafenbrack & Vohs, 2018). The guided meditation repeatedly instructs listeners to bring their attention to the present moment and the physical sensations of their breath. In the podcast condition, participants were asked to listen to a 10-minute clip from an episode of the "Stuff You Should Know" podcast that focuses on the history of emojis. This type of comparison condition is consistent with previous research that has had participants listen to educational recordings (e.g., natural history; Lueke & Gibson, 2015), clips from a story (Mirams et al., 2013), and excerpts from public radio (Erisman, & Roemer, 2010). The intention was to use a comparison condition that would be engaging for undergraduate students but without a mindful component (Heppner & Shirk, 2018). In the filler questionnaire condition, participants completed filler questionnaires for approximately 10 minutes.

After the manipulation, participants in both conditions completed a manipulation check to examine whether the manipulation was successful at inducing state mindfulness in the mindfulness condition, relative to the other conditions. Next, participants reported on their amount of motivation towards their personal goals (and, for exploratory purposes, an anagram task) and then completed some filler materials for approximately

10 minutes before reporting on their amount of goal motivation for a third and final time.[2]

Due to an error in the survey, 51 participants did not complete the 10-minute follow-up

motivation measurement properly.[3] After the final motivation measurement, participants

completed two attention checks to investigate whether they were paying attention to the

audio recording that they listened to (in the mindfulness and podcast conditions). Finally,

participants reported on their previous experience with mindfulness meditation and were

debriefed.

Materials

  Goal setting task. The instructions for setting the personal goals were as follows:

"Personal goals are projects and concerns that people think about, plan for, carry

out, and sometimes (though not always) complete or succeed at. They may be

more or less difficult to implement; require only a few or a complex series of

steps; represent different areas of a person's life; and be more or less time

consuming, attractive, and urgent. Please list three personal goals that you plan to

pursue over the upcoming week."

These instructions have been used in previous research on goal pursuit (Koestner, Lekes,

Powers, & Chicoine, 2002; Werner, Milyavskaya, Foxen-Craft, & Koestner, 2016). Some

examples of goals that participants set include: "finish my assignments", "go to the gym",

and "finish my readings."

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[2] As outlined in the preregistration this time point was originally supposed to be a 20-minute follow-up but participants took less time to complete the filler materials than anticipated.
[3] During data collection the filler questionnaire condition was removed in accordance with the preregistration. Towards the end of data collection the filler questionnaire condition was added back to the survey for exploratory purposes. When the survey was edited, the third goal motivation measurement was accidentally moved to immediately after the second goal motivation measurement. Therefore, the motivation scores reported at the final time point for these participants were deleted and omitted from the exploratory analyses involving all three time points.

   Goal self-concordance. Participants rated their quality, or type, of motivation for

each goal using five items that assessed external ("Because somebody else wants you to,

or because you'll get something from somebody if you do"), introjected ("Because you

would feel ashamed, guilty, or anxious if you didn't—you feel that you ought to strive for

this"), identified ("Because you really believe that it is an important goal to have"),

intrinsic ("Because of the fun and enjoyment which the goal will provide you—the

primary reason is simply your interest in the experience itself"), and integrated ("Because

it represents who you are and reflects what you value most in life") reasons for goal

pursuit (Koestner et al., 2002). All responses were made on a 7-point scale ranging from

1 (not at all for this reason) to 7 (completely for this reason). Consistent with previous

research (e.g., Sheldon & Elliott, 1999; Werner et al., 2016), a measure of goal self-

concordance was calculated for each goal by subtracting the average of the controlled

(extrinsic and introjected) items from the average of the autonomous (identified, intrinsic,

and integrated) items for each goal, such that the score for self-concordance ranged from

-6 to 6.

   Amount of motivation. At three separate time points (pre-manipulation, post-

manipulation, 10-min. follow-up), participants were asked to report how motivated they

were to pursue each personal goal in that moment and how committed they were to each

goal in that moment, using a scale from 1 (very slightly or not at all) to 7 (extremely).

They were also asked how much effort they were willing to spend to pursue each goal, in

that moment, on a scale from 1 (very little effort or none) to 7 (an enormous amount).

Amount of motivation was calculated by taking the average of the motivation and

commitment items for each goal.[4] An aggregate score of amount of motivation was calculated by taking the average across all three goals.

For exploratory purposes, anagram motivation was investigated at the post-manipulation time point only. Participants were asked to report how motivated they were to engage in the anagram task in that moment, using a scale from 1 (very slightly or not at all) to 7 (extremely). They were also asked how much effort they were willing to spend on the anagram task, in that moment, on a scale from 1 (very little effort or none) to 7 (an enormous amount).[5] Amount of anagram motivation was calculated by taking the average of these two items.

Manipulation and Attention Checks. To examine differences in state mindfulness between conditions following the manipulation, a 6-item manipulation check was used. Items were taken from Hafenbrack and Vohs (2018) and assessed participants' levels of present moment focus (e.g., "To what extent are you focused on the present moment right now?) as well as their focus on the breath (e.g., "To what extent are you focused on your breathing right now?"), using a scale from 1 (not much at all) to 7 (extremely). In addition, two attention checks were conducted at the end of the study to examine whether participants paid attention to the recordings that they listened to. The two questions were: "What was the recording that you listened to about?" and "Were you doing anything else while you listened to the recording?"

Meditation Experience. Participants were also asked about their previous meditation experience ("What is your experience with mindfulness meditation?") since a

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[4] It was preregistered that effort was only to be included in the average score if it correlated above .70 with the motivation and commitment items, which was not the case.
[5] Commitment was not used as an item for anagram motivation because it did not seem appropriate in the context of an anagram task that was only just presented to the participants.

10-minute beginner level guided meditation may have different effects on an individual without any or much meditation experience compared to an individual with substantial experience. As preregistered, participants with over two years of regular meditation experience were excluded from analyses.

Results

Descriptive statistics are presented in Table 1. As a manipulation check, a one-way analysis of variance (ANOVA) was conducted; there was a significant effect of condition on state mindfulness, $F(2,271) = 25.81$, $p < .001$, $\eta_p^2 = .16$. Participants in the mindfulness condition reported greater state mindfulness than those in the podcast condition (*mean difference* = 0.99, $p < .001$, 95% C.I. [0.61; 1.37]) and the filler questionnaire condition (*mean difference* = 1.01, $p < .001$, 95% C.I. [0.60; 1.42]); there were no differences between the podcast condition and the filler questionnaire condition (*mean difference* = 0.02, $p = 1.00$, 95% C.I. [-0.40; 0.43]; see Table 1). Thus, the manipulation was effective.

Research question 1: Post-manipulation goal motivation

To examine group differences in amount of post-manipulation goal motivation, a one-way ANOVA was conducted. There was a significant effect of condition on goal motivation, $F(2,271) = 4.71$, $p = .010$, $\eta_p^2 = .03$. Immediately following the manipulation, participants in the mindfulness condition reported greater goal motivation than those in the podcast condition (*mean difference* = 0.50, $p = .011$, 95% C.I. [0.09; 0.91]) but not the filler questionnaire condition (*mean difference* = 0.10, $p = 1.00$, 95% C.I. [-0.35; 0.54]); there were no differences between the podcast condition and the filler questionnaire condition (*mean difference* = 0.40, $p = .09$, 95% C.I. [-0.85; 0.04]).

Table 1

Study 1 Descriptive Statistics

	Condition					
	Mindfulness (*n* = 103)		Podcast (*n* = 97)		Filler Q (*n* = 74)	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*
State Mindfulness	4.89	1.11	3.89	1.14	3.88	1.07
Goal Motivation Pre	5.22	0.97	5.05	1.04	5.13	0.97
Goal Motivation Post	5.26	1.10	4.76	1.29	5.17	1.22
Anagram Motivation Post	4.26	1.57	4.37	1.37	4.10	1.67
Goal Motivation Follow-up	5.47	1.05	5.09	1.25	5.16	1.31

Note: Filler Qs refers to the filler questionnaire condition; all measures were completed on scales that ranged from 1-7. For the follow-up time point *n* = 86 for the mindfulness condition, *n* = 81 for the podcast condition, and *n* = 56 for the filler questionnaire condition.

