Mindfulness Reduces Information Avoidance[*]

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Abstract

Mindfulness meditation has been found to influence various important outcomes such as health, stress, depression, productivity, and altruism. We report evidence from a randomised-controlled trial on a previously untested effect of mindfulness: information avoidance. We find that a relatively short mindfulness treatment (two weeks, 15 minutes a day) is able to induce a statistically significant reduction in information avoidance – that is, avoiding information that may cause worry or regret. Supplementary evidence supports mindfulness's effects on emotion regulation as a possible mechanism for the effect.

Keywords: mindfulness, information avoidance, randomized controlled trial.
JEL: D91, I31, C91.
Word Count: 3094.

1 Introduction

A well-known bias in individual decision-making is the tendency to avoid information about potentially negative outcomes, even if it is freely available. Information avoidance can be costly: an individual's ability to make good decisions hinges critically on their knowledge of the state of the world. However its potential costs are greater still when taking into account social connections; for example, individuals unwilling to learn about whether or not they carry an infectious disease pose a significant risk to society, as they may infect others.

Previous work suggests that anticipatory emotions (such as worry or regret) play an important role in information avoidance[1]. It is therefore plausible that mental training that targets the regulation of such emotions might help to diminish their influence in decision making. One such form of mental training is "mindfulness" meditation: a secularised form of Buddhist meditation, initially developed for pain management (Kabat-Zinn, 1990). Reporting evidence from a Randomised-Controlled Trial (RCT), this paper will examine whether mindfulness can influence information avoidance.

Mindfulness has become increasingly popular in the West in recent decades and has been linked with a variety of benefits, e.g. for health, stress, depression, and productivity (Brown et al., 2007). Meditation encourages a particular state of mind (non-judgmental attention to the present moment), and various evidence from psychology and neuroscience has demonstrated that its practice can increase levels of attention and emotion regulation (and, indeed, structurally change regions of the brain associated with such tasks[2]). However, mindfulness can be viewed as a trait as well as a meditation practice (Brown and Ryan, 2003): different individuals naturally spend more or less time in such mindful states even if they have never meditated, so its study has implications for non-meditators as well.

To test for a causal effect of mindfulness on information avoidance, we designed a randomized human-subjects experiment.[3] Experiment participants ($n = 261$) were randomly allocated to either a treatment intervention (14 days of 15-minute guided mindfulness meditations), or an active control intervention (14 days of 15-minute guided relaxing-music listening.[4]) This design allows us to test the effects of mindfulness over-and-above just feeling more relaxed.

Our main finding is that mindfulness reduced information avoidance – that is, the tendency for a participant to avoid receiving information that might cause worry or regret (Ho et al., 2020). Relative to the active control, the mindfulness treatment reduced the information avoidance scale by approximately 0.25 standard deviations. We provide supporting evidence for emotion regulation as a plausible mechanism, as the treatment had a positive effect on a self-

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[1]See Golman et al. (2017) for a review.

[2]See Hölzel et al. (2011) for a review.

[3]Pre-registered in the AEA RCT Registry (Ash et al., 2020).

[4]The same instructor delivered both the treatment and the active control.

report measure of non-reactivity to inner experience.

We next review the relevant literature and our relative contribution, before detailing the design and results. We end with a discussion and some concluding remarks.

2 Literature

This research adds to the literature on the causes of information avoidance. The previous literature has documented various potential causes of information avoidance, with Golman et al. (2017) grouping them into hedonic (avoiding information to avoid feeling bad, e.g. because of belief-based utility) and strategic (as a way to committing to an a priori preferred course of action). However, relatively little is understood about the psychological and cognitive forces that make different individuals more or less susceptible to avoiding information. In part this could be because of a lack of a measure of information avoidance as a psychological construct, which was the motivation for Ho et al. (2020) to produce the scale we use in this paper. Sweeny et al. (2010) mention some empirical work that suggests coping styles and uncertainty orientation as two possible explanations for individual differences in information avoidance. Our paper adds to this literature by documenting the role of mindfulness.

