Mindfully motivated: Can a brief session of mindfulness meditation enhance motivation
towards personal goals?

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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 personal goals and an anagram task. In Study 1 ($n = 200$), participants in the mindfulness condition reported greater goal motivation than those in a comparison podcast condition (due to a decrease in the podcast condition); this difference remained 10 minutes later. Exploratory analyses revealed no differences between conditions in post-manipulation anagram motivation. In Study 2 ($n = 120$), participants in the mindfulness condition reported greater goal motivation than those in the podcast condition; this difference remained 20 minutes later. There were no differences between conditions in anagram motivation. Furthermore, goal motivation increased from before to after meditating, whereas anagram motivation remained the same. These findings oppose the notion that meditation impairs motivation and instead suggest that meditation may offer motivational benefits for personal goal pursuit.

Keywords: Mindfulness, mindfulness meditation, motivation, goal pursuit, self-determination theory

Mindfully motivated: Can a brief session of mindfulness meditation enhance motivation towards personal goals?

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). Nonetheless, recent research has begun to explore potential limitations of this construct (Hafenbrack & Vohs, 2018; Schindler, Pfattheicher, & Reinhard, 2019; Van Dam et al., 2018). 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 participants in a mind-wandering condition. One limitation to this research is that it included only traditional laboratory tasks, which may 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).

Mindfulness

While there is ongoing debate over the definition of mindfulness (Nilsson & Kazemi, 2016; Van Dam et al., 2018), a common conceptualization 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). According to this

perspective, mindfulness is characterized by qualities such as acceptance and awareness. A large portion of the research to date has focused on trait mindfulness – the general tendency to deploy mindful attention in daily life (Brown & Ryan, 2003). However, mindfulness as a mental behaviour is fundamentally a psychological state, which involves mindfully attending to the present moment (Bishop et al., 2004).

Although mindful states can arise naturally in everyday life (Brown & Ryan, 2003; Friesen & Hofmann, 2016), the present research focused on state mindfulness as induced by mindfulness exercises. State mindfulness is typically studied in experimental settings, wherein participants (often those with little or no meditation experience; Leyland, Rowse, & Emerson, 2019) are randomly assigned to engage in a mindfulness exercise (e.g., guided meditation) or a time-matched comparison condition (e.g., educational recording) prior to engaging in some sort of cognitive or behavioural task. A number of cognitive, emotional, social, and health-related benefits have been reported following mindfulness exercises (see Heppner & Shirk, 2018 for a review). For example, previous research reports that a brief, single-session mindfulness induction can improve executive attention (Gorman & Green, 2016), reduce the sunk cost bias (Hafenbrack, Kinias, & Barsade, 2014), counteract self-control depletion (Friesen, Messner, & Schaffner, 2012), and promote emotional resilience (Arch & Craske, 2006; Erisman & Roemer, 2010). Despite these wide-ranging benefits, recent research suggests there may be downsides to inducing state mindfulness, such as blunted moral reactions (Schindler et al., 2019), false-memory susceptibility (Wilson, Mickes, Stolarz-Fantino, Evrard, & Fantino, 2015), and, of particular relevance to the present research, impaired motivation (Hafenbrack & Vohs, 2018).

Mindfulness and 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 chunks of text, cover-letter editing, and brainstorming uses for a brick. For these experiments, motivation was operationalized in terms of its amount or strength (e.g., how motivated are you to complete this task?). The results 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 induction.

Although Hafenbrack and Vohs (2018) concluded that mindfulness meditation impairs motivation, this notion contrasts with considerable correlational research that links mindfulness with adaptive motivational properties. For example, a recent meta-analysis reported that mindfulness was negatively associated with amotivation (Donald et al., 2019), 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 et al., 2015) and greater interest in day-to-day activities such as work tasks (Shiba et al., 2015), interactions with romantic partners (Karremans & Papies, 2017), and connecting with nature (Wolsko & Lindberg, 2013). Thus, in certain contexts mindfulness may 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 autonomous motivation – the drive to pursue goals because they are meaningful, interesting, and/or value-congruent (Deci & Ryan, 1980; Donald et al., 2019; Smyth, Werner, Milyavskaya,

Holding, & Koestner, 2020). For example, in an experience sampling study, Brown and Ryan (2003) reported that trait mindfulness was positively associated with both dispositional autonomy and autonomous activity in daily life. They also reported that individuals were more likely to be acting in accordance with their values and interests (i.e., autonomously) when they were in a mindful state. In addition, the aforementioned meta-analysis by Donald et al. (2019), which included long-term mindfulness interventions, offers insight into the direction of the relationship between mindfulness and autonomous motivation and suggests that mindfulness interventions promote a more autonomous motivational orientation (Donald et al., 2019). Taken together, a large body of research suggests that mindfulness is linked to (and may foster) a greater tendency to engage in meaningful and engaging 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 typically characterized by an attitude of acceptance towards 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.

