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Mindfulness and Financial Decision Making

An Exploratory Investigation into the Effects of Mindfulness Interventions on Making Financial Decisions

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Abstract

This study investigates whether a mindfulness intervention has an effect on financial decision making. Based on a literature review, this thesis hypothesizes that state mindfulness improves the outcomes of financial decisions, measured through the performance in the Iowa Gambling Task. Further, it hypothesizes that the relationship is mediated by affect and temporal focus. The results of the experimental study (N = 78) show that participants who meditated performed significantly worse in the financial decision-making task than the control group. Accordingly, the findings are not consistent with the hypothesis and contribute to the growing literature on the negative effects of mindfulness.

Keywords: Meditation, state mindfulness, financial decision making, iowa gambling task

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Introduction

Throughout several aspects of life, individuals are constantly faced with financial decisions that need to be made. There are various types of financial decisions and can either involve investments or financing. They can either be minor, such as choosing how much money is spent on lunch; or of great importance for the future, such as deciding on how much money is saved for retirement or where it is going to be invested. In other words, financial decisions are not only shaping individuals' daily lives but can also have a significant impact on their future. Thus, it is important to enhance the outcomes of financial decisions as much as possible. So, is there a way to improve financial decision making and achieve better results?

A recent Forbes article discusses the question “What the heck does meditation have to do with being a great investor or even a better investor?” (Rae, 2019), and suggests that meditation would positively influence investment decisions. This raises the question of whether meditation can be used as a tool to not only influence investments but also other financial decisions. The concept of mindfulness has gained tremendous attention over the past decades because of its numerous beneficial effects on well-being, psychological outcomes and clinical interventions (e.g., Brown & Ryan, 2003). Mindfulness has been researched in various fields; however, little to nothing has been done regarding the impact of state mindfulness on financial decision making. Therefore, the present study aims to fill the gap in the literature by investigating the influence of state mindfulness on financial decisions in an experimental lab setting.

This thesis begins with reviewing the existing literature to identify factors that influence financial decisions as well as to explain the concept of mindfulness and how it could affect financial decision making. Moreover, this section develops hypotheses based on the literature review. Next, the methodology of the experimental research and the procedure is described. After that, the results of the experimental study are presented, and in the subsequent section, the findings are explained and interpreted as well as its implications are discussed. The

following chapter discusses limitations and presents suggestions for future research and finally, the findings of this thesis will be summarized.

Literature Review

Financial Decision-Making

Although traditional finance theory states that individuals are rational and that decision-makers quantitatively weigh the benefits and costs to achieve the highest possible outcome with the best risk-benefit trade-off (Loewenstein, Weber, Hsee, & Welch, 2001), the mounting evidence shows that individuals are not always able to obtain all relevant information and rather act partly rational or even irrational when making financial decisions (Madaan & Singh, 2019).

In the present research, a framework of behavioral finance theory, saying that psychology influences financial decisions by considering anomaly and irrational characteristics, is adapted. This approach proposes that financial decisions are influenced by an individual's preferences and psychological biases, both cognitive and emotional (Jureviciene & Jermakova, 2012). The following sections discuss some cognitive and emotional biases that are obstacles to optimal financial decision making.

Risk perception. Defined as the “judgement process that investors employ when assessing risk and the degree of uncertainty” (Baker & Ricciardi, 2014, p. 328), risk perception has a crucial impact on financial decisions since individuals may perceive risk higher or lower than the actual risk is. Individuals often rely on their emotions, gut feelings and past experiences when evaluating risk, which may impair the accuracy of risk reflection. (Loewenstein et al., 2001; Sobkow, Traczyk, & Zaleskiewicz, 2016).

Heuristics and bias. Heuristics are mental shortcuts or rules of thumbs used for processing information and reasoning (Baker & Ricciardi, 2014). Because of heuristics, financial decision-makers tend to ignore part of the information in order to decide quickly or frugally, which makes the decision-making process simpler, but the result mostly not optimal.

Thus, biases are one reason why individuals do not make rational financial decisions and may achieve lower outcomes. The most common heuristics in financial decision making tend to lead to biases such as representativeness, overconfidence, anchoring and adjustment, availability and loss aversion biases (Baker & Ricciardi, 2014).

Emotions and other affective states. Emotions play a crucial role in financial decision making as they can induce biases and distort information retrieval in the decision-making process (Seo & Feldmann Barrett, 2007). In addition, Sobkow et al. (2016) found that emotions have an influence on risk perception. Negative affect has been found to cause a higher perceived risk than positive affect (Sobkow et al., 2016). Lee and Andrade (2011) revealed that fearful and anxious individuals tried to minimize uncertainty and would choose the safer option, although the financial outcome may have been lower. Further studies found that individuals who experience less intense emotions achieved better results from making financial decisions because of greater risk neutrality from a more consistent connection between the individual value and measurable gain (Lo, Repin, & Steenbarger, 2005; Schunk & Betsch, 2006).

Risk perception, biases and emotions are the main reasons why individuals deviate from rational financial decisions. They can occasionally lead to errors in prediction or evaluation and thereby cause poorer financial decision outcomes (Baker & Ricciardi, 2014). The following sections introduce the concept of mindfulness and discuss how mindfulness could influence the above-mentioned factors to improve financial decisions.