We expect mindfulness to act on the hedonic form of information avoidance – where individuals avoid information about their beliefs because of psychological costs such as worry, regret, disappointment, pessimism or cognitive dissonance (Golman et al., 2017). The mindful state encourages individuals not to be wrapped up in thoughts and beliefs as if they were strictly true (the quality of "non-judgment"), and instead hold them lightly in awareness (a concept known as "meta-awareness").[5] Thus, mindfulness may weaken the potential emotional imprint of beliefs, reducing the influence of worry, regret, and other negative cognitive factors. In support of this idea, Saunders et al. (2013) find that mindfulness increases recall of self-threatening information. More indirectly, mindfulness has been shown to reduce symptoms of belief-based utility, such as anxiety (Roemer et al., 2009) and habitual worrying (Verplanken and Fisher, 2014). In general, mindfulness has been found to increase abilities to regulate emotions; for example, reducing emotional interference when performing a task (Ortner et al., 2007) and decreasing emotional reactivity (Goleman and Schwartz, 1976). Researchers point to people in mindful states being better able to "reappraise" emotions (Garland et al., 2011), which means they are more equipped to process uncomfortable emotions, and less likely to engage in experiential avoidance of thoughts and feelings. (Kumar et al., 2008). Supporting this work is neuroscience evidence showing that meditators have increased activation in regions of the brain associated with emotion regulation (Hölzel et al., 2011).

Our paper also relates to a literature that investigates the influence of mindfulness on decision-making. Alem et al. (2016) conduct an RCT which tested whether mindfulness influenced risk,

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[5]See Schooler et al. (2011) for a review.

time preferences and health-related behaviours (e.g. smoking, eating, alcohol consumption, sleeping), but their results in general were not statistically significant. Moreover, their active control (watching a historical documentary) does not specifically control for being relaxed, so it is hard to disentangle the effects of being mindful from being relaxed in their results. The RCT in Noone and Hogan (2018) investigates the effects of mindfulness on various cognitive tasks (including a heuristics-and-biases measure), using the Headspace app as a mindfulness intervention and a sham meditation active control. They did not find statistically significant effects, but that could be due to a short treatment not being effective enough, or it could be that the sham meditation might have engendered some degree of mindfulness. Papers analyzing effects of mindfulness on decision-making have found that mindfulness can make decisions more adaptive (in a gambling context) (Lakey et al., 2007); reduce negativity bias (Kiken and Shook, 2011); reduce correspondence bias (Hopthrow et al., 2017); decrease the sunk cost effect (Hafenbrack et al., 2014); alleviate addiction and self-control problems;[6] and increase levels of altruism (Iwamoto et al., 2020). Our paper adds information avoidance to these documented effects.

3 Experimental Design

3.1 Sample

We recruited subjects using Prolific, an online crowd-sourcing platform (based in the UK) which connects researchers to participants for academic studies. Like the more commonly used platform MTurk, Prolific has been found to produce data of a comparable quality to more traditional participant pools (Peer et al., 2017) and has been used to successfully run experiments in economics (e.g. Marreiros et al., 2017) and psychology (e.g. Callan et al., 2017). However, Prolific has the advantage of participants who are more naive with respect to experimental tasks and less dishonest than those on MTurk (Peer et al., 2017). Another reason we chose Prolific is because it is more active than MTurk in the UK, and we restricted participation to UK residents to maximise comprehension and familiarity with the instructor's English accent.

We recruited 261 subjects in one wave.[7] Besides restricting to the UK, we required that participants have already completed at least 10 previous Prolific studies, with a a good participation track record (at least 95% of Prolific studies approved). We also pre-screened on meditation experience, recruiting only participants who had answered "No" to Prolific's own pre-screening question, "Do you meditate?". In the invitation to potential participants, the study was described as investigating the effects of mood on decision-making. The task would involve doing a simple and enjoyable activity for 15 minutes a day on 14 consecutive days.

Each day, the instructions for the activity were given by a professional instructor via an

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[6]See Zgierska et al. (2009) for a review

[7]Calculations suggested a sample of 220-260 subjects would be adequate to detect effects with 80% power and 5% significance (Ash et al., 2020).

audio recording. On the day before and day after the course, the subjects took a survey (which measured our outcomes). The software o-Tree was used to host the surveys, while Qualtrics was used to deliver the interventions.

The subjects were paid for doing the activity (£2 per session in the first week; £2.50 per session in the second week) and taking the surveys (£2 for the pre-course survey; £3 for the post-course survey). To minimise attrition, subjects were told on sign-up that their submissions would only be "accepted" (i.e. they would only be paid) if they completed all parts of the study (unless there were exceptional circumstances). Various compliance measures are discussed below.

3.2 Interventions

After the pre-course survey, subjects were randomly allocated to one of two groups: a *mindfulness* intervention (the treatment), and a *music* intervention (an active control).

Mindfulness intervention. Here the instructor led the participants in a guided mindfulness meditation each day. Each session started with a short introduction (welcoming the participants). The instructor then led the participants through three stages of meditation: (1) bringing awareness to now (noticing what is happening outside and how you are); (2) mindful breathing (being aware of the breath and cultivating an attitude of non-judgment as thoughts arise); and (3) a body scan (expanding this awareness from the breath to the entire body). This was then followed by a period where the participants were asked to just sit with whatever awareness they had accumulated, before the instructor came back to end the session.