Research question 2: Goal self-concordance as a moderator

To test whether goal self-concordance moderated the relationship between condition and amount of goal motivation, a multilevel analysis was conducted. First goal self-concordance, a level-1 variable, was group/person-mean centered (Enders & Tofighi, 2007). Given that the main comparison of interest was between the mindfulness condition and the podcast condition, the filler questionnaire condition was omitted from this analysis. Condition, a level-2 variable, was dummy coded so that the mindfulness condition equalled zero and the podcast condition equalled one. Next, an unconditional model, without any predictors, was examined. The intraclass correlation (ICC) of the unconditional model supported the use of multilevel analysis (ICC = .43), indicating that approximately 43% of the variance in amount of motivation could be attributed to the between-person level (i.e., a greater proportion of the variance existed at the within-

person level). Next, goal self-concordance (level-1), condition (level-2), and a cross-level

interaction between goal self-concordance and condition were added as predictors to the

conditional model.

Table 2

Study 1 Fixed and Random Effects for Multilevel Model

Fixed Effects

Effect	Estimate	SE	95% Confidence Interval
Intercept	5.26	0.12	[5.03; 5.49]
GSC	0.12	0.04	[0.04; 0.19]
Condition	-0.49	0.17	[-0.83; -0.16]
GSC*Condition	0.06	0.06	[-0.06; 0.17]

Random Effects

Effect	Estimate	SE	95% Confidence Interval
Residual	1.29	0.09	[1.12; 1.48]
Intercept	1.00	0.15	[0.75; 1.33]

The fixed and random effects of the multilevel analysis are presented in Table 2.

The main effect for goal self-concordance was significant, $t(394.99) = 2.90$, $p = .004$,

such that greater goal self-concordance was related to greater motivation to pursue that

goal. The main effect of condition was also significant, $t(197.91) = -2.92$, $p = .004$, such

that individuals in the mindfulness condition reported greater motivation towards their

goals than those in the podcast condition. However, the cross-level interaction between

condition and goal self-concordance was non-significant, $t(399.74) = 1.00$, $p = .32$. Thus,

contrary to the hypotheses, goal self-concordance did not moderate the relationship

between condition and amount of post-manipulation goal motivation.

Exploratory analyses: Comparing goal motivation and anagram motivation

A 3 (condition: mindfulness, podcast, filler questionnaire) by 2 (task: goals,

anagrams) general linear model (GLM) yielded a significant condition by task

interaction, $F(2,271) = 5.07$, $p = .007$, $\eta_p^2 = .04$ (see middle panel of Figure 1; see Table 3

for main effects).[6] As previously noted, immediately post-manipulation participants in the

mindfulness condition reported greater goal motivation than those in the podcast

condition (*mean difference* = 0.50, $p = .011$, 95% C.I. [0.09; 0.91]); however, there were

no differences between the mindfulness condition and the filler questionnaire condition

(*mean difference* = 0.10, $p = 1.00$, 95% C.I. [-0.35; 0.54]) or the between the podcast

condition and the filler questionnaire condition (*mean difference* = -0.40, $p = .09$, 95%

C.I. [-0.85; 0.04]).

For post-manipulation anagram motivation, there were no differences between the

mindfulness condition and the podcast condition (*mean difference* = -0.11, $p = 1.00$, 95%

C.I. [-0.63; 0.41]), the mindfulness condition and the filler questionnaire condition (*mean

difference* = 0.16, $p = 1.00$, 95% C.I. [-0.41; 0.72]), or the podcast condition and the filler

questionnaire condition (*mean difference* = 0.27, $p = .79$, 95% C.I. [-0.30; 0.83]).

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[6] The item related to commitment was not used for anagram motivation because it would not have made
much sense in this context. Thus, anagram motivation was comprised of two items (motivation and effort)
that were different from goal motivation (motivation and commitment). Similar results were obtained when
the analysis was rerun with a new score for goal motivation made up of the same two items used for
anagram motivation (motivation and effort). The two scores for goal motivation were correlated at $r = .96$.
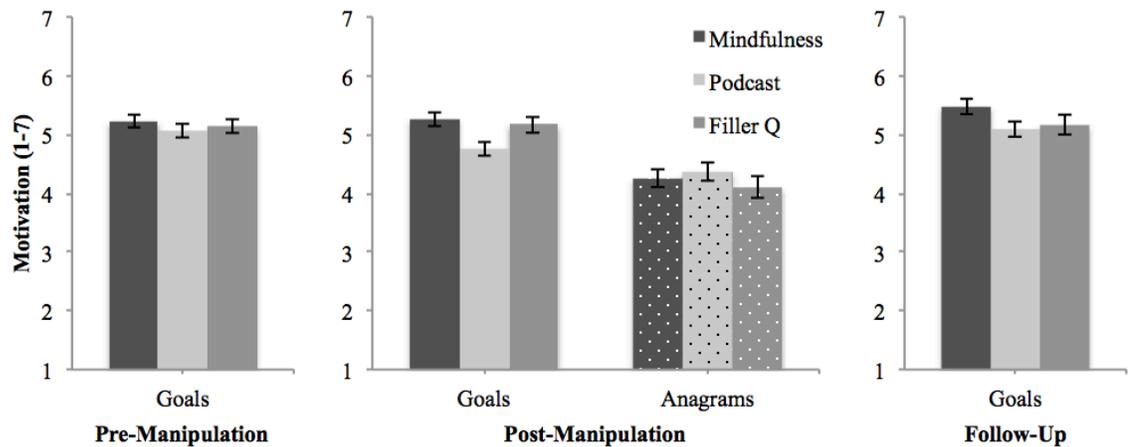
Figure 1. Motivation levels over time by condition (error bars represent standard error)

Exploratory analyses: Pre-post changes in goal motivation

A 3 (condition: mindfulness, podcast, filler questionnaire) by 2 (time: pre, post) repeated-measures GLM yielded a significant condition by time interaction, $F(2, 271) = 3.72$, $p = .025$, $\eta_p^2 = .03$ (see the first two panels of Figure 1; see Table 3 for main effects). Follow-up pairwise comparisons using a Bonferroni correction indicated that goal motivation did not change from pre- to post-manipulation in the mindfulness condition (*mean difference* = 0.04, $p = .64$, 95% C.I. [-0.14; 0.23]). In the podcast condition, goal motivation decreased from pre- to post-manipulation (*mean difference* = -0.29, $p = .003$, 95% C.I. [-0.48; -0.10]). In the filler questionnaire condition, goal motivation did not change from pre- to post-manipulation (*mean difference* = 0.03, $p = .77$, 95% C.I. [-0.18; 0.25]). Moreover, there were no differences in pre-manipulation goal motivation between the mindfulness condition and the podcast condition (*mean difference* = 0.17, $p = .68$, 95% C.I. [-0.17; 0.51]) or the mindfulness condition and the filler questionnaire condition (*mean difference* = 0.08, $p = 1.00$, 95% C.I. [-0.28; 0.45]); similarly, there were no differences between the podcast condition and the filler

questionnaire condition (*mean difference* = -0.09, *p* = 1.00, 95% C.I. [-0.46; 0.28]).

However, the mindfulness condition reported greater post-manipulation goal motivation

than the podcast condition but not the filler questionnaire condition.

Table 3

Study 1 Exploratory Analyses

3 (condition: mindfulness, podcast, filler questionnaire) x 2 (task: goals, anagrams) GLM				
Source	*df*	*F*	*p*	η_p^2
Task	**1**	**72.46**	**< .001**	**.21**
Condition	2	0.77	.46	.01
Task*Condition	**2**	**5.07**	**.007**	**.04**
3 (condition: mindfulness, podcast, filler questionnaire) by 2 (time: pre, post) GLM				
Source	*df*	*F*	*p*	η_p^2
Time	1	1.47	.23	.01
Condition	*2*	*2.95*	*.054*	*.02*
Time*Condition	**2**	**3.72**	**.025**	**.03**
3 (condition: mindfulness, podcast, filler questionnaire) by 3 (time: pre, post, follow-up) GLM				
Source	*df*	*F*	*p*	η_p^2
Time	2	1.98	.14	.0
Condition	2	2.21	.11	.02
Time*Condition	**4**	**3.23**	**.012**	**.03**

Note. Significant effects are bolded; marginal effects are italicized.