On the other hand, although mindfulness is characterized by an attitude of acceptance, this does not imply 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), and experimental research suggests that long-term mindfulness interventions promote an autonomous orientation (Donald et al., 2019). In addition, the finding that mindfulness is negatively associated with amotivation (Donald et al., 2019) seems particularly problematic for the proposition that mindfulness impairs motivation. Moreover, mindfulness has been associated with enhanced performance in a variety of domains (though experimental research on state mindfulness suggests that this is not always the case; e.g., Hafenbrack & Vohs, 2018; Wilson et al., 2015), 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 limitations to this research. First, the studies only included tasks assigned by the researchers that may have lacked substantial meaning for their participants, such as copying out blocks of text. Although similar tasks exist in other settings, such as the workplace, results may differ for self-selected tasks with greater personal relevance. Second, the researchers did not use a pre-post design and instead used a post-test only design. Although a pre-post design is not always appropriate, without a pre-post design it is unclear whether the lower levels of motivation reported in the mindfulness condition were due to an actual *decrease* in motivation from before to after meditating or an increase in motivation in the mind-wandering condition (or some combination of changes in each condition). The use of a mind-wandering induction as the comparison condition could reflect another limitation as some 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 worth noting that these types of limitations and other limitations (e.g., failing to take into account or provide information about participants' previous meditation experience) apply more generally to the existing experimental research on state mindfulness, which is still in its infancy (Heppner & Shirk, 2018). This has led some researchers to question the quality of this work and recommend more rigorous approaches (Leyland et al., 2019).

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 and led them to report lower motivation towards them. Participants in the mind-wandering condition may have failed to recognize the triviality of the tasks because they were acting on “autopilot” (Levesque & Brown, 2007). 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 *motivate* (or at least not demotivate) 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 difficult to know whether mindfulness meditation *decreases* motivation from before to after meditating. Given the challenges of selecting an appropriate comparison condition to pair with a mindfulness induction (Heppner & Shirk, 2018), using a pre-post design

offers some additional insight into the specific effects of mindfulness meditation when investigating its effects on motivation. Moreover, examining changes over time can provide information about the duration of the motivational effects of mindfulness meditation. Although Hafenbrack and Vohs (2018) investigated motivation immediately after their manipulation only, the actual effect of mindfulness meditation on motivation may increase or decrease, or simply persist, over time. For example, previous research reports that on days when individuals engaged in meditation, they responded to events with greater mindfulness throughout the day (Lacaille et al., 2018), suggesting that certain effects of meditation may continue for some time after meditating. Exploring the duration of the effects of meditation is important given that meditation appears to confer both positive (e.g., Gorman & Green, 2016) and negative effects (e.g., Wilson et al., 2015) and a better understanding of the duration of these effects may help researchers to determine under which circumstances mindfulness meditation may be appropriate or not, as well as optimal times to engage in mindfulness exercises. In the event that meditation does indeed impair motivation, it is possible that the impairment is only temporary and that motivation levels return to baseline shortly after meditating. This possibility has 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 (among those with little or no meditation experience) and investigate whether the impaired motivational effect of meditation documented in previous research extends to more meaningful pursuits. Study 1 examined the effects of mindfulness meditation on motivation towards personal goals. Study 2

replicated and extended Study 1 by investigating the effects of mindfulness meditation on motivation towards personal goals and an anagram task over time. Both studies were conducted at a Canadian university. The hypotheses, data collection plan, and analyses for both studies were preregistered. All measures, manipulations, exclusions, and deviations from the preregistrations are disclosed. Data and study materials are available on the Open Science Framework (OSF). Project link: <https://osf.io/q5cn9/>

Study 1

Study 1 investigated the effects of mindfulness meditation on motivation towards individuals' personal goals. 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 a comparison condition. Conversely, in line with self-determination theory research, inducing state mindfulness may lead to greater goal motivation compared to a comparison condition.¹ 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. Given that the impaired motivational effects of meditation reported in Hafenbrack and Vohs (2018) were serially mediated by reductions in future focus and state arousal immediately after the mindfulness induction, it was expected that future focus and arousal would return to normal 20 minutes after meditating and therefore it was hypothesized that there would be no differences between conditions in goal motivation at the 20-minute follow-up time point.

Methods

Participants and Procedure

Sample size was determined using a power analysis to detect a small to medium effect ($f = 0.18$ or $\eta_p^2 = .03$) 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 to account for potential exclusions. In total, 353 university students participated and were offered 1% course credit. In accordance with the exclusion criteria outlined in the preregistration, 79 participants were removed from analyses.²

After clearance was granted from the research ethics board, participants were recruited to participate in a lab study entitled “Personal Goals and Motivation.” Participants provided informed consent and set three personal goals that they planned to pursue the upcoming week. Next, they reported on their motivation for each goal and completed a demographics questionnaire. Participants were then assigned to one of three conditions: a mindfulness condition, a podcast condition, or a filler questionnaire condition. Given methodological flaws in the filler questionnaire condition ($n = 74$), and our preregistered plan to consider removing it (see OSF for full details), we removed this condition³ and focused our analyses on the two key conditions (final $n = 200$, mean age = 21.15, 74% female, 55% Caucasian); full write-up and output for analyses with the filler questionnaire condition are available on OSF. In the mindfulness condition, participants listened to and followed a 10-minute abbreviated version of a guided meditation that was created by a professional mindfulness meditation instructor (Hafenbrack et al., 2014), adapted from Arch and Craske (2006), which has been used in previous research (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 listened to a 10-minute clip from an episode of the “Stuff You Should Know” podcast that focuses on the history of emojis (see “Podcast” on OSF to access the clip). 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, Poliakoff, Brown, & Lloyd, 2013), and excerpts from public radio (Erisman, & Roemer, 2010). The mind-wandering induction used in Hafenbrack and Vohs (2018) was not used in the present research because it appeared to inadvertently induce state mindfulness in an experiment for an unrelated project (see “Mind-Wandering Experiment” on OSF; link: <https://osf.io/kvzce/>) and because some researchers caution against its use as an appropriate comparison (Heppner & Shirk, 2018).