Mindfulness

Mindfulness is defined as “the state of being attentive to and aware of what is taking place in the present moment” by Brown and Ryan (2003, p. 822). Another often-cited definition comes from Kabat-Zinn (1994, p. 4), who describes mindfulness as “paying attention in a particular way: on purpose, in the present moment, and non-judgmentally.” In the past 20 years, Western society increasingly focused on mindfulness research and interventions. Nevertheless, the original concept of mindfulness is rooted in Buddhist psychology from 2,500 years ago and

is used as a spiritual and healing practice as the core teaching of the Buddhist tradition. The word *mindfulness* comes from the Pali word *sati* and combines awareness, attention and remembering (Kabat-Zinn, 1994). Accordingly, being mindful implies to stay present with thoughts and emotions and to observe whether the experience is positive, negative, or neutral without judging.

Although mindfulness has been studied in the context of many different areas, only a scarce amount of studies documented negative effects of mindfulness (e.g., Britton, 2019; Hafenbrack & Vohs, 2018). However, numerous studies have demonstrated the beneficial effects of mindfulness on well-being (e.g., Broderick, 2005). Mindfulness was found to decrease stress, anxiety and depressions (Frewen et al., 2011), increase immune and brain functioning (Davidson et al., 2003) as well as improve the ability to regulate emotions (Arch & Craske, 2006; Bishop et al., 2006).

Conceptualizations of mindfulness. Literature has commonly investigated three different conceptualizations of mindfulness: state mindfulness, trait mindfulness and mindfulness practice.

State mindfulness is defined as a temporary state of awareness through practices such as mindfulness meditation (Tang et al., 2007). It implies that an individual is mindful as long as the attention is purposely brought to the experience in an open manner. If the attention regulation stops, the individual is no longer mindful (Bishop et al., 2006). Bishop and colleagues (2006) highlight that state mindfulness is not only limited to meditation or other mindfulness practices and can be evoked in many situations.

Trait mindfulness, also referred to as dispositional mindfulness, is defined as the individual and cross-situational level of mindfulness awareness (Bishop et al., 2006). A natural variance between individuals' baselines of mindfulness is caused by genetic predispositions and different life experiences (Vasudevan & Reddy, 2019). Without any interventions, trait

mindfulness appears to be stable. However, it can be cultivated and strengthened through mindfulness practice (Kiken, Garland, Bluth, Palsson, & Gaylord, 2015).

Mindfulness practice induces repeated activation of the mindfulness state to recover unconscious values to awareness (Shapiro & Carlson, 2009). Mindfulness practice can either be formal or informal. Formal practices refer to systematic meditation practices to cultivate mindfulness and include, for instance, sitting meditation, walking meditation and body scan (Shapiro & Carlson, 2009). They can be practiced for a short time duration every day or as an intensive retreat for several hours. Informal practices consist of open attention to everyday life activities such as eating or reading (Shapiro & Carlson, 2009). Further, mindfulness can be seen as a skill that can be learned and developed through practice and instructions and can be evoked in many different situations (Bishop et al., 2006).

Being mindful stands in contrast to many daily experiences in which one is acting mindlessly. Mind-wandering has been described as a default mode of the brain (Buckner, Andrews-Hanna, & Schacter, 2008). In these moments of mindlessness and mind-wandering, individuals do not pay attention to what they are doing and perform their tasks on autopilot, while daydreaming, while thinking about the past or worrying about the future (Brown & Ryan, 2003). Since individuals are used to acting mindlessly, cultivating mindfulness can be a difficult task.

Particularly, enhancing trait mindfulness can be challenging because it may need some weeks of mindfulness-training as it is demonstrated in several studies (Brown & Ryan, 2003; Kiken et al., 2015). This indicates that increasing trait mindfulness requires a lot of time, effort and money, which some individuals may not be willing or able to spend. State mindfulness, on the other hand, can already be increased through a 15-minutes meditation session (Frewen, Lundberg, MacKinley, & Wrath, 2011). Because of this, many people meditate to achieve immediate beneficial effects of mindfulness, for example, when they are at work in order to be less stressed and more focused (Gelles, 2015). This shows that enhancing state mindfulness can

be a practical method that can easily be used in the daily lives of individuals without requiring large amounts of time, money and effort.

For that reason, this thesis aims to answer the question of whether individuals should meditate before making financial decisions to improve the outcome. Accordingly, the effect of an exogenously created state of mindfulness on financial decision making is investigated in the present research.

Link between Mindfulness and Financial Decisions

This section identifies three main reasons why mindfulness may influence financial decisions. Further, it develops a hypothesis about which effect mindfulness may have and two hypotheses about possible mediators of the relationship.

As mindfulness cultivates present awareness and non-judgmental acceptance (Brown & Ryan, 2003; Kabat-Zinn, 1994), individuals may see important factors more clearly and become more aware of cues while making financial decisions. Particularly, mindful individuals have been found to be more able to prevent cognitive failures or involuntary errors as they are more aware of the external situations and internal stimuli (Herndon, 2008). In addition, much of the mindfulness literature has documented positive effects on attention (e.g., Jha, Krompinger, & Baime, 2007; Norris, Creem, Hendler, & Kober, 2018; Tang et al., 2007). Broadly speaking, this suggests that mindfulness makes individuals more able to attend to their environment and react flexibly to changes, leading to better financial decision-making outcomes (Dayton, 2014). Therefore, I hypothesize the following:

H1) Mindfulness has a positive effect on financial decision making.