Additional analyses: Changes in goal motivation over time

A 3 (condition: mindfulness, podcast, filler questionnaire) by 3 (time: pre, post,

10-min. follow-up) repeated measures GLM yielded a significant condition by time

effect, $F(4, 440) = 3.23$, $p = .012$, $\eta_p^2 = .03$, (see Figure 1; see Table 3 for main effects).[7]

Follow-up pairwise comparisons, using a Bonferroni correction indicated that goal

motivation increased from pre-manipulation (*M* = 5.21, *SD* = 0.99) to the follow-up

(*mean difference* = 0.26, *p* = .026, 95% C.I. [0.02; 0.49) in the mindfulness condition. In

the podcast condition, there were no differences in goal motivation from pre-

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[7] The descriptive statistics presented in the text for the pre-manipulation time point of this analysis are slightly different from those presented in the table because, as previously noted, this analysis involved fewer participants.

manipulation (*M* = 5.09, *SD* = 1.08) to the follow-up (*mean difference* = -0.002, *p* = 1.00, 95% C.I. [-0.24; 0.24]). Similarly, in the filler questionnaire condition there were no differences from pre-manipulation (*M* = 5.23, *SD* = 0.96) to the follow-up (*mean difference* = -0.07, *p* = 1.00, 95% C.I. [-0.36; 0.23]).

In addition, there were no differences in follow-up goal motivation between the mindfulness condition and the podcast condition (*mean difference* = 0.38, *p* = .13, 95% C.I. [0.07; 0.82]),[8] or the mindfulness and the filler questionnaire condition (*mean difference* = 0.30, *p* = .42, 95% C.I. [-0.19; 0.80]); similarly, there were no differences between the podcast condition and the filler questionnaire condition (*mean difference* = -0.07, *p* = 1.00, 95% C.I. [-0.57; 0.43]); see Table 1).

Discussion

Results from Study 1 support the first of the two aforementioned competing hypotheses – that is, that individuals in the mindfulness condition would report greater amounts of post-manipulation goal motivation than individuals in the podcast condition. This finding contrasts previous research that suggests a potential demotivating effect of mindfulness meditation (Hafenbrack & Vohs, 2018). The discrepancy between the present findings and those from Hafenbrack and Vohs (2018) may be explained by the different goals/tasks that were considered in each study. In the present research participants were asked to report their motivation towards personal goals, whereas in Hafenbrack and Vohs (2018) participants were asked to report their motivation towards a series of seemingly mundane and superficial tasks assigned by the researchers. Taken

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[8] Due to the conservative Bonferroni correction, follow-up analyses did not yield any significant differences between conditions at the 10-minute follow-up time point; however, when the filler questionnaire condition is omitted from the analyses, results yield a significant difference between the mindfulness and the podcast conditions with the mindfulness condition reporting greater goal motivation.

together, these findings suggest that the effects of mindfulness meditation on motivation

may be task- or goal-dependent. Whereas previous research found that inducing state

mindfulness led individuals to report lower motivation towards traditional laboratory

tasks, compared to a mind-wandering condition, the present research found that inducing

state mindfulness led individuals to report higher motivation towards personal goals,

compared to a podcast condition.

For exploratory purposes, Study 1 also included measures pertaining to anagram

motivation. There were no differences between any of the conditions for post-

manipulation anagram motivation. This finding is inconsistent with the results of

Hafenbrack and Vohs (2018). Given that these two studies used the same mindfulness

induction (Arch & Craske, 2006), this discrepancy is likely due to the different

comparison conditions that were used (i.e., listening to a podcast or completing filler

questionnaires versus listening to a mind-wandering induction). Without the use of a pre-

post design for anagram motivation in either of these studies, it remains unclear whether

mindfulness meditation actually *decreases* anagram motivation.

On the other hand, Study 1 did include a pre-manipulation measure of goal

motivation. Exploratory analyses revealed that goal motivation did not change from pre-

to post-manipulation in the mindfulness condition or the filler questionnaire condition. In

contrast, goal motivation levels decreased significantly from pre- to post-manipulation in

the podcast condition. Thus, the difference in motivation levels reported immediately

post-manipulation between the mindfulness condition and the podcast condition was

likely due in part to the decrease in motivation in the podcast condition. This finding

highlights the importance of including pre-manipulation measures, when possible, to

separate the effects of mindfulness meditation from the effects of a comparison condition (Heppner & Shirk, 2018). Nonetheless, additional exploratory analyses identified an increase in motivation towards personal goals in the mindfulness condition from pre-manipulation (i.e., from before meditating) to the follow-up time point (i.e., ~10 min. after meditating). This pattern did not emerge in the podcast condition or the filler questionnaire condition. This finding should be interpreted with caution since it was exploratory but it may suggest that mindfulness meditation has the potential to increase goal motivation. Although results suggests that there were no differences in goal motivation between conditions at the follow-up time point, which is consistent with the original hypothesis, this appears to be due to the overly conservative Bonferroni correction. When the filler questionnaire condition is removed from this analysis, there is a significant difference between the mindfulness condition and the podcast condition with the mindfulness condition reporting greater goal motivation.

It is worth noting that the mindfulness condition and the filler questionnaire conditions did not differ significantly in terms of post-manipulation goal motivation (despite differences in state mindfulness). This finding was not anticipated and may be explained in part by the nature of the questionnaires that were completed in the filler questionnaire condition, some of which were related to goal pursuit. These questionnaires may have inadvertently led participants to reflect on their personal goals, and in turn, report higher motivation than they might have otherwise, without such prompts. As a result, the filler questionnaire condition did not reflect a true control condition where participants do "nothing" (Heppner & Shirk, 2018). Once again, this notion reinforces the importance of using pre-post designs, when possible, to investigate the effects of

mindfulness meditation in a manner that is independent of the effects of comparison conditions.

Contrary to the hypotheses, Study 1 did not find that goal self-concordance moderated the effect of mindfulness meditation on motivation. In other words, individuals in the mindfulness condition did not report greater motivation for goals that were more self-concordant. This finding should be interpreted with caution; however, it may suggest that mindfulness meditation has a similar effect on one's personal, weeklong goals, regardless of their level of self-concordance.

One limitation to Study 1 is that a large number of participants were removed for "failing" an attention check. As noted in the preregistration, any participants who reported that they were doing something else when they were listening to either the mindfulness induction or the podcast were removed from analyses for not following instructions. Unexpectedly, a large number of participants responded "yes" to the question: "Were you doing anything else while you listened to the recording?" Given that this was a laboratory study, it was assumed that the majority of participants would have responded "no" to this question. This assumption led to the omission of a follow-up question that could have provided insight into whether or not these participants truly warranted removal.[9] This limitation was addressed in Study 2.

Overall, Study 1 suggests that the effects of mindfulness meditation on motivation depend on the nature of the goal or task that is being considered. While previous research suggests that inducing state mindfulness may decrease motivation in the context of

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[9] To further explore this issue, a sensitivity analysis with these participants included, was conducted for the main analysis comparing post-manipulation goal motivation between the mindfulness condition and the podcast condition. The mindfulness condition ($M = 5.19$; $SD = 1.17$) reported marginally greater post, manipulation goal motivation compared to the podcast condition ($M = 4.91$; $SD = 1.24$), $t(266) = 1.89$, $p = .061$, which could be expected with additional noise in the data.

traditional laboratory tasks, the present research suggests that mindfulness meditation may enhance motivation towards personal goals. Nonetheless, more research is needed to corroborate these findings and examine whether mindfulness meditation actually *decreases* motivation towards traditional laboratory tasks.

Study 2

Study 2 aimed to replicate and extend Study 1 by investigating three research questions. First, Study 2 investigated the effects of mindfulness meditation on individuals' motivation towards both their personal goals and an anagram task. Second, Study 2 employed a pre-post design to investigate whether mindfulness meditation *increased* motivation towards personal goals and *decreased* motivation towards the anagram task. Third, Study 2 investigated changes in goal and anagram motivation over time (i.e., from before to 20 minutes after the manipulation).

Hypotheses

First, consistent the with results of Study 1, it was hypothesized that the mindfulness condition would report greater post-manipulation goal motivation, but similar or less (Hafenbrack & Vohs, 2018) anagram motivation, than the podcast condition. Second, consistent with the results of Study 1, it was hypothesized that individuals in the mindfulness condition would report no changes in goal motivation from pre- to post-manipulation; anagram motivation was expected to stay the same or decrease (Hafenbrack & Vohs, 2018). In the podcast condition, both goal and anagram motivation were expected to decrease. Third, in the mindfulness condition, it was hypothesized that goal motivation would increase from pre-manipulation to a 20-minute follow-up, whereas

anagram motivation was expected to stay the same or decrease. In the podcast condition, both goal and anagram motivation were expected to stay the same or decrease over time.