Music intervention. Here the same instructor led the participants in a period of relaxing music listening each day. The idea of the intervention was to try to control for as many of the structural elements of the treatment as possible (15 minutes a day of doing an activity instructed by an audio recording, with the same instructor leading the activity), and in addition control for the relaxing effects of the meditations.[8] To try to make the instructor's presence felt as much as in the treatment, the instructor spent time on a short introduction before the music began (welcoming the participants, mentioning the details of the artist/album etc., and also reciting a famous quote about music for the participants to contemplate), and after the music finished he would come back to end the session.

In order to boost feelings of instructor-participant interaction for both groups (and help minimise attrition), the instructor prepared three short videos of himself to be played at the start, middle and end of the interventions (simple check-ins). In addition, participants were sent

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[8]Various studies document the salutary effects of music for stress – see de Witte et al. (2020) for an overview. In some contexts music has been found to have comparable effects to meditation in reducing stress (e.g. Innes et al., 2016), and has previously been used as part of an active control for the widely-used Mindfulness-Based Stress Reduction (MBSR) programme (MacCoon et al., 2012). Stress impacts cognitive processes (e.g. "System 1" and "System 2" thinking (Kahneman, 2011)) that underlie various kinds of decisions (including information avoidance).

daily reminders on Prolific about the activity sessions. Compliance was encouraged before the recordings began with a request to close all sources of distraction and to stay on the browser tab (and not multitask). Compliance was then monitored using two different measures: (1) how often they left their browser tab during the recording; (2) whether they clicked to the "next page" when the instructor asked them to at the end of the recording. We also included an optional feedback question about their experience of the session at the end.

3.3 Procedure

The study was launched on Thursday the 27th of August, 2020. On the first day we recruited 261 subjects, who signed up and completed the pre-course survey. Then from the 28th of August through to the 11th of September, each day the subjects were invited to complete a session of the daily activity (study available from 6am; reminder sent at 3pm), and were asked to submit by 3am the following day. Participants who missed a session were asked to take the session on the following day instead. Participants who attempted a session but had difficulties finishing it for some reason (e.g. because of internet trouble) were allowed to miss the session. Any participant who missed more than one session without giving a reason was excluded. On the 12th of September, participants were asked to take the post-course survey.

3.4 Outcomes

Information avoidance. We used the *Information Preference Scale* (IPS) (Ho et al., 2020): a 13-item scale (validated by an incentivised experiment) that measures an individual's willingness to receive information that might cause worry or regret in a series of thirteen hypothetical scenarios.[9] Replies to the scenarios use a 4-point scale coded $\{0, \ldots, 3\}$, giving scores $\{0, \ldots, 39\}$. Due to the transparent nature of the questions, information preferences were measured in the post-course survey only.

Mindfulness. We used the 15-item version of the *Five Facet Mindfulness Questionnaire* (FFMQ) (Baer et al., 2012), a frequently-used measure of mindfulness and its underlying dimensions (Sauer et al., 2013). Responses are made on a 5-point scale coded $\{0, \ldots, 4\}$, giving a mindfulness score of $\{0, \ldots, 60\}$, but the scale can also be disaggregated into subscales that measure five attributes of mindfulness: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience (3 items in each, scores $\{0, \ldots, 12\}$). Due to its transparency, this outcome was also measured in the post-course survey only.

Stress. We used the 10-item version of the *Perceived Stress Scale* (PSS) (Cohen and Williamson, 1988), a widely-used instrument to assess subjective perceptions of stress (Liu et al., 2020). Responses are made on a 5-point scale coded $\{0, \ldots, 4\}$, giving scores $\{0, \ldots, 40\}$.

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[9]See Appendix A-C for the items of the IPS, FFMQ and PSS measures.

3.5 Regression Specification

To estimate the statistical effect of the treatment on outcomes in the post-course survey, we use the following linear regression model:

$$Y_i = \alpha + \beta \text{Treat}_i + \gamma X_i + \epsilon_i \tag{1}$$

where Y_i is the outcome, Treat_i is a dummy variable equal to 1 for individuals in the mindfulness treatment, and X_i is a vector of individual characteristics measured at baseline.

4 Results

4.1 Sample Characteristics

Considering the sample characteristics, there were no significant differences in the means of our baseline measures across the treatment and control groups (see Appendix D). Levels of attrition were 13% in the treatment and 18% in the control, which mostly occurred after the pre-course survey (see Appendix E); the remaining samples of non-attritors were still comparable on the baseline measures (see Appendix F). Average feedback of the sessions was positive and similar for the treatment and control (see Appendix G), and there were strong and similar levels of compliance in both groups according to our different compliance measures (see Appendix H).