Mindfulness could also influence financial decisions through an improved ability to regulate emotions. Previous research has shown that intense emotions, negative affect and anxiety impair financial decisions (Dayton, 2014; Lo et al., 2005; Loewenstein et al., 2001). In fact, Sobkow et al. (2016) demonstrated that negative affect distorted risk perception and led to

a poorer assessment of risk. Therefore, emotion regulation is an important ability to perceive and assess risk more accurately and to make better financial decisions (Seo & Feldmann Barrett, 2007). As most of the research on mindfulness has come from treating depression and anxiety, there is strong evidence that mindfulness improves emotion regulation (e.g., Arch & Craske, 2006; Bishop et al., 2006), and therefore, I hypothesize:

***H2a)** The positive effect of mindfulness on financial decision making is mediated by emotion regulation.*

Another way that mindfulness could impact financial decision making is through temporal focus. Studies have shown that individuals who think about the past when evaluating risk tend to judge less accurately (Sobkow et al., 2016). Further research has shown that individuals who are too optimistic or too fearful about future events may not process all relevant information. This happens for example, if individuals wrongly anticipate an economic crisis (Gärling, Kirchler, Lewis, & van Raaij, 2009; Weinstein, 1980). For that reason, relying on past experiences or ruminating about future events can lead to poorer financial decisions. To increase the accuracy of risk perception, it is important that individuals are aware of the present moment so that they do not oversee important information and factors when evaluating. Mindfulness has been shown to change the temporal focus away from the future and past to the present moment (Hafenbrack, Kinias, & Barsade, 2014). Thus, I hypothesize the following:

***H2b)** The positive effect of mindfulness on financial decision making is mediated by temporal focus.*

Present Study

This thesis aims to fill the gap in the literature by examining whether an exogenously created state of mindfulness significantly improves financial decision making, measured through the performance in the Iowa Gambling Task (IGT). Further, it investigates whether

affect and temporal focus mediate the relationship between state mindfulness and financial decisions. The study was conducted in an experimental lab setting.

Method

Participants. One hundred twelve students from Nova SBE participated in exchange for a breakfast menu voucher worth 2.75 € and an additional cash payment contingent based on their task performance in the lab. Participants were mostly recruited through the online portal of the Nova Behavioral Lab (about 70%), or in person on campus (about 30%). The participants were mostly Bachelor or Master students in the fields of management, economics and finance, with a few being students in law and biology. Thirteen participants who had issues with aspects of the survey and sixteen participants who failed the attention check were excluded from the analyses. Although participants were randomly assigned to conditions, visual inspections of self-reported meditation frequency revealed that ten frequent meditators (i.e., who meditate once or more than once a week) were in the control condition while three frequent meditators were in the experimental condition (see Appendix A). To address this oversampling of frequent meditators in one condition, the thirteen participants across both conditions were excluded from the analyses. Consequently, seventy-eight participants were included in the analyses (51% female, $M_{age} = 23$ years, $SD = 2.48$, $range_{age} = 17 - 27$).

Inductions. Participants in the experimental group listened to a 15-min mindfulness breathing meditation audio. The guided audio instructed the participants to focus their attention on sensations of their breath and to remain open-minded to the experiences. Whenever their minds had wandered, they were instructed to notice this and redirect their attention back to the breath without blaming themselves for having lost the focus ($N = 38$).

Participants in the control group listened to a 15-min mind-wandering audio that gave the participants instructions to let the mind wander freely and think of whatever comes to their

mind (N = 40). Mind-wandering is very often used as a control condition for mindfulness because of its valenced stimuli (Hafenbrack et al., 2014; Kiken & Shook, 2011).

Both meditation and mind-wandering involve the arising and passing of mental objects with each moment. Thus, participants could have the distorted perception that they are meditating even though they are listening to the mind-wandering audio. Mind-wandering has been described aptly as a sham meditation (Zeidan, Johnson, Gordon, & Goolkasian, 2010), increasing the face-validity of the control condition. In fact, participants in the control group gave feedback after the study that they thought they were listening to the meditation audio.

Measures (Appendix B)

Manipulation Checks

Toronto Mindfulness Scale. The 13-item-self-report questionnaire (TMS; Lau et al., 2006) measures state mindfulness by letting participants rate to which extent they are mindful after they completed a mindfulness or control exercise. The TMS is composed of the two factors curiosity and decentering. The items are rated on a 5-point Likert scale ranging from 0 “not at all” to 4 “very much.” The responses were averaged for the overall TMS ($\alpha = .77$), the curiosity subscale ($\alpha = .82$) and the decentering subscale ($\alpha = .59$).

State Mindful Attention Awareness Scale. The 5-item scale (state MAAS; Brown & Ryan, 2003) assesses the degree of attention and awareness of what is happening in the current moment. The items of the scale are rated on a 6-point Likert-scale from 0 “not at all” to 5 “very much.” The responses were averaged ($\alpha = .86$).

Mediators

Temporal Focus Scale. Parts of the scale (TFS; Shipp, Edwards, & Lambert, 2009) were used to measure whether participants are thinking about the past, present and future. The scale was used as a mediator of the relationship between mindfulness and financial decisions.

The three items are rated on a 5-point scale ranging from 0 “not at all” to 4 “extremely.” The responses were averaged ($\alpha = .92$).

PANAS-X. The extended form of the Positive and Negative Affect Scale (PANAS-X; Watson, Clark, & Tellegen, 1988) was used to measure the current state of emotions as a potential mediator. The questionnaire contains 60 items. 30 items to measure positive affect ($\alpha = .86$) and the other 30 items to measure negative affect ($\alpha = 0.90$). The participants rate the extent to which they feel each emotion on a 5-point Likert-scale from 0 “not at all” to 4 “extremely.” The PANAS-X also provides a wide range of sub-scores. For this experiment, there was a focus on the sub-scores sadness ($\alpha = .70$), fear ($\alpha = .90$), serenity ($\alpha = .84$), fatigue ($\alpha = .86$), attentiveness ($\alpha = .60$) and self-assurance ($\alpha = .80$).