After the manipulation, participants in both conditions completed a manipulation check to examine levels of state mindfulness. Next, they reported on their motivation towards their goals (with prompts reminding them of the goals they set). For exploratory purposes they also reported their motivation towards an anagram task that they were told they would complete shortly. They then completed filler materials for approximately 10 minutes before reporting on their goal motivation for a third time. (This time interval was originally supposed to be 20 minutes but participants took less time to complete the materials than anticipated.) Due to an error with the survey, 33 participants did not complete the third goal motivation time point. Next, participants completed two attention checks, reported their previous meditation experience 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 (e.g., Koestner, Lekes, Powers, & Chicoine, 2002). Examples of goals that participants set include: "finish my assignments", "go to the gym", "eat more greens", "catch up with family", and "get a tattoo".

Motivation. At three time points participants reported how motivated they were to pursue each goal and how committed they were to each goal, using a scale from 1 (very slightly or not at all) to 7 (extremely). They also reported how much effort they were willing to spend to pursue each goal, on a scale from 1 (very little effort or none) to 7 (an enormous amount). Motivation was calculated by taking the average of all three items for each goal. An aggregate score for goal motivation was calculated for each time point by taking the average across all three goals.

For exploratory purposes, participants were asked to report how motivated they were to engage in an anagram task at the post-manipulation time point only, 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, on a scale from 1 (very little effort

or none) to 7 (an enormous amount). Anagram motivation was calculated by taking the average of these two items.

Manipulation and attention checks. To examine state mindfulness following the manipulation, a 6-item manipulation check from Hafenbrack and Vohs (2018) was used to assess participants' focus on the present moment (e.g., "To what extent are you focused on the present moment right now?) and their breathing (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?") given that the effects of a brief bout of mindfulness meditation may vary depending on one's level of meditation experience (Hafenbrack & Vohs, 2018; Vidrine et al., 2016). As preregistered, participants with over two years of regular meditation experience were excluded from analyses.

Results

Descriptive statistics and between-group comparisons are presented in Table 1. Participants in the mindfulness condition reported greater state mindfulness than those in the podcast condition (see Table 1); thus, the manipulation was effective.

Main analysis: Post-manipulation goal motivation

An independent samples *t*-test, with 80% power to detect an effect size of $d = .40$,

indicated that participants in the mindfulness condition reported greater goal motivation immediately following the manipulation, compared to those in the podcast condition (*mean difference* = 0.51, $p = .003$, 95% C.I. [0.18; 0.83]; see Table 1).

Table 1

Study 1 Descriptive Statistics and Between-Group Comparisons

	Condition				<i>t</i>	<i>p</i>	<i>d</i>
	Mindfulness (<i>n</i> = 103)		Podcast (<i>n</i> = 97)				
Variable	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
State Mindfulness	4.89	1.12	3.89	1.14	6.21	< .001	0.88
Goal Motivation Pre	5.23	0.88	5.05	0.96	1.37	.17	0.20
Goal Motivation Post	5.25	1.09	4.74	1.26	3.05	.003	0.43
Anagram Motivation Post	4.26	1.57	4.37	1.37	-0.52	.60	0.07
Goal Motivation Follow-up	5.41	1.06	5.04	1.23	2.08	.039	0.32

Note. Significant effects are bolded; all scales ranged from 1-7; $df = 198$ for all analyses except the follow-up time point where $df = 165$ ($n = 86$ for the mindfulness condition and $n = 81$ for the podcast condition).

Exploratory analyses: Comparing goal motivation and anagram motivation

A 2 (condition: mindfulness, podcast) by 2 (task: goals, anagrams) general linear model (GLM), with 80% power to detect an effect size of $f = .10$ or $\eta_p^2 = .01$ (with correlations among repeated measures assumed to be $r = 0.5$), yielded a significant condition by task interaction, $F(1,198) = 8.40$, $p = .004$, $\eta_p^2 = .04$ (see middle panel of Figure 1; see Table 2 for main effects).⁴ As previously noted, participants in the mindfulness condition reported greater post-manipulation goal motivation than those in the podcast condition (*mean difference* = 0.51, $p = .003$, 95% C.I. [0.18; 0.83]); however, there were no differences between the mindfulness and the podcast condition for anagram motivation (*mean difference* = -0.11, $p = .60$, 95% C.I. [-.52; 0.30]).

Figure 1. Motivation levels over time by condition (error bars represent standard error)

Table 2

Study 1 Exploratory Analyses

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

Source	<i>df</i>	<i>F</i>	<i>p</i>	η_p^2
Task	1	41.55	< .001	.17
Condition	1	1.62	.20	.01
Task*Condition	1	8.40	.004	.04

2 (condition: mindfulness, podcast) by 2 (time: pre, post) GLM

Source	<i>df</i>	<i>F</i>	<i>p</i>	η_p^2
Time	1	4.80	.03	.02
Condition	1	6.47	.012	.03
Time*Condition	1	6.46	.012	.03

2 (condition: mindfulness, podcast) by 3 (time: pre, post, follow-up) GLM

Source	<i>df</i>	<i>F</i>	<i>p</i>	η_p^2
Time	1.92	4.92	.008	.03
Condition	1	4.76	.031	.03
Time*Condition	1.92	4.63	.011	.03

Note. Significant effects are bolded.

Exploratory analyses: Pre-post changes in goal motivation

A 2 (condition: mindfulness, podcast) by 2 (time: pre, post) repeated-measures general linear model (GLM), with 80% power to detect an effect size of $f = .10$ or $\eta_p^2 = .01$ (with correlations among repeated measures assumed to be $r = 0.5$), yielded a significant condition by time interaction, $F(1, 198) = 6.46$, $p = .012$, $\eta_p^2 = .03$ (see the

first two panels of Figure 1; see Table 2 for main effects). Follow-up pairwise comparisons indicated that goal motivation did not change from pre- to post-manipulation in the mindfulness condition (*mean difference* = 0.02, $p = .80$, 95% C.I. [-0.20; 0.15]). In the podcast condition, goal motivation decreased from pre- to post-manipulation (*mean difference* = -0.31, $p = .001$, 95% C.I. [-0.48; -0.12]).