4.2 Active Control Intervention had Similar Effect on Stress

The treatment intervention and active control intervention had similar effects on measured stress. As shown in Figure 1, both interventions reduced perceived stress, but the effects are not statistically significant. It is unclear why the treatment and active control did not have significant effects on reducing stress. It could be that the length of the interventions and amount of practice per day were insufficient to generate significant reductions, or perhaps the perceived stress scale was too noisy a measure to have detected a change with the current sample. In any case, the active control has fulfilled its primary purpose: to provide a equivalent effect on stress.

4.3 Mindfulness and Information Avoidance

We now evaluate the effect of the treatment on information avoidance. As seen in Table 1, being assigned to the treatment had a significant positive effect on preferences to receive potentially negative information as measured by the Information Preference Scale (IPS) ($p = 0.060$ without demographics; $p = 0.084$ with them). Being in the treatment is associated with an increase of approximately 0.25 standard deviations in the information preference scale.

Figure 1: Intervention Effects on Perceived Stress
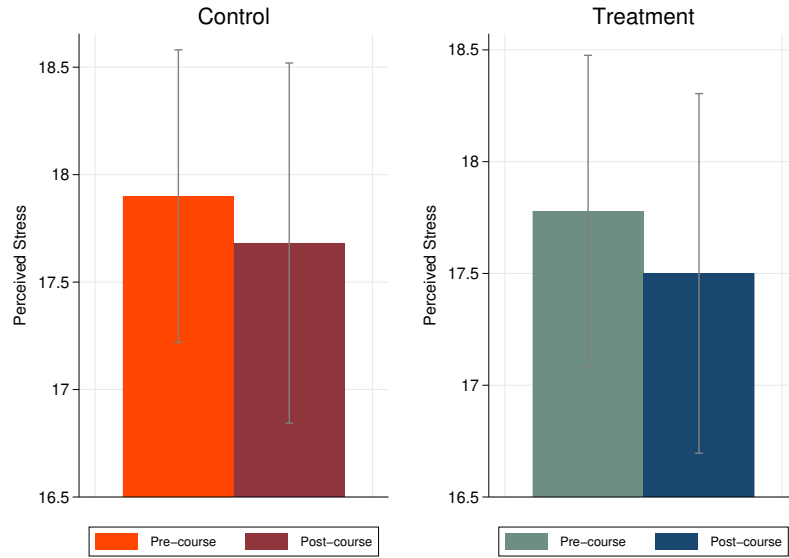
Notes: This figure shows the pre-course and post-course means of perceived stress in the treatment and control. Gray bars show 95% confidence intervals.

Table 1: Effect of the Treatment on Information Preferences

Marginal effects	Information Preference Scale	
	(1)	(2)
Treatment	0.251*	0.230*
	(1.892)	(1.735)
Demographics	No	Yes
Observations	226	224

*$p < 0.10$. Marginal effects from OLS regressions with robust standard errors in parentheses. IPS is standardised. Demographics include sex, age, race, education, household income and conservatism.

Table 2: Effect of the Treatment on Non-Reacting

Marginal effects	Non-React Scale	
	(1)	(2)
Treatment	0.272**	0.269**
	(2.057)	(1.984)
Demographics	No	Yes
Observations	226	224

$^{**}p < 0.05$. Marginal effects from OLS regressions with robust standard errors in paren-
theses. Non-React Scale is standardised. Demographics include sex, age, race, educa-
tion, household income and conservatism.

4.4 Emotion Regulation as a Potential Mechanism

In Table 2 we show that the treatment had a significant effect on the non-react scale of the
FFMQ ($p = 0.041$ without demographics; $p = 0.049$ with them).[10] In terms of magnitudes,
being in the treatment group is associated with an increase of approximately 0.27 standard
deviations in the non-react scale. The items of the scale are all about not reacting to distressing
inner experience. This inner experience could include anticipatory emotions such as worry or
regret. This evidence supports regulation of anticipatory emotions as a mechanism by which
the mindfulness training was able to reduce tendencies for information avoidance.

5 Discussion

In this paper we have provided evidence on mindfulness as a cause of differences between in-
dividuals in their susceptibility to information avoidance. The costs of information avoidance
for individuals, society and the economy are potentially substantial (from individuals unwilling
to learn about their health, including whether or not they carry infectious diseases, to students
unwilling to check their marks, to investors holding off looking at their stocks' performance
(Ho et al., 2020)) so understanding what might drive some individuals to avoid information
more than others is important. Our evidence suggests that people in the population who spend
more of their time inhabiting mindful states are better able to look at potentially negative, but
nonetheless useful, information about themselves and the world. Supplementary evidence sug-
gests that it may be mindfulness's effects on emotion regulation (specifically, non-reaction to
emotions) that acts as a potential mechanism through which this greater tolerance for informa-
tion operates.