Method

Participants

Participants (n = 125) were recruited through Carleton University's SONA system to participate in a laboratory study on "Personal Goals and Motivation." Participants were offered 1% course credit for participating. Participants had to be fluent in the English language and without any auditory impairment in order to be eligible to participate. Initially, the plan was to over-recruit and collect 250 participants (with the expectation of excluding ~50 participants due to failed attention checks). This sample size was determined by conducting a power analysis to detect a small effect size (f = 0.1) with 80% power for the main analysis, a repeated measures ANOVA with a within-between interaction. The power analysis indicated that 200 participants would be necessary. However, due to the Coronavirus pandemic, in-lab data collection was interrupted and suspended indefinitely. At that point, 125 participants had participated in the study. In accordance with the exclusion criteria outlined in the preregistration, 5 participants were removed from analyses.[10] The final sample size consisted of 120 participants (mean age = 19.93; 65% female; 56% Caucasian). A new post-hoc power analysis for the main analysis, a 2 (condition: mindfulness, podcast) by 2 (task: goals, anagrams) mixed ANOVA, revealed that with 120 participants there would be 80% power to detect a small

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[10] Participants (n = 2 in the mindfulness condition) were excluded for reporting that they were doing something else that would have interfered with their ability to listen to the mindfulness induction. Participants (n = 1 in the mindfulness condition; n = 2 in the podcast condition) were removed because they could not recall what the audio recording was about.

effect ($f = 0.13$) and 95% power to detect a small to medium effect ($f = 0.17$). Since there

was adequate power to detect a small to medium effect, the data were analyzed.

Procedure

Study 2 followed the same procedures as Study 1 with a few notable differences.

First, more stringent instructions were included at the beginning of the study to increase

the likelihood that participants would attend to the audio recordings. Participants were

asked to turn off their cell phones and keep them out of sight for the duration of the

study. Second, an open-ended follow-up question was included so that in the event that

participants reported that they were doing something else while they listened to a

recording, information about what they were doing could be collected and used to

determine whether these participants warranted removal.

Another change was the inclusion of questions pertaining to anagram motivation

at all three time points; anagram motivation and goal motivation questions were

counterbalanced. Finally, additional filler materials were included to increase the time

interval between the post-manipulation and follow-up time points to approximately 20

minutes. These materials were unrelated to goal pursuit and motivation. A number of the

materials were related to personality traits (e.g., Big Five Inventory; John & Srivastava

1999), emotional experiences over the past week (e.g., Positive and Negative Affect

Schedule; Watson, Clark, & Tellegen, 1988) or quiz-type questions about random facts.

Materials

Goal setting task. The goal setting task was the same as the task used in Study 1

and previous research (Koestner et al., 2002; Werner et al., 2016).

Amount of motivation. At three different time points (pre, post, 20-min. follow-up) participants reported how motivated they were to pursue each personal goal and how much effort they were willing to invest in each goal (using the items from Study 1). These two items were averaged for each goal and aggregated across the three goals to generate an overall score for goal motivation at each time point.[11] In addition, participants were asked to report how motivated they were and how much effort they were willing to invest in the anagram task at each time point. These items were aggregated to generate a score for anagram motivation at each time point.

Manipulation and attention checks. The same 6-item state mindfulness manipulation check used in Study 1 and previous research (Hafenbrack & Vohs, 2018), was used in Study 2. The same attention checks used in Study 1 were also used in Study 2 with the addition of a follow-up question to investigate what participants were doing if they reported doing something else while listening to a recording.

Meditation experience. The same item used to measure meditation experience in Study 1 was used in Study 2.

Results

Descriptive statistics and between-group comparisons are presented in Table 4. As expected, participants in the mindfulness condition reported greater levels of state mindfulness compared to participants in the podcast condition (see Table 4). Thus, the

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[11] This combination of items (motivation + effort) is slightly different than the combination of items used to measure goal motivation in Study 1 (motivation + commitment). Correlations between the two different combinations for goal motivation in Study 2 ranged from, r = .94-.98 for the three time points. This preregistered modification was made to ensure that the same items could be used for goals and anagrams. Participants were not asked how committed they were to their goals and the anagram task because this would not have made sense for the anagram task. Additionally, participants were not asked how much time they were willing to put into their goals and the anagram task (as was done for anagrams in Hafenbrack and Vohs, 2018) because the amount of time required to achieve one's personal goals would not have been an appropriate comparison to the amount of time required to complete the anagram task.

manipulation was effective.

Research question 1: Comparing goal motivation and anagram motivation

A 2 (condition: mindfulness, podcast) by 2 (task: goals, anagrams) GLM, yielded

a significant condition by task interaction, $F(1, 118) = 4.09$, $p = .045$, $\eta_p^2 = .03$ (see

middle panel of Figure 2; see Table 5 for main effects). Participants in the mindfulness

condition reported greater goal motivation than individuals in the podcast condition,

(*mean difference* = 0.70, $p = .005$, 95% C.I. [0.22; 1.18]; see Table 4). There were no

differences between conditions for anagram motivation, (*mean difference* = 0.06, $p = .84$,

95% C.I. [-0.52; 0.64]).

Table 4

Study 2 Descriptive Statistics and Between-Group Comparisons

	Condition						
	Mindfulness (*n* = 60)		Podcast (*n* = 60)				
Variable	*M*	*SD*	*M*	*SD*	*t*	*p*	*d*
State mindfulness	**5.13**	**1.04**	**3.91**	**1.12**	**6.18**	**< .001**	**1.13**
Goal Motivation Pre	5.15	0.99	4.90	1.03	1.36	.18	0.25
Anagram Motivation Pre	4.53	1.56	4.73	1.29	0.77	.45	0.14
Goal Motivation Post	**5.43**	**1.19**	**4.73**	**1.45**	**2.87**	**.005**	**0.52**
Anagram Motivation Post	4.54	1.69	4.48	1.53	.20	.84	0.03
Goal Motivation Follow-up	**5.09**	**1.35**	**4.49**	**1.69**	**2.17**	**.03**	**0.40**
Anagram Motivation Follow-up	3.57	1.79	3.56	1.76	.03	.98	0.00

Note. Significant effects are bolded; all scales ranged from 1-7; $df = 118$ for all analyses.

Research question 2: Pre-post changes in motivation

A 2 (condition: mindfulness, podcast) by 2 (task: goals, anagrams) by 2 (time:

pre, post) repeated measures GLM failed to yield a significant three-way interaction,

$F(1,118) = 0.58$, $p = .45$, $\eta_p^2 = .01$ (see first two panels of Figure 2; see Table 5 for main effects and two-way interactions). Nonetheless, to address the second research question, specific, planned pairwise comparisons were conducted using a Bonferroni correction. In the mindfulness condition there was a significant increase in goal motivation from pre- to post-manipulation (*mean difference* = 0.28, $p = .030$, 95% C.I. [0.03; 0.53]), but no change in anagram motivation from pre- to post-manipulation (*mean difference* = 0.01, $p = .96$, 95% C.I. [-0.34; 0.36]). In the podcast condition, there were no changes in goal motivation from pre- to post-manipulation (*mean difference* = -0.17, $p = .20$, 95% C.I. [-0.42; 0.09]), or anagram motivation from pre- to post-manipulation (*mean difference* = -0.25, $p = .16$, 95% C.I. [-0.60; 0.10]).
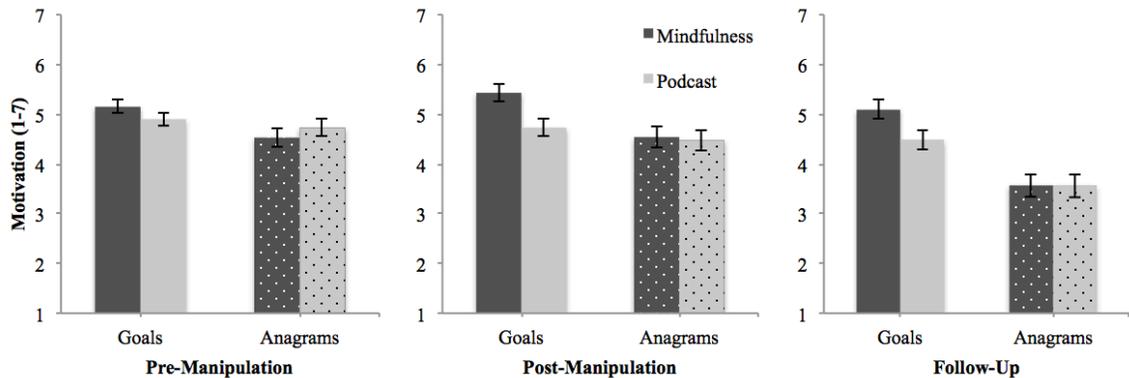
Figure 2. Motivation levels over time by condition (error bars represent standard error)

In addition, there were no significant differences between conditions in goal motivation pre-manipulation (*mean difference* = 0.25, $p = .18$, 95% C.I. [-0.12; 0.62]); however, post-manipulation, as previously noted, the mindfulness condition reported greater goal motivation than the podcast condition. For anagram motivation, there were no differences between conditions pre-manipulation (*mean difference* = 0.20, $p = .45$,

95% C.I. [-0.32; 0.72]), and, as previously noted, there were no differences post-

manipulation.