Additional analyses: Changes in goal motivation over time

A 2 (condition: mindfulness, podcast) by 3 (time: pre, post, 10-min. follow-up) repeated measures GLM was conducted. Since sphericity was violated, a Greenhouse-Geisser correction was applied. The GLM had 80% power to detect an effect size of $f = .09$ or $\eta_p^2 = .01$ (with correlations among repeated measures assumed to be $r = 0.5$) and yielded a significant condition by time effect, $F(1.92, 316.91) = 4.63$, $p = .011$, $\eta_p^2 = .03$, (see Figure 1; see Table 2 for main effects).⁵ Follow-up pairwise comparisons indicated that there was a marginal (non-significant) increase in goal motivation from pre-manipulation ($M = 5.22$, $SD = 0.88$) to the follow-up (*mean difference* = 0.19, $p = .079$, 95% C.I. [-.015; 0.40]) in the mindfulness condition. In the podcast condition, there were no differences in goal motivation from pre-manipulation ($M = 5.10$, $SD = 0.98$) to the follow-up (*mean difference* = -0.06, $p = 1.00$, 95% C.I. [-0.28; 0.15]). In contrast to our hypothesis that there would be no differences between conditions at the follow-up time point, the mindfulness condition reported greater goal motivation than the podcast condition (*mean difference* = 0.37, $p = .039$, 95% C.I. [0.02; 0.72]; see Table 1).

Discussion

Study 1 provided support for the second of our two competing hypotheses: individuals in the mindfulness condition reported greater post-manipulation goal

motivation than those in the podcast condition. This finding appears to contrast with the findings from Hafenbrack and Vohs (2018), where participants in the mindfulness condition reported lower task motivation than those in the mind-wandering condition. This discrepancy likely relates to the nature of the goals/tasks considered in each study. In the present research participants reported their motivation towards their self-selected personal goals, whereas in Hafenbrack and Vohs (2018) participants reported their motivation towards a series of traditional laboratory tasks assigned by the researchers, which may have been perceived as less meaningful or engaging.

For exploratory purposes, Study 1 included a measure of anagram motivation. In contrast to the results of Hafenbrack and Vohs (2018), there were no differences between conditions for post-manipulation anagram motivation. Given that these two studies used the same mindfulness induction, this inconsistency is likely due to the different comparison conditions that were used (i.e., mind-wandering induction versus podcast). Without the use of a pre-post design for anagram motivation in either of these studies, it remains unclear whether meditation *decreases* anagram motivation.

On the other hand, Study 1 did include a measure of pre-manipulation goal motivation. Exploratory analyses revealed that there was no change in goal motivation in the mindfulness condition from pre- to post-manipulation. Conversely, in the podcast condition, goal motivation decreased from pre- to post-manipulation. Thus, the between-group difference in post-manipulation goal motivation appears to have been due to the decrease in motivation in the podcast condition. These findings highlight an advantage of using a pre-post design: the ability to separate the effects of the mindfulness induction from the effects of the comparison condition (Heppner & Shirk, 2018). These findings

may also suggest that meditation helps to sustain or buffer against decreases in goal motivation. Additional analyses indicated that goal motivation in the mindfulness condition exhibited an increasing trend over time – there was evidence of a marginal (non-significant) increase in goal motivation from before to approximately 10 minutes after meditating. This trend was not observed in the podcast condition. In addition, in contrast to our original hypothesis, additional analyses indicated that participants in the mindfulness condition reported greater goal motivation than those in the podcast condition at the follow-up time point, suggesting that the motivational effects of mindfulness meditation last for at least 10 minutes.

One limitation to Study 1 is that a large number of participants were removed for “failing” an attention check. As noted in the preregistration, participants who reported doing something else while undergoing the manipulation 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.⁶ This limitation was addressed in Study 2.

Overall, Study 1 suggests that the effects of mindfulness meditation on motivation may depend on the nature of the goal/task that is being considered. While previous research suggests that inducing state mindfulness may decrease motivation in the context of traditional laboratory tasks, the present research suggests that this effect may not apply to personal goals; rather, individuals in the mindfulness condition reported greater goal

motivation than those in the podcast condition. Study 1 also raises the question of whether mindfulness meditation can *increase* goal motivation from before to shortly after meditating. 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 both goal and anagram motivation. Consistent 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, Study 2 employed a pre-post design to investigate changes in goal and anagram motivation from before to immediately after the manipulation. 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, Study 2 investigated changes in goal and anagram motivation from before to 20 minutes after meditating. In the mindfulness condition, it was hypothesized that goal motivation would increase from pre-manipulation to a 20-minute follow-up (in line with the trend observed in Study 1), 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.

Methods

Participants

Our preregistered data collection plan was to collect 250 participants (to account for potential exclusions). However, due to the COVID-19 pandemic, in-lab data collection was interrupted and suspended indefinitely. At that point, 125 university students had participated in the study and were offered 1% course credit. In accordance with the exclusion criteria outlined in our preregistration, 5 participants were removed from analyses.⁷ The final sample size consisted of 120 participants (mean age = 19.93; 65% female; 56% Caucasian). A second, post-hoc power analysis for our 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 even a small effect ($f = 0.13$ or $\eta_p^2 = .02$). Given that we had adequate power, we proceeded with data analysis.