Control variables

Age and gender were included as control variables. There was an equal distribution between nationalities across the two conditions (see Appendix C).

Dependent variables

The Iowa Gambling Task. The Iowa Gambling Task (IGT) was invented to assess real-life decision making under uncertainty (Bechara, Damasio, Damasio, & Anderson, 1994). Participants receive a loan of \$2,000 fake money and should maximize the earnings over the course of 100 decisions by selecting cards from one of four decks, labeled A, B, C, D. There are no restrictions on how often participants can switch between the decks. With each selection, they can either win or lose a predetermined amount of money. Decks A and B always yield a profit of \$100, while decks C and D always yield a profit of \$50. However, each card has a 50% chance of a fee that must be paid to the bank. For decks A and B, the fee is \$250 and for decks C and D, the fee is \$50. As illustrated in Figure 1, decks A and B have higher losses in the long run and are termed “disadvantageous” decks. Decks C and D, on the other hand, have higher overall gains in the long run and are referred to as “advantageous” decks (Bechara et al., 1994).

	Disadvantageous Decks		Advantageous Decks	
	A	B	C	D
Gain per card	\$ 100	\$ 100	\$ 50	\$ 50
Loss per 10 cards	\$ 1250	\$ 1250	\$ 250	\$ 250
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Net per 10 cards	\$ -250	\$ -250	\$ +250	\$ +250

Figure 1. Overview of the Iowa Gambling Task.

Initially, the IGT was conducted with decks of paper cards. Nowadays, the computerized version is more commonly used, and studies found that there are no differences between the original and computerized versions (Bechara et al., 2005; Bechara et al., 1994).

From the IGT, several dependent variables were computed:

- 1) **IGT overall net gain.** This was the total money after 100 decisions.
- 2) **IGT total net score.** This was the difference between the total number of selections from the advantageous decks minus the total number of selections from the disadvantageous decks [(Deck C + Deck D) - (Deck A + Deck B)].

Monetary rewards

As part of the financial decision-making task, real monetary reward was used to increase participants' motivation to perform well at the task. Each choice had a real economic consequence for the participants as it is in real-life financial decisions, strengthening the reliability and validity of the collected data. For every \$50 the participants gained at the end of the Iowa Gambling Task, they got 0,05€ real money as a reward. For ethical reasons, participants who got negative fake money at the end of the task neither had to pay anything from their own real money nor received any real money as a reward. In other words, their losses had been written off. Participants were informed as such.

Procedures

Sessions were conducted in groups of two to nine participants and lasted roughly 45 minutes. At the beginning of each session, the participants were greeted and briefed to do their best to follow the instructions. Throughout the lab sessions, participants were seated at individual computer terminals, separated by desk dividers to prevent knowledge of how other participants were doing on the tasks. Before beginning, participants were made aware of their rights, requirements and benefits of participation. Only if they gave their informed consent they could carry on (see Appendix D).

In the first part of the lab session, participants completed the experimental manipulation and some measures on Qualtrics: They began with an audio test to check that the headphones were working. Then, participants were randomly assigned to the mindfulness meditation or mind-wandering control group. After listening to the 15-minutes audio of the assigned condition with headphones, the students completed the TMS (Lau et al., 2006) the state MAAS (Brown & Ryan, 2003) and items of the TFS (Shipp et al., 2009) to measure the participants' level of mindfulness. Further, they completed the PANAS-X (Watson et al., 1988) to measure their emotional state.

In the second part of the lab session, the participants were introduced to the financial decision-making task and were tested on their understanding of the task. The displayed instructions and extracts of the task can be seen in Appendix E. If they fully understood the game, they were allowed to complete the computerized version of the IGT through the PsyToolkit platform.

In the final part of the lab session, the students returned to the Qualtrics platform and filled in the demographic questionnaire. At the completion of the experimental session, participants were debriefed and given the breakfast menu voucher as well as a monetary reward based on their final outcome of the IGT.

Results

Manipulation Checks

All data were analyzed using SPSS version 26. Prior to running primary analyses, manipulation checks were made. An ANCOVA on state mindfulness scores was computed to ensure that the manipulation created significant changes between the groups, using gender and age as covariates.

Participants in the mindfulness condition ($M = 3.53$, $SD = .50$) did not report significantly higher state mindfulness through the TMS compared to the participants in the mind-wandering condition ($M = 3.44$, $SD = .61$, $p = .47$). Further, the experimental group ($M = 3.85$, $SD = .65$) did not report significantly more curiosity than the control group ($M = 3.96$, $SD = .75$, $p = .52$). However, the mindfulness group ($M = 3.26$, $SD = .53$) reported marginally significantly higher decentering compared to the mind-wandering group ($M = 2.99$, $SD = .66$, $p = .06$). Finally, the mindfulness group ($M = 3.27$, $SD = .86$) did not report significantly higher state mindfulness through the state MAAS compared to the control group ($M = 3.27$, $SD = 1.19$, $p = .99$).

Additional analysis. A factor analysis indicated that the TMS comprises four factors, although it consists of the two factors curiosity and decentering. Further, the analysis revealed that only two of the seven items adequately captured the factor decentering and five of the six items adequately captured curiosity (see Appendix F). The discussion section further addresses why these manipulation checks were not significant.

Reaction Time

A repeated measures ANOVA with a Greenhouse-Geisser correction was conducted to explore changes in the reaction time between each decision across conditions.