Table 5

Study 2 Analyses

2 (condition: mindfulness, podcast) by 2 (task: goals, anagrams) GLM

Source	df	F	p	η_p^2
Task	**1**	**12.86**	**< .001**	**.10**
Condition	1	3.00	.086	.03
Task*Condition	**1**	**4.09**	**.045**	**.03**

2 (condition: mindfulness, podcast) by 2 (task: goals, anagrams) by 2 (time: pre, post) repeated measures GLM

Source	df	F	p	η_p^2
Time	1	0.13	.722	.00
Task	**1**	**11.80**	**.001**	**.09**
Condition	1	1.32	.252	.01
*Time*Condition*	*1*	*3.87*	*.052*	*.03*
*Task*Condition*	*1*	*3.83*	*.053*	*.03*
Time*Task	1	2.06	.153	.02
Time*Task*Condition	1	0.58	.447	.01

2 (condition: mindfulness, podcast) by 2 (task: goals, anagrams) by 3 (time: pre, post, follow-up) repeated measures GLM

Source	df	F	p	η_p^2
Time	**1.89**	**30.59**	**< .001**	**.20**
Task	**1**	**27.15**	**< .001**	**.19**
Condition	1	1.64	.202	.01
Time*Condition	2	1.98	.140	.02
Task*Condition	**1**	**4.04**	**.047**	**.03**
Time*Task	**1.89**	**20.27**	**< .001**	**.15**
Time*Task*Condition	2	0.26	.775	.00

Note. Significant effects are bolded; marginal effects are italicized.

Research question 3: Changes in motivation over time

A 2 (condition: mindfulness, podcast) by 2 (task: goals, anagrams) by 3 (time:

pre, post, 20-min. follow-up) repeated measures GLM failed to yield a significant three-

way interaction, $F(2, 117) = 0.29$, $p = .75$, $\eta_p^2 = .01$ (see Figure 2; see Table 5 for main

effects and two-way interactions). Nonetheless, to address the third research question, specific, planned pairwise comparisons were conducted using a Bonferroni correction. In the mindfulness condition there were no significant changes in goal motivation from pre-manipulation to the follow-up (*mean difference* = -0.05, *p* = 1.00, 95% C.I. [-0.42; 0.32]), whereas anagram motivation decreased from pre-manipulation to the follow-up (*mean difference* = -0.97, *p* < .001, 95% C.I. [-1.47; -0.46]).

In the podcast condition, goal motivation decreased from pre-manipulation to the follow-up (*mean difference* = -0.41, *p* = .03, 95% C.I. [-0.78; -0.04]); similarly, anagram motivation decreased from pre-manipulation to the follow-up (*mean difference* = -1.18, *p* < .001, 95% C.I. [-1.68; -0.67]). In addition, the mindfulness condition reported greater goal motivation than the podcast condition at the follow-up (*mean difference* = 0.61, *p* = .03, 95% C.I. [0.05; 1.16]); however, there were no differences between conditions for anagram motivation at the follow-up (*mean difference* = 0.01, *p* = .98, 95% C.I. [-0.63; 0.65]; see Table 4).

Discussion

Consistent with the hypotheses for the main research question, and the results of Study 1, participants in the mindfulness condition reported greater post-manipulation goal motivation than those in the podcast condition; however, there were no differences between conditions for post-manipulation anagram motivation. Consistent with the hypothesis concerning changes in motivation from pre- to post-manipulation, participants in the mindfulness condition reported no change in anagram motivation; however, in contrast to the hypothesis that goal motivation would stay the same, participants reported a significant increase in goal motivation from before to after meditating. Inconsistent

with hypotheses, participants in the podcast condition did not report a decrease in goal or anagram motivation after listening to the podcast.

Study 2 yielded partial support for the hypotheses concerning changes in motivation from pre-manipulation to the 20-minute follow-up. Consistent with the hypotheses, results showed that motivation generally decreased over time, except for goals in the mindfulness condition. In contrast to the hypothesis concerning the mindfulness condition and individuals' personal goals, motivation did not increase over time, but instead remained similar to pre-manipulation levels at the 20-minute follow-up. Additional analyses revealed that there were no significant differences in goal motivation between conditions at the pre-manipulation time point; however, at the post-manipulation and the 20-minute follow-up time points, the mindfulness condition reported greater goal motivation than the podcast condition. Conversely, there were no differences between conditions at any of the three time points for anagram motivation.

It is important to note that the three-way interactions were non-significant for the second and third research questions. This is likely because the patterns of motivation over time for both tasks were directionally consistent within each condition. For example, in the mindfulness condition, motivation increased slightly from pre- to post-manipulation for both goals (significant) and anagrams (non-significant), whereas in the podcast condition there was a slight (non-significant) decrease in motivation towards both goals and anagrams.

Overall, the findings of Study 2 are fairly consistent with those of Study 1. In both studies participants in the mindfulness condition reported greater goal motivation at the post-manipulation and follow-up time points, compared to the podcast condition. There

were no between-group differences in post-manipulation anagram motivation in either

study. In addition, there was a slight increase in goal motivation in the mindfulness

condition from pre- to post-manipulation in Study 1 (non-significant) and Study 2

(significant), whereas there was a slight decrease in goal motivation from pre- to post-

manipulation in the podcast condition in Study 1 (significant) and Study 2 (non-

significant). These minor differences in significance between the two studies with regards

to pre-post changes in motivation may relate to the more stringent precautions that were

taken in Study 2 to ensure that participants attended to the manipulation recordings.

Although Study 2 did not find a significant increase in goal motivation from pre-

manipulation to the follow-up time point (whereas Study 1 did), this can likely be

explained by the longer time interval used in Study 2. The additional filler materials

included in Study 2 may have inadvertently increased participant burden (Lingler,

Schmidt, Gentry, & Terhorst, 2014) and made participants feel bored or fatigued (Ben-

Nun, 2008). This sense of depletion may have prompted participants to disengage from

the task at hand (Inzlicht, Schmeichel, & Macrae, 2014; Kurzban, Duckworth, Kable, &

Myers, 2013) and ultimately report lower motivation, in general, at the final time point.

This notion may be reflected in the main effect of time in Study 2 that showed a

significant decrease in motivation (across tasks and conditions) from both the pre- and

post-manipulation time points to the 20-minute follow-up (whereas there was no main

effect of time in Study 1, which was shorter in duration). Nonetheless, while the rest of

the conditions reported a significant decrease in motivation over time, individuals in the

mindfulness condition did not report a decrease in motivation towards their goals. Thus,

mindfulness meditation may help to buffer against decreases in goal motivation that might otherwise occur over longer periods of time.

Despite the differences between the two studies, the pattern of between-group differences in goal motivation (i.e., no differences pre-manipulation followed by greater goal motivation in the mindfulness condition at both the post-manipulation and follow-up time points) remained the same in both studies. Moreover, while Study 1 suggests that individuals may continue to see an increase in goal motivation shortly after meditating, Study 2 suggests that meditation may help to buffer against decreases in goal motivation.

Overall, the results of Study 2 oppose the claim that mindfulness meditation *decreases* motivation (Hafenbrack & Vohs, 2018). In contrast with the results of Hafenbrack and Vohs (2018), there were no differences between conditions in anagram motivation levels at any time point. Moreover, the use of a pre-post design showed that anagram motivation did not decrease from before to after meditating. Mindfulness meditation appeared to have little effect on individuals' motivation to engage in an anagram task and when it came to individuals' personal goals, mindfulness meditation *increased* motivation.