Procedure

The procedures of Study 2 paralleled those of Study 1 with the exception of the following 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. An open-ended follow-up question was also included with the attention check 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. Second, at the beginning of the study participants were told that they would complete an anagram task later on. Specifically, they were told:

At some point during this study we are going to ask you to work on solving a series of ten anagram word puzzles. An anagram is a word, phrase or name that can be formed by rearranging the letters of another word, phrase or name. For example, “cinema” can be rearranged to form “iceman”.⁸

They were asked to report their motivation towards the anagram task at all three time points; anagram motivation and goal motivation questions were counterbalanced. Fourth, for exploratory purposes, items were included at the beginning of the study (prior to the manipulation) to examine whether participants perceived their personal goals as relatively more autonomous than the anagram task. Fifth, approximately five minutes worth of filler materials related to random facts were included after the first motivation measurement, prior to undergoing the manipulation, to increase the amount of time between the first two motivation measurements and reduce the possibility that the pre-test measure would interfere with subsequent measures. Finally, additional filler materials were included to increase the time interval between the post-manipulation and follow-up time points to approximately 20 minutes.

Materials

Goal setting task. The goal setting task from Study 1 was also used in Study 2. Examples of goals that participants set include: “walk my dogs”, “get more sleep”, “clean the house”, “finish my essay”, and “drink more water”.

Relative autonomy (i.e., goal self-concordance). At the beginning of the study, after participants set their personal goals and learned about the upcoming anagram task,

they rated five items related to their autonomous and controlled reasons for pursuing each goal and completing the anagram task. Autonomous reasons included “because you really believe it is an important goal/task” (identified), “because of the fun and enjoyment which the goal/task will provide you – the primary reason is simply your interest in the experience itself” (intrinsic), and “because it represents who you are and reflects what you value most in life” (integrated). Controlled reasons included “because somebody else wants you to, or because you’ll get something from someone if you do” (external) and “because you would feel ashamed if you didn’t – you feel that you should try to accomplish this goal” (introjected). Items were rated on a 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), a measure of relative autonomy (i.e., goal self-concordance) was calculated by subtracting the average of the controlled items from the average of the autonomous items for each goal and the anagram task, such that the scores ranged from -6 to 6. A composite score for goals was calculated by taking the average of the three goals.⁹

Motivation. At three 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. 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.

It is important to note that the combination of items used for goal motivation in Study 2 (i.e., motivation and effort) differ slightly from those in Study 1 (i.e., motivation, effort, and commitment). We made this preregistered modification so that the same items could be applied to both goal and anagram motivation (i.e. it did not seem appropriate to ask participants how committed they were to an anagram task that was only presented to them at the beginning of the study). The 2-item measure was correlated with the 3-item measure at $r = .94-.98$ for the three time points.

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. Individuals with more than two years of meditation experience were again excluded from analyses.

Results

Descriptive statistics and between-group comparisons are presented in Table 3. As would be expected, participants rated their personal goals ($M = 0.86$, $SD = 1.81$) as higher in relative autonomy compared to the anagram task ($M = -1.64$, $SD = 1.89$), $t(119) = 13.08$, $p < .001$, $d = 1.19$. In terms of the manipulation check, participants in the mindfulness condition reported greater levels of state mindfulness compared to participants in the podcast condition (see Table 3). Thus, the manipulation was effective.

Table 3

Study 2 Descriptive Statistics and Between-Group Comparisons

	Condition				<i>t</i>	<i>p</i>	<i>d</i>
	Mindfulness (<i>n</i> = 60)		Podcast (<i>n</i> = 60)				
Variable	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
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 1: Comparing goal motivation and anagram motivation

A 2 (condition: mindfulness, podcast) by 2 (task: goals, anagrams) general linear model (GLM), with 80% power to detect an effect size of $f = .13$ or $\eta_p^2 = .02$ (with correlations among repeated measures assumed to be $r = 0.5$), 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 4 for main effects). Participants in the mindfulness condition reported greater goal motivation than those in the podcast condition, (*mean difference* = 0.70, $p = .005$, 95% C.I. [0.22; 1.18]; see Table 3). Conversely, there were no differences between conditions for anagram motivation, (*mean difference* = 0.06, $p = .84$, 95% C.I. [-0.52; 0.64]).

Figure 2. Motivation levels over time by condition (error bars represent standard error)

Table 4

Study 2 Analyses

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

Source	<i>df</i>	<i>F</i>	<i>p</i>	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	<i>df</i>	<i>F</i>	<i>p</i>	η_p^2
Time	1	0.13	.722	.00
Task	1	11.80	.001	.09
Condition	1	1.32	.252	.01
<i>Time*Condition</i>	<i>1</i>	<i>3.87</i>	<i>.052</i>	<i>.03</i>
<i>Task*Condition</i>	<i>1</i>	<i>3.83</i>	<i>.053</i>	<i>.03</i>
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	<i>df</i>	<i>F</i>	<i>p</i>	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 2: Pre-post changes in motivation

A 2 (condition: mindfulness, podcast) by 2 (task: goals, anagrams) by 2 (time: pre, post) repeated measures GLM¹⁰ 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 4 for main effects and two-way interactions). Nonetheless, to address our research question we proceeded with specific, planned pairwise comparisons 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]).

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 4 for main effects and two-way interactions). Nonetheless, to address our research question we proceeded with specific, planned pairwise comparisons 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 3).

Discussion

Consistent with the hypotheses for our 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 our 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 our hypothesis that goal motivation would stay the same, participants reported an increase from before to after meditating. Inconsistent with our hypotheses, participants did not report a decrease in goal or anagram motivation after listening to the podcast.