The within-subjects F-test results show that the reaction time between each decision was different, $F(9.28, 696.05) = 16.89$, $p < .001$. Of interest, there is a significant linear effect

of decisions along with the graph of reaction time across decisions, suggesting that people took less time with each decision, as can be seen in Figure 2. The trends of reaction time do not significantly differ between the conditions and are both downward, $F(9.28, 696.05) = 1.08, p = .37$. However, the mindfulness group had a significantly higher mean reaction time than the mind-wandering group, as shown by the between-subjects F-test results, $F(1,75) = 8.613, p = .004$.

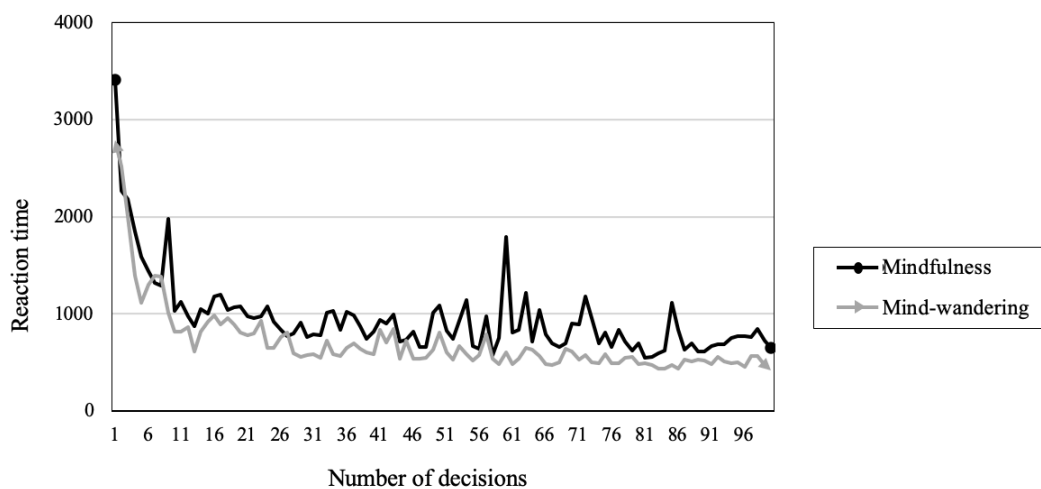


Figure 2. Trends of the mean reaction time between each decision for both conditions.

The Iowa Gambling Task

Prior to analyzing the IGT performance, potential outliers were identified using Tukey's fences (1977). One observation fell out of the overall pattern as its value was more than 1.5 times the interquartile range below the first quartile. There was no observation that was more than 1.5 the interquartile range above the third quartile (see Appendix G). Subsequently, the outlier was excluded from the following analyses.¹

IGT overall net gain. An ANOVA was conducted to test whether the mindfulness condition affected the final result of the financial decision-making task. The overall net gain

¹All analyses were also conducted including the outlier and with the control variables gender and age. They did not show any significant differences.

(money after 100 decisions) was used as a dependent variable and the mindfulness condition was entered as a fixed variable.

The results show a significant difference between the mindfulness group ($M = 2409.21$, $SD = 1139.93$) and the mind-wandering group ($M = 3006.41$, $SD = 844.58$), $F(1, 76) = 6.85$, $p = .011$). In contrast to hypothesis 1, the participants of the mindfulness condition achieved lower overall net gains than the participants of the mind-wandering condition.

IGT total net score. An ANOVA showed a significant difference in the total net scores between the mindfulness group ($M = 16.05$, $SD = 45.01$) and the mind-wandering group ($M = 37.49$, $SD = 36.98$), $F(1, 76) = 5.23$, $p = .025$). The results reveal that the mindfulness group chose the disadvantageous decks more often compared to the mind-wandering group, resulting in a lower mean total net score.

IGT frequencies of deck selections. To gain deeper insights into the decision-making behavior, the frequencies of total deck selections were investigated. The frequencies refer to the number of participants who selected a specific total amount of a deck over the course of 100 decisions. As an example, deck A was selected 30 times by three participants from the mindfulness group (i.e., frequency of three) and one participant of the mind-wandering group (i.e., frequency of one). As illustrated in Figure 3, more participants from the mind-wandering group selected a higher total number of deck C and D over 100 decisions. On the other hand, the mindfulness group selected more often deck A and B and less frequent the advantageous decks. More details about the frequencies of total deck selection are shown in Appendix H.