General Discussion

The present research investigated the effects of mindfulness meditation on individuals' motivation towards their personal goals and an anagram task. Consistent with hypotheses, both studies found that participants in the mindfulness condition reported greater post-manipulation goal motivation than those in the podcast condition. In addition, results showed that mindfulness meditation *increased* goal motivation from before to after meditating (i.e., 10 minutes after in Study 1 and immediately after in Study

2). Moreover, in both studies, individuals in the mindfulness condition consistently

reported greater goal motivation than those in the podcast condition at the post-

manipulation and follow-up time points (but not pre-manipulation).

      With regards to the anagram task, there were no differences between conditions in

post-manipulation anagram motivation in either study, nor were there differences at the

pre-manipulation or follow-up time points in Study 2. Moreover, in Study 2, anagram

motivation did not significantly decrease from before to after meditating.

      Overall, the present research suggests that the effects of mindfulness meditation

on motivation depend on the nature of the goal or task that is being considered. While

mindfulness meditation appears to have an enhancing effect on motivation towards

personal goals, it appears to have little effect on motivation towards a traditional

laboratory task. Moreover, the present research suggests that mindfulness meditation

leads to greater goal motivation compared to a podcast condition and that these between-

group differences last for at least 20 minutes after meditating.

Relation to previous research

      The present research appears to, but may not necessarily, contrast with previous

research by Hafenbrack & Vohs (2018), where individuals in the mindfulness condition

consistently reported lower task motivation (including anagram motivation) than those in

a mind-wandering condition. Since these two studies used the same mindfulness

induction, the discrepancy with regards to between-group differences in anagram

motivation (or lack thereof in the present research) likely relates to the different

comparison conditions that were used in each study. In the present research, participants

listened to a clip from a podcast, whereas in Hafenbrack and Vohs (2018), participants

listened to a mind-wandering induction[12] (with the exception of Experiment 3 where participants engaged in either a reading or writing task). Without the use of a pre-post design in Hafenbrack & Vohs (2018), it is unclear whether mindfulness meditation actually decreased task motivation in their experiments.

The present research addressed this limitation. In Study 2, contrary to inferences made in Hafenbrack and Vohs (2018), anagram motivation did not decrease from before to after meditating; post-meditation levels were similar to pre-meditation levels. Thus, it seems plausible that the between-group differences reported in Hafenbrack & Vohs (2018) may have been due, in part, to an increase in task motivation in the mind-wandering condition (or a combination of changes in each condition), rather than a significant decrease in the mindfulness condition. Ultimately, the present findings oppose the notion that mindfulness meditation *impairs* motivation. The present research found no such evidence for the anagram task and in the case of individuals' personal goals, the opposite effect was observed – mindfulness meditation *increased* motivation, adding to a growing body of research on the benefits of brief mindfulness inductions (Heppner & Shirk 2018).

The present research is also consistent with research generated in the context of self-determination theory that links mindfulness with a greater tendency to engage in meaningful pursuits (Brown & Ryan, 2003; Donald et al., 2019). For example, evidence from an experience sampling study showed that individuals were more likely to be acting in line with their values and interests when they were in a mindful state, even if they were low in dispositional mindfulness (Brown & Ryan, 2003). The present findings offer

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[12] This mind-wandering induction was not used in the present research because it seemed to inadvertently induce state mindfulness in a previous experiment (Smyth et al., submitted).

insight into the direction of this relationship and suggest that inducing state mindfulness may increase individuals' likelihood of engaging in meaningful pursuits by increasing their motivation to do so. In this sense, the greater *amounts* of motivation observed towards individuals' personal goals in the mindfulness condition might reflect a mechanism through which state mindfulness facilitates the selection of, and engagement in, autonomously motivated activities. In other words, when individuals are in a mindful state they may become more motivated to engage in behaviours that are aligned with their values and interests. This notion of directionality is consistent with research on long-term mindfulness interventions, which have been reported to promote more autonomous motivational orientations (Donald et al., 2019).

The present findings may also shed light on previous research that suggests mindfulness interventions are effective in helping people sustain effort and remain committed towards meaningful goals, even when they are difficult or aversive, such as smoking cessation (Bowen & Marlatt, 2009), substance use reduction (Lee, An, Levin, & Twohig, 2015), and weight loss (Tapper et al., 2009). Study 2 found that individuals in the mindfulness condition sustained baseline levels of goal motivation approximately 20 minutes after meditating, while motivation in the rest of the conditions dropped significantly, presumably because participants were bored or fatigued. Other research suggests that inducing state mindfulness can promote emotional resilience (Arch & Craske, 2006; Erisman & Roemer, 2010) and counteract ego-depletion (Friese et al., 2012). Taken together, engaging in mindfulness exercises may help individuals regulate challenging emotions, potentially through acceptance and non-reactivity (Donald et al., 2019), and ultimately sustain motivation towards meaningful goals.

The present research also supports the notion that mindfulness is negatively associated with amotivation (Donald et al., 2019). Amotivation is characterized by a state in which there is a lack of intentionality and motivation (Ryan & Deci, 2017). It describes the extent to which individuals are passive, ineffective and/or without purpose (Ryan & Deci, 2017). In the present research, not only were individuals in the mindfulness condition more motivated to pursue their goals, they also exhibited intentionality. That is, they were able to distinguish between their goals and the anagram task and only reported increases in goal motivation. The idea that mindfulness promotes greater intentionality is reflected in previous research that reports enhanced decision-making following a mindfulness induction (Hafenbrack et al., 2014) and research linking trait mindfulness with less automatic behaviour (Levesque & Brown, 2007) and lower impulsivity (Peters, Erisman, Upton, Baer, & Roemer, 2011).

Why might mindfulness meditation enhance motivation towards personal goals?

The notion that mindfulness meditation would enhance goal motivation may be understood in the context of self-determination theory and expectancy-valence models of motivation. The present findings support self-determination theory's proposition that mindfulness aids in the recognition and selection of goals and behaviours that are aligned with individuals' interests and values (Deci & Ryan, 1980; Ryan & Deci, 2017). Mindfulness is thought to foster clarity, which helps to liberate individuals from their usual, automatic responses and instead provides "space" for more reflective, autonomous regulation to occur (Ryan & Deci, 2017). According to Ryan and Deci (2017) being in a mindful state allows people to "reflect and select or decline actions with greater choice, thus promoting self-endorsed behaviour" (p. 269). In the present research, being in a

mindful state may have enhanced participants' capacity to openly attend to their inner

experience (i.e., thoughts, sensations, emotions). This, in turn, may have offered

participants the self-insight necessary to ensure that their self-reported motivation was

consistent with their goals and values (Ryan & Deci, 2017). Moreover, being in a mindful

state may have enhanced participants' ability to recognize the importance of their goals

(Donald et al., 2019).

The idea that recognizing the value of one's goals would, in turn, lead to greater

motivation is consistent with expectancy-valence theories of motivation where the

amount of motivation to engage in a goal depends on the psychological *value* of attaining

the goal and the likelihood of attaining it (e.g., Feather, 1990; Vroom, 1964). The

enhanced awareness that is a fundamental characteristic of state mindfulness may have

enhanced participants' capacity to recognize the importance of their personal goals

(Donald, et al., 2019), which in turn led them to report greater motivation towards them.

On the other hand, participants in the podcast condition, without any prompts to deploy

mindful attention, may have been operating on "autopilot" (i.e., acting automatically or

nonconciously) and therefore failed to recognize the importance of their goals (Levesque

& Brown, 2007). When considering the pattern of results in both the mindfulness and the

podcast conditions, the present findings seem to support the proposition that mindfulness

decreases automatic behaviours (i.e., behaviours that are controlled by forces outside of

awareness; Deci, 1980; Deci & Ryan, 1980), and instead increases the likelihood of

engaging in behaviours that are aligned with individuals' values and goals (Levesque &

Brown, 2007). Nonetheless, the present research did not investigate any behavioural

outcomes; therefore, it remains unclear whether the greater amounts of goal motivation

reported in the mindfulness condition, relative to the podcast condition, would translate into a greater tendency to engage in value-congruent behaviours.

Why doesn't mindfulness impair motivation?