Study 2 yielded partial support for our hypotheses concerning changes in motivation from pre-manipulation to the 20-minute follow-up. Consistent with our hypotheses, results showed that motivation generally decreased over time, except for goals in the mindfulness condition. In contrast to our 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. In addition, the mindfulness condition reported greater goal motivation than the podcast condition at the 20-minute follow-up; there were no differences between conditions for anagram motivation at this time point. The different pattern of results for goal motivation and anagram motivation may relate to the fact that participants self-selected their goals and rated them as higher in relative autonomy compared to the anagram task.

It is important to note that the three-way interactions were non-significant for our 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 between-group findings between Study 1 and Study 2 were consistent. 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. However, Study 1 and Study 2 differ with respect to the within-group findings. In Study 1 there was no increase in goal motivation from before to immediately after meditating whereas in Study 2 there was. This discrepancy may relate to the more stringent precautions that were taken in Study 2 to ensure that participants attended to the manipulation and/or the slightly longer time interval between the pre-manipulation and post-manipulation time points in Study 2.

Although Study 1 showed a trend towards an increase in goal motivation from before to 10 minutes after meditating, there was no significant increase in goal motivation from pre-manipulation to the 20-minute follow-up in Study 2. Given that motivation levels generally decreased at the 20-minute follow-up in Study 2, it is possible that the additional filler materials inadvertently increased participant burden (Lingler, Schmidt, Gentry, & Terhorst, 2014) and contributed to boredom or fatigue (Ben-Nun, 2008). Nonetheless, while the rest of the conditions reported a significant decrease in motivation over time, individuals in the mindfulness condition sustained their baseline levels of goal motivation. Thus, mindfulness meditation may help to buffer against decreases in goal motivation that might otherwise occur over time.

In summary, Study 2 provides additional evidence that opposes the notion that mindfulness meditation *decreases* motivation (Hafenbrack & Vohs, 2018). Mindfulness meditation did not appear to affect individuals' motivation to engage in an anagram task and instead led to a small increase in individuals' motivation towards their personal goals.

General Discussion

The present research investigated the effects of mindfulness meditation on motivation towards personal goals and an anagram task. Consistent with our hypotheses, both studies found that participants, who had little or no meditation experience, reported greater post-manipulation goal motivation in the mindfulness condition compared to those in the podcast condition. This between-group difference remained at the follow-up time points in both studies. Additional analyses showed that goal motivation stayed the same from before to immediately after meditating in Study 1 (though there was a trend

towards an increase from before to 10 minutes after meditating), and that goal motivation increased from before to immediately after meditating in Study 2. 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 decrease from before to after meditating.

Overall, the present research opposes the notion that mindfulness meditation decreases motivation. Additional support for this assertion comes from the observed positive correlations between state mindfulness and post-manipulation goal and anagram motivation across both studies.¹¹ The present research also suggests that the effects of meditation on motivation may depend on the nature of the goal/task that is being considered and the degree to which it is considered meaningful and engaging. Moreover, the present research raises the question of whether or not mindfulness meditation can *increase* motivation towards certain goals.

Relation to previous research

The present research appears to, but may not, 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 the mind-wandering condition. Since these two studies used the same mindfulness induction, the discrepancy with regards to between-group anagram motivation findings likely relates to the different comparison conditions that were used in each study (i.e., mind-wandering induction versus podcast). As previously noted, a mind-wandering induction was not used in the present research because it appeared to inadvertently induce state mindfulness

in an unrelated project (see “Mind-Wandering Experiment” on OSF; link: <https://osf.io/kvzce/>) and because mind-wandering inductions may “provide the opposite experience to mindfulness rather than a true control” (Heppner & Shirk, 2018, p. 9). Ultimately, without the use of a pre-post design in Hafenbrack & Vohs (2018), it is unclear whether mindfulness meditation *decreased* task motivation in their experiments.

Study 2 addressed this limitation and found that anagram motivation did not decrease from before to after meditating; it stayed the same. Thus, the between-group differences reported in Hafenbrack and Vohs (2018) may have been due to an increase in motivation in the mind-wandering condition (or some combination of changes in each condition), rather than a significant decrease in the mindfulness condition. In sum, the present findings challenge the general notion that meditation impairs motivation. The present research found no such evidence for the anagram task and in the case of personal goals mindfulness meditation appears to sustain or potentially increase motivation.

The present findings may shed light on previous experimental 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 substance use reduction (Lee, An, Levin, & Twohig, 2015) and weight loss (Tapper et al., 2009). In both studies, the mindfulness condition reported greater goal motivation than the podcast condition at the post-manipulation and follow-up time points. Moreover, in Study 2 mindfulness meditation appeared to sustain 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 (Frieze 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 (Miele, Scholer, & Fujita, 2020).

The notion that mindfulness is negatively associated with amotivation (Donald et al., 2019) is supported by the present research. Amotivation is characterized by a state in which there is a lack of motivation and intentionality; it describes the extent to which individuals are passive, ineffective and/or without purpose (Ryan & Deci, 2017). In the present research, participants in the mindfulness condition not only reported greater goal motivation compared to those in the podcast condition, they exhibited intentionality. That is, they appeared to distinguish between their goals and the anagram task and only reported higher amounts of goal motivation. Participants rated their goals as relatively more autonomous than the anagram task and it is possible that inducing state mindfulness helped participants to recognize this distinction throughout the remainder of the study. Those in the podcast condition, on the other hand, may have neglected this factor because they were acting on “autopilot” (Levesque & Brown, 2007). The idea that mindfulness promotes greater intentionality is reflected in previous experimental research that reports enhanced decision-making following a mindfulness induction (Hafenbrack et al., 2014) and correlational research linking trait mindfulness with less automatic behaviour (Levesque & Brown, 2007) and less impulsivity (Peters, Erisman, Upton, Baer, & Roemer, 2011).