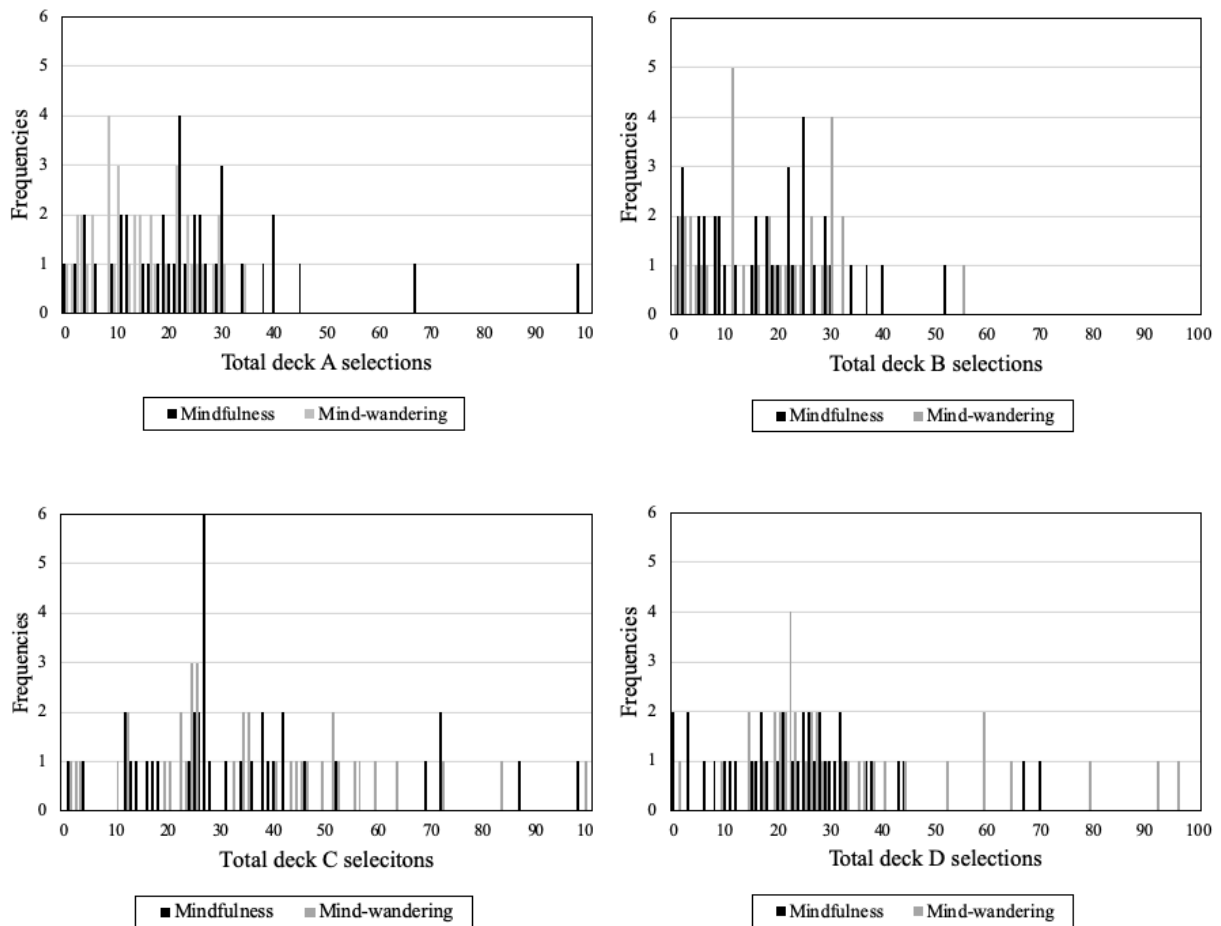


Figure 3. Frequency of the total selections for each deck and across both conditions.

IGT mean deck selections. The mean deck selections over 100 decisions are shown in Table 1. In order to test if the mindfulness condition significantly influenced the differences in deck selections, an additional set of ANOVAs was conducted.

Table 1

Means and standard deviations for the selected decks between conditions

Condition	Deck A		Deck B		Deck C		Deck D	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Mindfulness	24.21	18.03	17.76	12.13	33.92	21.51	24.11	15.51
Mind-wandering	14.46	9.44	16.79	12.11	36.15	21.71	32.59	21.35
Total	19.27	15.07	17.27	12.05	35.05	21.50	28.40	19.06

Note. *M* and *SD* represent mean and standard deviation, respectively.

The results of the ANOVAs revealed that the mindfulness condition had a significant effect on the mean selection of the disadvantageous decks, $F(1, 76) = 5.23, p = .025$. Further, the condition had a significant impact on the choice of deck A, $F(1, 76) = 8.90, p = .004$, but not on the choice of deck B, $F(1, 76) = .123, p = .73$. These findings indicate that the mindfulness group chose significantly more often deck A, which is the main reason for the higher number of disadvantageous decks, and consequently, also for the lower overall net gain and total net score of the mindfulness group. The discussion section gives a possible explanation for the more frequent selection of deck A.

IGT net score per block. To further examine the trajectories of the IGT performance, the choices were split into five blocks of 20 consecutive decisions. This method is typically used to examine the performance between the blocks and is based on the analyses of the original researchers (Bechara et al., 2005; Bechara et al., 1994)

The net scores for each of the five blocks were calculated and compared across conditions using a repeated measures ANOVA with a Greenhouse-Geisser correction. The within-subjects F-test results indicate that the mean net scores differ significantly between the five blocks, $F(2.50, 187.78) = 22.27, p < .001$. As Figure 4 illustrates, there is an upward trend of the net scores, indicating that most individuals learned which were the advantageous decks over time and therefore selected them more often. The trend of choices does not differ significantly between the groups, as indicated by the within-subjects linear contrast, $F(1, 75) = .01, p = .98$. However, the mindfulness group had significantly lower mean net scores in each block compared to the mind-wandering group, as indicated by the between-subjects F-test results, $F(1, 75) = 5.26, p = .025$.

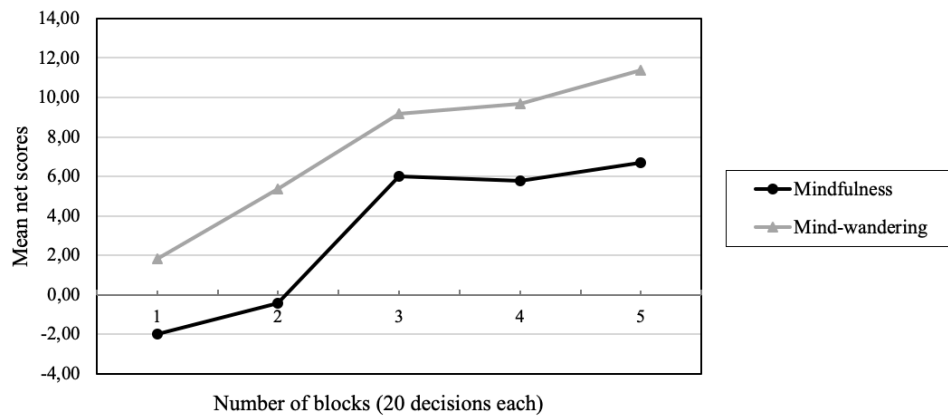


Figure 4. Mean net scores per block between conditions,

IGT proportions of deck selections. The proportion of deck selection per block shows the ratio of the selected deck to the total number of decks chosen in each block. As shown in figure 5, the mindfulness group chose a higher proportion of deck A in each block and a lower proportion of deck D compared to the mind-wandering group.