An important concern about the randomized control trial is whether subjects in the treatment
group actually engaged with the guided meditations. The compliance measures were encourag-
ing in this regard in that it appeared that significant proportions of the subjects were listening
to the recordings (e.g. not switching off the browser tab, and clicking to the next page when

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[10]The effects on the other facets of mindfulness were not as significant (see Appendix I).

the instructor asked them to at the end of the recording). However, it could be that the subjects listened to the recordings but did not practice the meditations. Although this is hard to rule out, it seems difficult to square with the evidence, which showed that subjects in the treatment group developed higher levels of non-reaction, a known effect of meditation. An additional concern is that subjects in the treatment group, once they knew that meditation was their daily activity, would have certain expectations about the effects of meditation, and this would then influence their responses on the information avoidance measure (an "experimenter demand" effect). Given that information avoidance is an unknown effect of meditation (not discussed in the public domain), and that no relevant cues were given during the interventions in relation to information avoidance, we are less concerned about experimenter demand in relation to this outcome. Nonetheless, we controlled the expectations that could be managed in the design as best as possible, with both the treatment and control groups being told the same message in regards to their activity at the start of the interventions: that it had been found to have a "positive effect on people's mood and wellbeing".

Our paper adds information avoidance to the growing list of documented benefits of mindfulness. This result has potentially strong policy implications. "Nudging" (Thaler and Sunstein, 2009) has become a staple of behavioural policy, being employed in various governments throughout the world. However, by shaping individual choices without their knowledge, it has been criticised as a potential threat to individual autonomy.[11] Making better decisions through greater levels of mindfulness, on the other hand, is a fully conscious process, so mindfulness training could provide governments with a more ethical approach to ameliorating cognitive biases. Our evidence shows that mindfulness is able to reduce information avoidance, but more work is needed to test its effects on a wider array of cognitive biases. For example, mindfulness (by managing the emotions triggered by beliefs) might also affect the processes underlying "motivated beliefs" (such as wishful thinking).[12] We hope our investigation will encourage more research in this area.

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[11]See, for example, Hausman and Welch (2010).

[12]See Bénabou and Tirole (2016) for a review.

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Information Preference Scale

In each scenario below, you will have an opportunity to receive information. This information may or may not be useful and it may or may not be painful to learn. Please read each scenario carefully, then indicate if you want to know that information. [Choices: Definitely don't want to know; Probably don't want to know; Probably want to know; Definitely want to know. "R" is scored in reverse.]

1) As part of a semiannual medical checkup, your doctor asks you a series of questions. The answers to these questions can be used to estimate your life expectancy (the age you are predicted to live to). Do you want to know how long you can expect to live?

2) You provide some genetic material to a testing service to learn more about your ancestors. You are then told that the same test can, at no additional cost, tell you whether you have an elevated risk of developing Alzheimer's. Do you want to know whether you have a high risk of developing Alzheimer's?

3) At your annual checkup, you are given the option to see the results of a diagnostic test, which can identify, among other things, the extent to which your body has suffered long-term effects from stress. Do you want to know how much lasting damage your body has suffered from stress?

4) Ten years ago, you had the opportunity to invest in two retirement funds: Fund A and Fund B. For the past 10 years, you have invested all your retirement savings in Fund A. Do you want to know the balance you would have if you had invested in Fund B instead?

5) You decide to go to the theater for your birthday and give your close friend (or partner) your credit card so they can purchase tickets for the two of you, which they do. You aren't sure but suspect that the tickets may have been expensive. Do you want to know how much the tickets cost?

6) You bought an electronic appliance at a store at what seemed like a reasonable,though not particularly low, price. A month has passed, and the item is no longer returnable. You see the same appliance displayed in another store with a sign announcing "SALE." Do you want to know the price you could have bought it for?

7) You gave a close friend one of your favorite books for her birthday. Visiting her apartment a couple of months later, you notice the book on her shelf. She never said anything about it; do you want to know if she liked the book?

8) Someone has described you as quirky, which could be interpreted in a positive or negative sense. Do you want to know which interpretation he intended?

9) You gave a toast at your best friend's wedding. Your friend says you did a good job, but you aren't sure if he or she meant it. Later, you overhear people discussing the toasts. Do you want to know what people really thought of your toast?

10) As part of a fundraising event, you agree to post a picture of yourself and have people guess your age (the closer they get, the more they win). At the end of the event, you have the option to see people's guesses. Do you want to learn how old people guessed that you are?

11) You have just participated in a psychological study in which all of the participants rate others' attractiveness. The experimenter gives you an option to see the results for how people rated you. Do you want to know how attractive other people think you are?