Does mindfulness meditation enhance motivation?

The present research suggests that meditation may enhance (i.e., sustain or increase) motivation towards personal goals. According to self-determination theory, 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). Being in a mindful state allows people to “reflect and select or decline actions with greater choice, thus promoting self-endorsed behaviour” (Ryan & Deci, 2017, p. 269). By enhancing individuals’ capacity to openly attend to their inner experience (e.g., thoughts, emotions), meditation may offer an opportunity for individuals to become more aware of their goals (i.e., goal salience) and their importance (Donald et al., 2019).

The idea that becoming more aware of the value of one’s goals would, in turn, lead to motivational benefits is consistent with expectancy-valence theories of motivation, where the amount of motivation to pursue a goal depends on the psychological value of the goal and the likelihood of attaining it (e.g., Feather, 1990; Vroom, 1964). The enhanced awareness and reflection that characterizes state mindfulness may increase individuals’ ability to recognize the value of their goals (Donald, et al., 2019), which should, in turn, boost their motivation. Without prompts to deploy mindful attention, participants in the podcast condition may have been less attuned to, or even distracted from, the importance of their goals (Levesque & Brown, 2007); this notion may help to account for the decrease in goal motivation in Study 1.

In addition, meditation may affect individuals’ ability beliefs and expectancies for success (Wigfield & Eccles, 2000). For example, if a student is doubtful that they will perform well on an upcoming test, because of test anxiety or difficulty concentrating,

meditation may increase their sense of efficacy by reducing anxiety and/or increasing focus (Mrazek, Franklin, Phillips, Baird, & Schooler, 2013). Consequently, meditation may decrease the perceived difficulty of the task, increase the student's expectancies for success, and ultimately enhance motivation (Wigfield & Eccles, 2000).

The within-group findings in the present research raise the question of whether meditation can not only sustain but also *increase* goal motivation from before to after meditating. In Study 1 there was a trend towards an increase in goal motivation from before to approximately 10 minutes after meditating and in Study 2 goal motivation increased from before to immediately after meditating. Taken together, these findings may suggest that meditation can increase motivation under certain circumstances (e.g., towards certain goals), though additional research is needed to draw more definitive conclusions. Future research should further investigate this possibility and the conditions under which this effect may exist.

Does mindfulness meditation 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 fallacious. Acceptance involves allowing unwanted private experiences (e.g., thoughts, emotions) to come and go without resisting them (Harris, 2006). Acceptance does not imply contentment, apathy, or passivity (Good et al., 2016). 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. 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), where acceptance is not an end in itself, but rather is encouraged as a means of increasing value-congruent action (Hayes et al., 2006). If cultivating an attitude of acceptance truly undermined motivation, it might be counterproductive to include this component in behavioural change interventions; however, this does not seem to be the case (e.g., Gifford et al., 2004; Ruiz, 2012). Furthermore, as previously noted, state mindfulness was consistently positively associated with post-manipulation goal and anagram motivation in the present research, providing additional evidence that state mindfulness is not incompatible with motivation.

Although Hafenbrack and Vohs (2018) suggest that mindfulness meditation may impair motivation on certain tasks, without the use of a pre-post design, it remains unclear whether motivation *decreased* in their experiments. Nonetheless, the idea that mindfulness meditation could decrease motivation in certain contexts may warrant further investigation, especially since the present research suggests that the motivational effects of meditation may vary across goals/tasks. 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 environments where extrinsic values are emphasized, mindfulness inductions may impair motivation (Donald et al., 2019).

It is also worth noting that while the present findings challenge the idea that mindfulness meditation decreases motivation, there were differences between the present research and the experiments by Hafenbrack and Vohs (2018) that make direct

comparisons difficult (i.e., different comparison conditions, different designs, different motivation items). Thus, while the evidence generated in the present research appears to oppose the notion that meditation impairs motivation, the aforementioned methodological differences likely contributed to this conclusion. Moreover, it is possible that meditation has competing effects on individuals' motivation towards their goals. For example, meditation may reduce future focus and arousal leading to reductions in motivation (Hafenbrack & Vohs, 2018), while simultaneously enhancing individuals' awareness of the value of their goals and/or their expectancies for success, leading to motivational benefits (Wigfield & Eccles, 2000). Future research can examine and contrast these potential mechanisms.

Limitations and Future Directions

There are some limitations to the present research. First, both studies used undergraduate samples, with little or no meditation experience, and the same mindfulness induction. Future research can examine whether the present findings generalize to other populations (e.g., experienced meditators) and mindfulness inductions (e.g., meditation apps). Second, the design of the present research does not preclude the possibility of demand effects. Participants in the mindfulness condition may have realized that they were engaged in meditation and expected to experience beneficial effects (e.g., enhanced motivation), since the media often exaggerates claims about the effectiveness of meditation (e.g., Gunderson, 2016; Huffington, 2013). This potential limitation applies to the majority of research on mindfulness inductions (e.g., Hafenbrack & Vohs, 2018) and interventions and does not account for the differential effects of meditation on goal and anagram motivation in the present research. Nonetheless, as mindfulness becomes

increasingly popular among the general public, researchers should be cognizant of the fact that participants may arrive at the lab with increased meditation experience, greater preconceived notions about the benefits of mindfulness, and various motives for engaging in mindfulness exercises (Pepping, Walters, Davis, & O'Donovan, 2016). Attempting to control for these variables may become increasingly important (Heppner & Shirk, 2018).