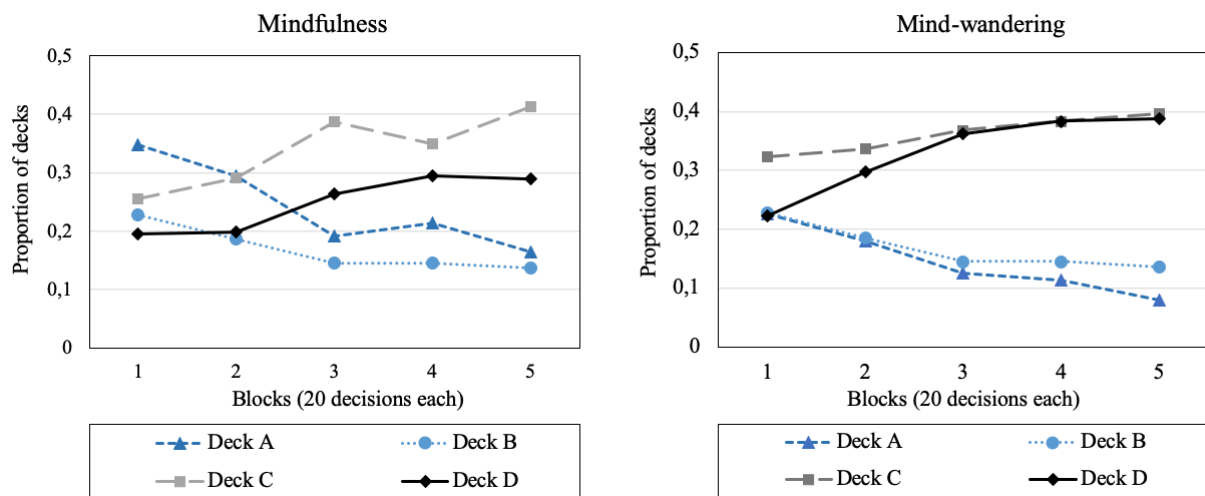


Figure 5. The proportions of deck selections per block between conditions.

Mediators

A mediation analysis using the PROCESS macro in SPSS (model 4; Hayes, 2018) was conducted to investigate whether affect and temporal focus mediate the effects of mindfulness on the IGT overall net gain (money after 100 decisions). Mindfulness was entered as a categorical independent variable. Positive affect, negative affect and temporal focus were used as mediating variables to predict the overall game money net gain.

Again, the results show that mindfulness has an effect on the overall net gain. However, there was no significant mediation of positive affect (indirect effect = $-.05$; 95% CI $[-.18, .04]$), negative affect (indirect effect = $-.01$; 95% CI $[-.09, .09]$) and temporal focus (indirect effect = $.03$, 95% CI $[-.05, .15]$) (see Appendix I).

To further examine whether specific emotions mediate the effect of mindfulness on the IGT overall net gain, a mediation analysis with the emotions sadness, fear, serenity, fatigue, attentiveness and self-assurance as parallel mediators using the PROCESS macro in SPSS (model 4; Hayes, 2018) was conducted (see Appendix J). However, the mediation analyses did not reveal any significant effects on the relationship between mindfulness and the overall money net gain. As Figure 6 illustrates, fear and sadness had a direct effect on the overall money net gain. But since the direct effect of mindfulness on the two emotions was not significant, the indirect effects were not significant either (indirect effect_{fear} = $-.10$; 95% CI $[-.32, .09]$, indirect effect_{sadness} = $.08$; 95% CI $[-.11, .34]$).

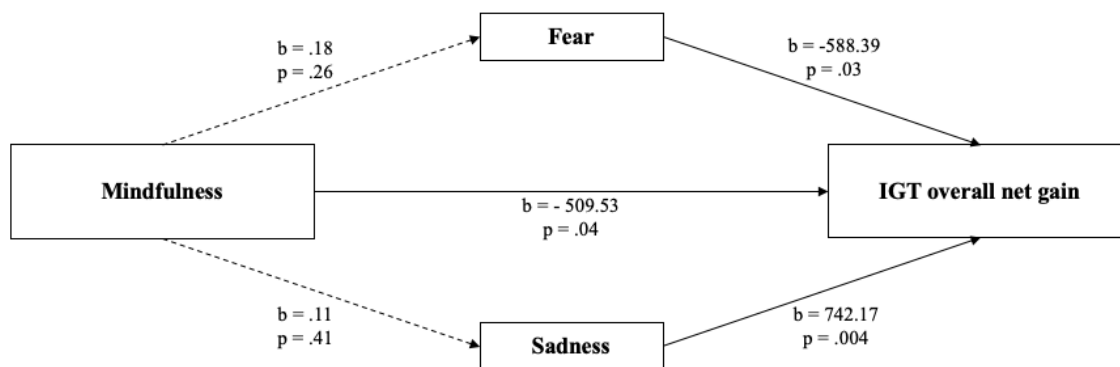


Figure 6. Direct effects on the relationship between mindfulness and the overall money net gain.