12) Some people seek out information even when it might be painful. Others avoid getting information that they suspect might be painful, even if it could be useful.How would you describe yourself?

13) If people know bad things about my life that I don't know, I would prefer not to be told. **[R]**

Five Facet Mindfulness Questionnaire

Please indicate how true the below statements are of you using the scale provided. [Choices: Never or very rarely true; Rarely true; Sometimes true; Often true; Very often or always true. "R" is scored in reverse. *Observing* items: 1, 6, 11. *Describing* items: 2, 7, 12. *Acting with awareness* items: 3, 8, 13. *Non-judging* items: 4, 9, 14. *Non-reacting* items: 5, 10, 15.]

1) When I take a shower or a bath, I stay alert to the sensations of water on my body.

2) I'm good at finding words to describe my feelings.

3) I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted. **[R]**

4) I believe some of my thoughts are abnormal or bad and I shouldn't think that way. **[R]**

5) When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.

6) I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

7) I have trouble thinking of the right words to express how I feel about things. **[R]**

8) I do jobs or tasks automatically without being aware of what I'm doing. **[R]**

9) I think some of my emotions are bad or inappropriate and I shouldn't feel them. **[R]**

10) When I have distressing thoughts or images I am able just to notice them without reacting.

11) I pay attention to sensations, such as the wind in my hair or sun on my face.

12) Even when I'm feeling terribly upset I can find a way to put it into words.

13) I find myself doing things without paying attention. **[R]**

14) I tell myself I shouldn't be feeling the way I'm feeling. **[R]**

15) When I have distressing thoughts or images I just notice them and let them go.

Perceived Stress Scale

The questions below ask about your feelings and thoughts during the last week. For each question, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate. [Choices: Never; Almost never; Sometimes; Fairly often; Very often. "R" is scored in reverse.]

1) In the last week, how often have you been upset because of something that happened unexpectedly?

2) In the last week, how often have you felt that you were unable to control the important things in your life?

3) In the last week, how often have you felt nervous and stressed?

4) In the last week, how often have you felt confident about your ability to handle your personal problems? **[R]**

5) In the last week, how often have you felt that things were going your way? **[R]**

6) In the last week, how often have you found that you could not cope with all the things that you had to do?

7) In the last week, how often have you been able to control irritations in your life? **[R]**

8) In the last week, how often have you felt that you were on top of things? **[R]**

9) In the last week, how often have you been angered because of things that happened that were outside of your control?

10) In the last week, how often have you felt difficulties were piling up so high that you could not overcome them?

Table: Baseline Measures

Variables	All		Treatment		Control		Diff
	Mean	SD	Mean	SD	Mean	SD	Mean
Age[a]	43.81	12.61	43.81	11.73	43.81	13.47	0.00
Female	0.61	0.49	0.60	0.49	0.61	0.49	0.00
White	0.93	0.25	0.92	0.27	0.94	0.24	-0.01
Degree	0.57	0.50	0.55	0.50	0.60	0.49	-0.05
Household income *(1-10)*	4.63	2.30	4.77	2.31	4.49	2.29	0.28
Conservatism *(0-100)*	44.17	22.07	45.57	22.52	42.75	21.60	2.82
Perceived stress *(0-40)*	17.84	3.99	17.78	4.05	17.90	3.94	-0.12
Observations	261		131		130		

Notes: None of the differences in means were significant at the 10% level. "Degree" is whether they have a Bachelor's degree. "Household income" bracket *i* is (*i*-1)*£10,000 to *i**£10,000 (pre-tax). "Conservatism" is liberal-conservative scale. [a]Two participants in the treatment group did not give their age, so the number of observations on age in the full sample / treatment was 259 / 129.