Another limitation to the present research is that there were no behavioural measures included. Although participants reported greater goal motivation in the mindfulness condition, it is unclear whether these differences would manifest in behavioural differences (e.g., greater persistence and/or better performance; Evans et al., 2009). Future research can explore this possibility. Finally, although the pre-post design used in present research offers additional insight into the effects of mindfulness meditation on motivation, this type of design also possesses some weaknesses. Asking participants about their motivation three times in less than an hour could have prompted participants to speculate about the purpose and hypotheses of the research. In addition, previous motivation measurements could have affected subsequent measurements. Nevertheless, a number of filler materials were included before and after the manipulation in Study 2 in an attempt to reduce these possibilities. Future research with other designs can attempt conceptual replications.

Implications

Despite these limitations, the present research has some important implications. First, the present research is an answer to calls from previous researchers to investigate the relationship between mindfulness and motivation towards meaningful pursuits (Good et al., 2016; Hafenbrack & Vohs, 2018). Second, the present research highlights an

advantage of pre-post designs: the ability to separate the effects of mindfulness meditation from the effects of a comparison condition. This is noteworthy given the challenges of selecting suitable comparison conditions to pair with mindfulness inductions (Heppner & Shirk, 2108).

In addition, the present research suggests that meditation may confer motivational benefits for meaningful goals, but not for all tasks. This nuance may help to explain the mixed findings with regards to the effectiveness of longer mindfulness interventions in boosting organizational productivity (Vonderlin, et al., 2020). Whether or not mindfulness interventions are effective in improving productivity may depend in part on the degree to which individuals endorse their work and view it as meaningful. Furthermore, the present research may suggest conditions under which mindfulness meditation, as an on-the-spot workplace intervention, does not impair motivation (Hafenbrack, 2017).

Finally, the present research hints at 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 self-selected pursuits that participants may engage with outside of the laboratory. Considering the degree to which participants perceive laboratory tasks as meaningful and engaging may help researchers gain a deeper understanding of their findings and their generalizability.

Conclusion

The present research provides a more nuanced picture of the effects of mindfulness meditation on motivation and ultimately opposes the notion that meditation impairs motivation. Instead, the present research (1) provides preliminary evidence that

brief sessions of meditation may offer motivational benefits in the context of personal goal pursuit and (2) suggests that future research concerning the nature and duration of these effects is warranted.

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¹ As per our pre-registration, we also investigated relative autonomy (i.e., goal self-concordance) as a moderator using multilevel modeling. This analysis failed to detect a significant effect, potentially because there was relatively little within-person variability – most personal goals were rated as relatively autonomous. It is also possible that the manipulation affected participants' perceptions of the relative autonomy of their weeklong goals (e.g., undergoing the mindfulness induction may have led participants to become more aware of the autonomous qualities, or lack thereof, of certain goals; Donald et al., 2019), which could have led to different post-manipulation perceptions of the relative autonomy of their goals compared to their original ratings reported at the beginning of the study. The output and write-up for this analysis are available on OSF.

² Participants ($n = 8$) in the mindfulness condition were removed for reporting extensive meditation experience. Participants ($n = 32$ in the mindfulness condition; $n = 36$ in the podcast condition) were excluded for reporting that they were doing something else while listening to an audio recording. 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.

³ The filler questionnaire condition was initially included as another comparison condition to increase the likelihood that there would be between-group differences between at least two of our conditions for state mindfulness. (In a previous unrelated project we used the mindfulness induction and the mind-wandering induction and found no differences in state mindfulness, rendering the manipulation ineffective.) Since there were differences in state mindfulness between the mindfulness condition and the podcast condition, the filler questionnaire condition was removed in accordance with the preregistration. Towards the end of data collection it was reincorporated for exploratory purposes but ultimately removed due to methodological flaws: the majority of the filler questionnaires in this condition were related to goal pursuit and motivation which likely prompted participants to reflect on their goals more than they otherwise might have.

⁴ Since anagram motivation was comprised of two items (motivation + effort), whereas goal motivation was comprised of three items (motivation + effort + commitment), we reran the analysis with a new score for goal motivation made up of the two items used for anagram motivation (motivation + effort) and got similar results (see Study 1 output on OSF). The two scores for goal motivation were correlated at $r = .99$. Commitment was not used as an item for anagram motivation because it would not have made much sense in the context of an anagram task that was only just presented to participants.

⁵ The descriptive statistics presented in the text for the pre-manipulation time point of this analysis are slightly different from those presented in Table 1 because, as previously noted, this analysis involved fewer participants.

⁶ To explore this issue, we reran the analysis for our main research question (comparing post-manipulation goal motivation between conditions) with these participants included. The results became marginally significant, $t(266) = 1.83$, $p = .068$, which would be expected with additional noise in the data. See “Sensitivity Analysis” on OSF for full output.

⁷ 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.

⁸ This task presentation is slightly different from how Hafenbrack & Vohs (2018) described the anagram task to their participants. They included a statement that said: “[t]his is an extremely difficult task that requires a lot of effort and persistence.”

⁹ These items were not included in the preregistration but were included in the study as a potential “manipulation check” to determine whether participants actually perceived their goals as relatively more autonomous than the anagram task.

¹⁰ We were unable to conduct a power analysis for the three-way interactions in our second and third research questions using GPower. However, given that the additional factor in these analyses (i.e., time) was a within-subjects factor, power for these analyses should be greater than the power reported for our first research question.

¹¹ In both studies, state mindfulness positively correlated with post-manipulation goal motivation (Study 1: $r = .28$; Study 2: $r = .42$) and anagram motivation (Study 1: $r = .22$; Study 2: $r = .38$).