The idea that mindfulness meditation would impair motivation seems to originate from the notion that one cannot be simultaneously accepting of the present moment and motivated to pursue a better future state (Hafenbrack & Vohs, 2018). At first glance, these two possibilities may seem incompatible; however, with further consideration this notion of incompatibility seems unlikely. Acceptance does not imply contentment, apathy, or passivity (Good et al., 2016). Acceptance simply involves allowing unwanted private experiences (e.g., thoughts, emotions) to come and go without resisting them (Harris, 2006). Thus, whether or not an individual is pleased or frustrated with their present circumstances is independent of whether or not they are accepting of them. In fact, the notion that an individual can be both accepting of their present circumstances and motivated to change them, is a central premise of acceptance and commitment therapy (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). In acceptance and commitment therapy, acceptance is not an end in itself; rather, it is encouraged as a method for increasing value-congruent action (Hayes et al., 2006).

Although Hafenbrack and Vohs (2018) suggest that mindfulness meditation may impair motivation on certain tasks, without the use of a pre-post design, convincing support for this claim has yet to be demonstrated. In fact, other research reports that individuals with higher trait mindfulness exhibited greater perseverance (which may be considered a proxy for motivation) on an anagram task (Evans, Baer, & Segerstrom, 2009). One potential explanation for why mindfulness meditation did not impair

motivation in the present research, even towards the anagram task, is that mindfulness is positively associated with openness to experience (Brown & Ryan, 2003). Thus, individuals in the mindfulness condition may have appraised the anagram task as interesting or enjoyable enough that they did not experience a decrease in motivation to engage with it, but not so important that they reported an increase in motivation.

Nonetheless, the idea that mindfulness meditation could decrease motivation in certain contexts may warrant further investigation. For example, individuals higher in trait mindfulness appear to be less likely to endorse extrinsic values such as wealth and image (Brown, Kasser, Ryan, Linley, & Orzech, 2009; Wang, Liu, Tan, & Zheng, 2017). Therefore, in highly controlled contexts or environments where extrinsic rewards are emphasized, mindfulness inductions may impair motivation (Donald et al., 2019). Future research can examine this possibility.

Limitations and future directions

There are some limitations to the present research. First, the samples used in both studies consisted of undergraduate university students. Given the nature of the samples, a large proportion of the goals that participants set were academic goals (e.g., "catch up on my readings"). Future research can investigate whether the present findings generalize to other samples (with different goals), such as younger or older populations and those with extensive meditation experience. Second, the present research only used one type of mindfulness induction (Arch & Craske, 2006; Hafenbrack & Vohs, 2018). Future research can also examine whether the present findings generalize to other mindfulness exercises (e.g., guided meditations from popular mobile apps; shorter/longer meditation sessions).

Another limitation to the present research is that there were no behavioural measures included. Although participants in the mindfulness condition consistently reported greater goal motivation than those in the podcast condition, it is unclear whether these differences would manifest in behavioural differences such as a greater likelihood of engaging in their goals, greater persistence towards their goals, and/or better performance on their goals. This is particularly relevant given that the majority of the motivation ratings across studies for both tasks fell between 4.5 and 5.5 on a 1-7 scale. While the present research yielded statistically significant results, the practical significance of these findings remains an open question.

Thus, an important avenue for future research would be to investigate the behavioural implications of the present findings. For example, researchers could examine whether the motivational benefits of mindfulness meditation observed in the present research lead to enhanced performance or goal progress (Locke & Latham, 2006). The idea that mindfulness meditation would improve performance seems plausible given that brief bouts of mindfulness meditation have also been reported to enhance focus and decrease mind-wandering (Hafenbrack & Vohs, 2018; Mrazek et al., 2012). Therefore, the combination of positive effects conferred by mindfulness meditation may lead to enhanced performance. One challenge to this line of research may be the selection of a task that (1) participants find meaningful and (2) can be objectively assessed.

The present research also alludes to an important limitation that may extend more generally to the majority of the experimental research on state mindfulness: even if participants report following instructions during a mindfulness induction, it is difficult to determine whether they are indeed engaging with the exercise as intended. This limitation

may be particularly relevant in situations like the present research, where samples consist of participants who are relatively new to mindfulness meditation, since meditation can be a difficult exercise to understand and engage with (Van Dam et al., 2018). Future research, particularly qualitative research, could investigate individuals' initial attempts at mindfulness meditation to get a better sense of the challenges that beginners may experience with this often confusing exercise.

Implications

Despite these limitations, the present research has a number of important implications. First, the present research is an answer to calls from previous researchers to investigate the relationship between mindfulness and motivation (Good et al., 2016), particularly with regards to the effects of mindfulness meditation on motivation towards meaningful goals (Hafenbrack & Vohs, 2018). Second, the present research highlights the importance of using pre-post designs (Heppner & Shirk, 2018). This is particularly important given the challenges of selecting suitable comparison conditions to pair with mindfulness inductions (Heppner & Shirk, 2108). In the present research the same podcast clip was used as a comparison condition for both studies. Although previous research typically uses similar comparison conditions, such as having participants listen to a story (McCrary & Heppner, 2015) or an educational recording (Leuke & Gibson, 2015), it is possible that the results in the present research, with respect to between-group differences, would have varied if another comparison condition were used. With that said, the use of a pre-post design in the present research allowed for the effects of the mindfulness induction to be separated from the effects of the podcast condition (Heppner & Shirk, 2018), and to that end, the present research is an improvement upon previous

research. The within-group findings in the present research lend confidence to the notion that mindfulness meditation can indeed *increase* goal motivation. Thus, the present research suggests that brief bouts of mindfulness may be an effective strategy for enhancing and sustaining motivation towards important goals.

As a result, mindfulness meditation may be an effective tool for goal pursuit in a variety of domains (e.g., educational and clinical setting). However, it is important to note that the motivational benefits of mindfulness meditation observed in the present research only applied to personal goals; they did not extend to the anagram task. This nuance may help to explain the mixed findings with regards to the effectiveness of long-term mindfulness interventions in boosting organizational productivity (Vonderlin, et al., 2020). Whether or not mindfulness interventions are effective in boosting individual or organizational productivity may depend in part on the degree to which individuals endorse their work and view it as meaningful (Donald et al., 2019).

Finally, the present research alludes to the importance of considering the personal relevance of tasks assigned in laboratory studies. Tasks that lack apparent meaning for participants may produce findings that do not generalize to the kinds of pursuits that participants would typically engage with outside of the laboratory. Considering the degree to which participants perceive laboratory tasks as personally relevant and engaging may help researchers gain a deeper understanding of their findings and their generalizability.

Conclusion

The present research provides a more complete picture of the effects of mindfulness meditation on motivation. Ultimately, the present findings oppose the notion

that mindfulness meditation impairs motivation and instead suggest that brief bouts of

meditation may enhance motivation towards meaningful pursuits.

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Appendix A: Goal Setting Task

Personal goals are projects and concerns that people think about, plan for, carry out, and sometimes (though not always) complete or succeed at. They may be more or less difficult; require only a few or many steps; represent different areas of a person's life; and be more or less time consuming, attractive, or urgent.

Please think of your three most important personal goals that you plan to pursue **over this coming week** and write them below.

Short-Term Goal #1: _____

Short-Term Goal #2: _____

Short-Term Goal #3: _____

Appendix B: Goal Self-Concordance (Study 1)

Goal Self-Concordance

For the following questions, think about your [FIRST/SECOND/THIRD] short-term goal: <insert text>

Think about the reasons that you are pursuing this goal. For each reason below, give a rating of 1 to 7 on how much you are pursuing your goal for that reason.

Scale: 1 (not at all for this reason) to 7 (completely for this reason)

1. Because somebody else (parent, professor, friend, etc.) wants you to, or because you'll get something from someone if you do
2. Because you would feel ashamed, guilty, or anxious if you didn't – you feel that you should try to accomplish this goal
3. Because you really believe that it is an important goal to have
4. Because of the fun and enjoyment which the goal will provide you – the primary reason is simply your interest in the experience itself
5. Because it represents who you are and reflects what you value most in life

Anagram Self-Concordance

Think about the reasons that you are completing the anagram task. For each reason below, give a rating of 1 to 7 on how much you are completing the anagram task for that reason.