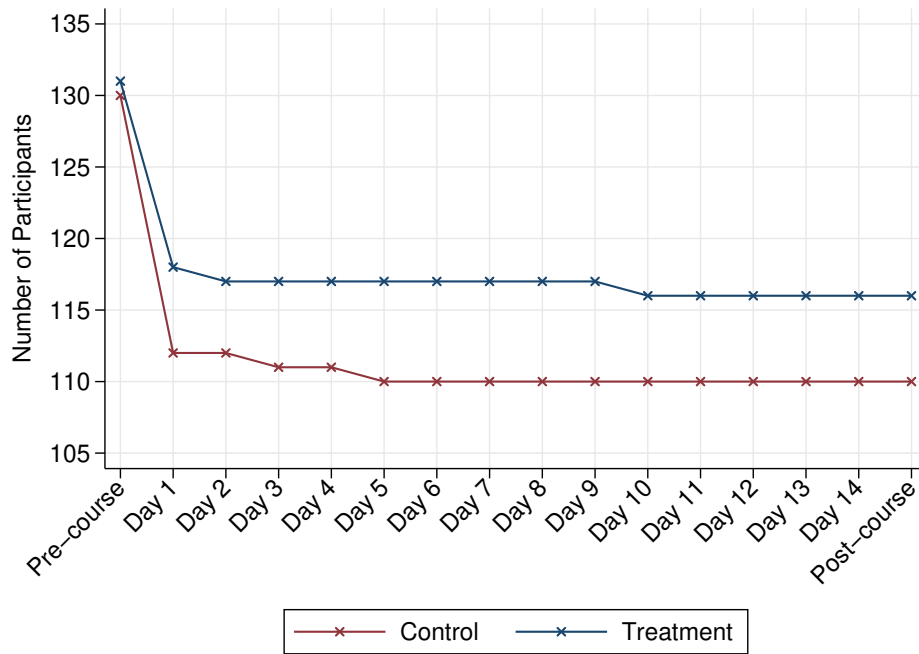Figure: Number of Participants at Each Session

Table: Comparison of Baseline Characteristics of Non-Attritors in Treatment and Control

	Difference in Mean
Age	0.118
	(1.690)
Female	-0.041
	(0.046)
White	-0.013
	(0.026)
Degree	-0.093
	(0.046)
Household income *(1-10)*	0.337
	(0.219)
Conservatism *(0-100)*	2.956
	(2.086)
Perceived stress *(0-40)*	0.131
	(0.376)

Notes: Standard errors in parentheses. No differences were significant at the 10% level.

Figure: Average Session Evaluation
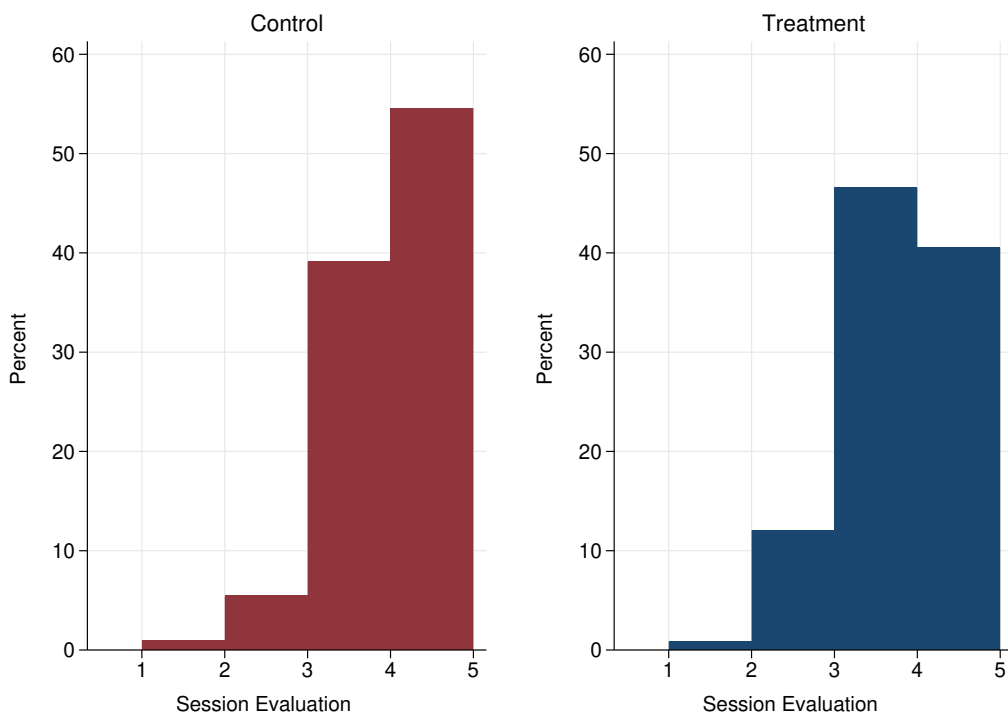
Notes: This figure shows the distributions over participants of their average session evaluation during the interventions (bins are of width 1). The distributions are similar for the treatment and control; average feedback per session was 3.92 in the control and 3.75 in the treatment.

Figure: Compliance Measure (Average Browser Tab Switches per Session)
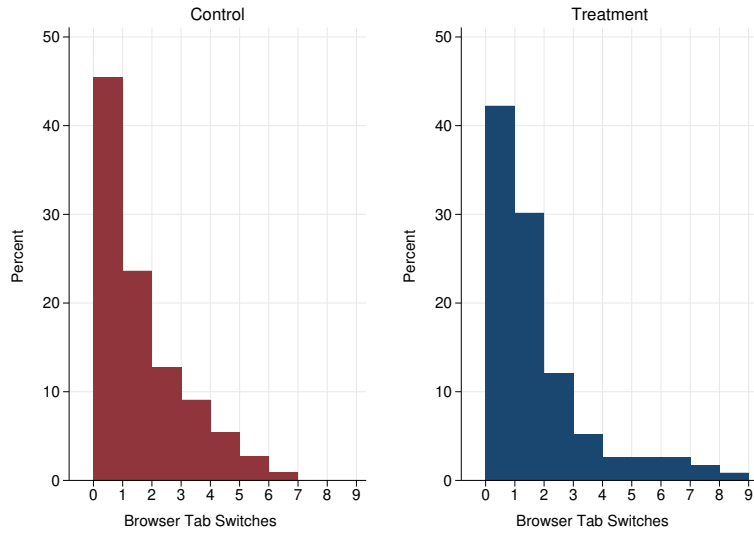
Notes: This figure shows the distributions over participants of the average number of browser tab switches per session during the interventions (bins are of width 1). The distributions are similar for the treatment and control, with significant numbers of participants focusing during the recordings (over 40% of the treatment and control groups have an average number of switches between 0 and 1). The difference in the mean of the control (1.61) and the treatment (1.72) is not statistically significant ($t = 0.680$; $p = 0.497$).

Figure: Compliance Measure (Average Difference in Submission Time per Session)
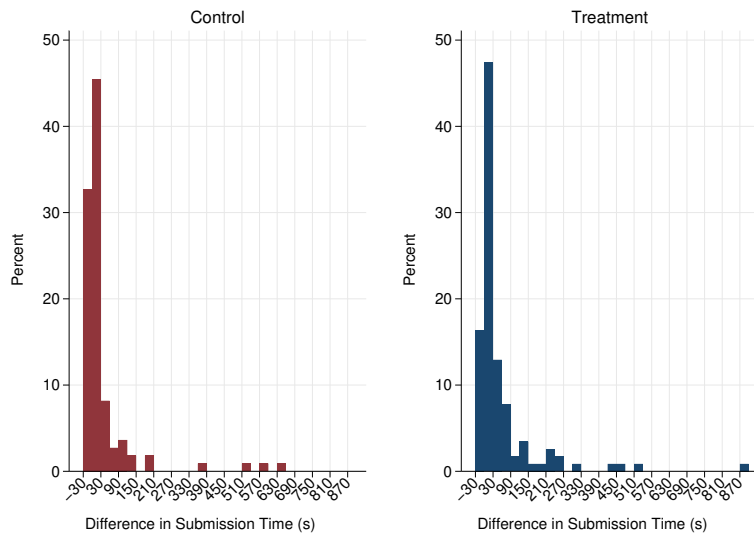
Notes: This figure shows the distributions over participants of their average difference in submission time per session from the true end of the recording (bins have a width of 30 seconds). The distributions are similar for the treatment and control, with a substantial portion of participants (over 40%) in both groups submitting more or less when they are told to (within 30 seconds of the end of the recording). The difference in the mean of the treatment (58 seconds) and control (36 seconds) is not statistically significant ($t = 1.464$; $p = 0.145$).

Figure: Intervention Effects on the Five Facets of Mindfulness Scale
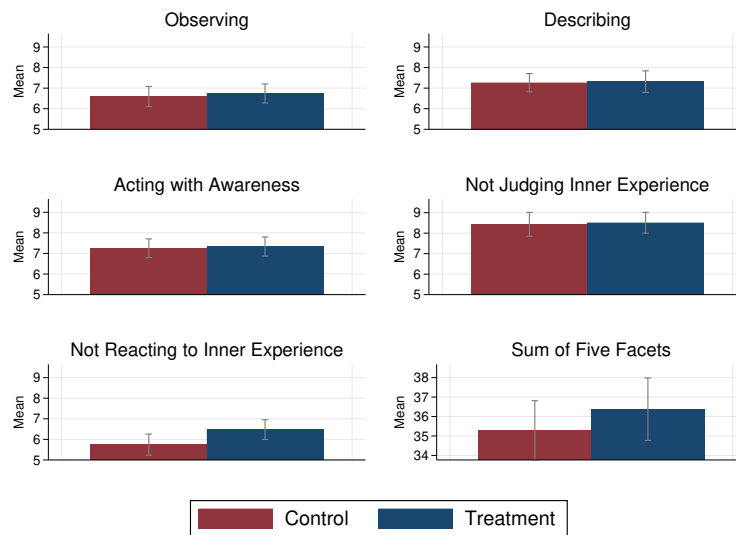
Notes: This figure compares the post-course means of the FFMQ scale and sub-scales. Gray bars show 95% confidence intervals.