Scale: 1 (not at all for this reason) to 7 (completely for this reason)

1. Because somebody else (parent, professor, friend, etc.) wants you to, or because you'll get something from someone if you do
2. Because you would feel ashamed, guilty, or anxious if you didn't – you feel that you should try to accomplish this goal
3. Because you really believe that it is an important goal to have
4. Because of the fun and enjoyment which the goal will provide you – the primary reason is simply your interest in the experience itself
5. Because it represents who you are and reflects what you value most in life

Appendix C: Amount of Motivation

Goal Motivation

For the following questions, think about your [FIRST/SECOND/THIRD] short-term

goal: <insert text>

Scale: 1 (very slightly or not at all) to 7 (extremely)

1. How motivated are you to pursue this goal RIGHT NOW?

2. How committed are you to pursuing this goal RIGHT NOW?

Scale: 1 (very little or none) to 7 (an enormous amount)

 3. How much effort are you willing to spend to pursue this goal RIGHT NOW?

Anagram Motivation

Scale: 1 (very slightly or not at all) to 7 (extremely)

1. How motivated are you to engage in the anagrams task RIGHT NOW?

Scale: 1 (very little or none) to 7 (an enormous amount)

 2. How much effort are you willing to spend to on the anagrams task RIGHT NOW?

Appendix D: State Mindfulness Manipulation Check

Please answer the following questions in terms of how you are feeling **RIGHT NOW**.
Scale: 1 (not much at all) to 7 (extremely)

1. To what extent are you focused on the present moment right now?
2. To what extent are you focused on your breathing right now?
3. To what extent are you focused on the physical sensations of your breath right now?
4. To what extent are you in touch with your body right now?
5. To what extent are you absorbed in the present moment right now?
6. To what extent are you thinking about the present moment right now?

Appendix E: Attention Checks

Study 1 and 2

What was the recording you listened to about? (If you did not listen to a recording, please anser "N/A."): _____

Were you doing anything else while you listened to the recording? (If you did not listen to a recording, please select "No."):

- Yes
- No

If yes, what were you doing? _____

Appendix F: Mindfulness Meditation Experience

What is your experience with mindfulness meditation?

- I have no experience with mindfulness meditation and do not know what it is
- I have heard about mindfulness meditation but have never tried it
- I have tried mindfulness meditation but do not do it regularly.
    - If so, how may times have you tried it?
- I practice mindfulness meditation fairly regularly (i.e., one to three times per month).
    - If so, how long have you been doing this?
- I practice mindfulness meditation fairly regularly (i.e., one to three times per week).
    - If so, how long have you been doing this?
- I practice mindfulness meditation almost everyday.
    - If so, how long have you been doing this?

Appendix G: Filler Questionnaire Condition (Study 1)

Goal Adjustment Scale
(Wrosch, Scheier, Miller, Schulz, & Carver, 2003)

During their lives people cannot always attain what they want and are sometimes forced to stop pursuing the goals they have set. We are interested in understanding how you usually react when this happens to you. Please indicate the extent to which you agree or disagree with each of the following statements, as it usually applies to you.

If I have to stop pursuing an important goal in my life…

Scale: 1 (strongly disagree) to 5 (strongly agree)

1. It's easy for me to reduce my effort towards this goal
2. I convince myself that I have other meaningful goals to pursue
3. I stay committed to the goal for a long time; I can't let it go
4. I start working on other new goals
5. I think about other new goals to pursue
6. I find it difficult to stop trying to achieve the goal
7. I seek other meaningful goals
8. It's easy for me to stop thinking about the goal and let it go
9. I tell myself that I have a number of other new goals to draw upon
10. I put effort toward other meaningful goals

Regulatory Focus Questionnaire
(Lockwood et al., 2002)

Below are 18 statements that you may agree or disagree with. Using a scale of 1 – 9, with 1 meaning "not at all true of me," and 9 meaning "very true of me," select your agreement with each item by clicking on the appropriate response bubble for that statement.

1. In general, I am focused on preventing negative events in my life
2. I am anxious that I will fall short of my responsibilities and obligations
3. I frequently imagine how I will achieve my hopes and aspirations
4. I often think about the person I am afraid I might become in the future
5. I often think about the person I would ideally like to be in the future
6. I typically focus on the success I hope to achieve in the future
7. I often worry that I will fail to accomplish my goals
8. I often think about how I will achieve success
9. I often imagine myself experiencing bad things that I fear might happen to me
10. I frequently think about how I can prevent failures in my life
11. I am more oriented toward preventing losses than I am toward achieving gains
12. A major goal I have right now is to achieve my ambitions
13. A major goal I have right now is to avoid becoming a failure
14. I see myself as someone who is primarily striving to reach my "ideal self" – to fulfill my hopes, wishes, and aspirations

15. I see myself as someone who is primarily striving to become the self I "ought" to be – to fulfill my duties, responsibilities, and obligations
16. In general, I am focused on achieving positive outcomes in my life
17. I often imagine myself experiencing good things that I hope will happen to me
18. Overall, I am more oriented toward achieving success than preventing failure

Global Motivation

Please indicate to what extent each of the following statements corresponds generally to the reasons why you do different things.

In general, I do things…

1. ...because I do not want to disappoint certain people
2. …in order to help myself become the person I aim to be
3. … because they represent who I am
4. …even though I do not see the benefit in what I am doing
5. …because I want other people to see me in a positive way
6. …because I chose them as a way to reach my goals
7. …for the pleasure of learning something new
8. …because otherwise I would feel guilty for not doing them
9. …because they are in line with my main beliefs
10. …even though it does not make a difference whether I do them or not
11. …for the pleasant feelings I get while I am doing them
12. …to show others what I am capable of
13. …because I force myself to do them
14. …because of the satisfaction I feel in trying to excel in what I do
15. …even though I do not have a good reason for doing them
16. …because I choose to make a commitment to what is important for me
17. …because I would be upset with myself if I did not do them
18. …because they reflect what I value most in life

The Rumination-Reflection Questionnaire
(Trapnell & Campbell, 1999)

For each of the following statements, rate you level of agreement using the following scale:

Scale: 1 (strongly disagree) to 5 (strongly agree)

Rumination

1. My attention is often focused on aspects of myself I wish I'd stop thinking about
2. I always seem to be rehashing in my mind recent things I've said or done
3. Sometimes it is hard for me to shut off thoughts about myself
4. Long after an argument or disagreement is over with, my thoughts keep going back to what happened

5. I tend to "ruminate" or dwell over things that happen to me for a really long time afterward
6. I don't waste time rethinking things that are over and done with
7. Often I'm playing back over in my mind how I acted in a past situation
8. I often find myself reevaluating something I've done
9. I never ruminate or dwell on myself for very long
10. It is easy for me to put unwanted thoughts out of my mind
11. I often reflect on episodes in my life that I should no longer concern myself with
12. I spend a great deal of time thinking back over my embarrassing or disappointing moments

Reflection

13. Philosophical or abstract thinking doesn't appeal to me that much
14. I'm not really a meditative type of person
15. I love exploring my "inner" self
16. My attitudes and feelings about things fascinate me
17. I don't really care for introspective or self-reflective thinking
18. I love analyzing why I do things
19. People often say I'm a "deep," introspective type of person
20. I don't care much for self-analysis
21. I'm very self-inquisitive by nature
22. I love to meditate on the nature and meaning of things
23. I often love to look at my life in philosophical
24. Contemplating myself isn't my idea of fun

The Mindset Quiz
(Dweck, 1999)

Read each sentence below and then mark the corresponding box that shows how much you agree with each sentence. There are no right or wrong answers.

Scale: 1 (strongly disagree) to 6 (strongly agree)

1. You have a certain amount of intelligence, and you really can't do much to change it
2. Your intelligence is something about you that you can't change very much
3. No matter who you are, you can significantly change your intelligence level
4. To be honest, you can't really change how intelligent you are
5. You can always substantially change how intelligent you are
6. You can learn new things, but you can't really change your basic intelligence
7. No matter how much intelligence you have, you can always change it quite a bit
8. You can change even your basic intelligence level considerably
9. You have a certain amount of talent, and you cant really do much to change it
10. Your talent in an area is something about you that you can't change very much
11. No matter who you are, you can significantly change your level of talent
12. To be honest, you can't really change how much talent you have

13. You can always substantially change how much talent you have
14. You can learn new things, but you can't really change your basic level of talent
15. No matter how much talent you have, you can always change it quite a bit
16. You can change even your basic level of talent considerably