Discussion

The purpose of this study was to investigate the effect of an exogenously created state of mindfulness on financial decision making. It was hypothesized that state mindfulness, cultivated through a 15-minutes meditation induction, would have positive effects on financial decisions, mediated by an enhanced ability to regulate emotions and increased temporal focus.

The manipulation checks, as well as the mediators, measuring affect and temporal focus, were not different between the two conditions. Consequently, hypothesis 2A and hypothesis 2B were not confirmed. The failed manipulation checks may be explained by the findings of the conducted factor analysis. They showed that the TMS did not adequately capture its two factors curiosity and decentering. A possible explanation for this finding may be that participants may have rated some items inconsistent with other items of the same factor. The individuals were not English native speakers and may have misread some items or may not have understood them correctly. Indeed, participants did ask questions about what certain words meant during the first part of the lab session where they answered these scales.

A further explanation for the failed manipulation and mediator checks may be that most participants were my friends or acquaintances and knew that I am an active member of the Mindfulness Club at Nova SBE. Therefore, they may have drawn conclusions that the thesis is related to mindfulness, although the topic was not disclosed before. Together with the fact that participants in the control condition often reported in the debrief that they thought they were in the meditation condition, the self-report scales may have been especially vulnerable to demand effects where participants answered what they thought would be appropriate to reach the goal of my experiment (Zizzo, 2010).

There is also a possibility that the mindfulness manipulation simply did not work. However, there was a significant difference between the two conditions for the performance in the financial decision-making task, in which performance was incentivized. These constellations of findings suggest that demand effects is the more plausible explanation.

Contrary to the initial hypothesis 1, the results show that the participants of the mindfulness group achieved lower overall net gains and total net scores of the IGT. This indicates that the exogenously created state of mindfulness had a negative effect on financial decisions. Although the selection of advantageous decks increased for both conditions over time, the mindfulness group chose these decks less frequent compared to the mind-wandering

group, resulting in a lower proportion of advantageous decks for each of the five blocks (20 decisions each). The findings also revealed that participants of the mindfulness condition stuck longer with the selection of disadvantageous decks while participants of the control group adapted their behavior quicker towards the advantageous decks and away from the disadvantageous decks.

A possible explanation for the poorer performance of the experimental group may be the fact that they felt marginal significantly more decentered compared to the control group. This indicates that participants in the mindfulness condition may have experienced the task more from the perspective of a third person, which decreased the motivation to achieve the highest outcomes in the task. In fact, post-experiment debriefs with participants who volunteered revealed that participants of the mindfulness condition felt demotivated, tired and did not care about how much money they would gain in the end. This finding goes in line with the results of a study conducted by Hafenbrack and Vohs (2018), who examined how mindfulness influences task motivation and task performance. The researchers found that mindfulness impaired motivation to perform well in the task because participants were less focused on the future. However, the task performance was not impaired by the decreased motivation and did not show any significant differences between the groups due to the increased task focus of the participants in the mindfulness condition. (Hafenbrack & Vohs, 2018).

Another explanation for the negative effect of mindfulness on the outcome of financial decisions can be linked to the higher frequency of deck A selections. For each of the five blocks, the mindfulness group chose a higher proportion of deck A compared to the mind-wandering group. In the experiment, deck A was displayed on the left side of the screen. Thus, participants have most likely seen this deck first as they are used to read from left to right. Studies found that the position of an option has an influence on a decision (Carney & Banaji, 2012; Mantonakis, Rodero, Lesschaeve, & Hastie, 2009). In particular, the first presented option has been shown to be preferred and chosen by individuals. The tendency to choose the first option

is called the “first is best” effect and primarily exists in automatic choice conditions and less in consciously controllable conditions (Carney & Banaji, 2012). The IGT rather reflects automatic choices and the results have shown that the mindfulness condition significantly influenced the choice of deck A but not the selection of deck B. Thus, it seems that the decisions of the mindfulness group were more influenced by the “first is best” effect than the decisions of the mind-wandering group.

Although the great majority of literature focuses on the numerous beneficial effects of mindfulness, there are some studies which predict that mindfulness has adverse effects (e.g., Britton, 2019; Cebolla et al., 2017; Hafenbrack & Vohs, 2018; Tangney, Dobbins, Stuewig, & Schrader, 2017). Britton (2019) suggests that only a certain level of mindfulness leads to a maximal level of well-being, whereas an exceptionally high level of mindfulness can cause adverse effects. In other words, there is an inverted U-shaped relationship between mindfulness practice and well-being. If the level of mindfulness is too high, it reduces the intensity of positive and negative emotions and could lead to emotional blunting and even dissociation (Britton, 2019). Therefore, people do not only experience less negative feelings but can completely lose positive emotions as well (Cebolla et al., 2017). Further, a very high level of acceptance and emotion regulation can decrease the motivation to change an unfavorable situation or to perform well in a task (Hafenbrack & Vohs, 2018). Tangney and colleagues (2017) even found that mindfulness increased criminal thinking of individuals with externalizing disorders who have problems with impulsive and aggressive behavior. In fact, increased non-judgment and acceptance of themselves cultivated through mindfulness led to lower self-control and self-scrutiny, increasing criminal thinking.

The results of this thesis together with the findings of the other studies show that it is important to find an optimal level of mindfulness and appropriate situations in which mindfulness meditation is used to eliminate the adverse effects and increase the beneficial

aspects. Due to the findings of this thesis, I cannot recommend meditating right before financial decisions from which individuals immediately earn or lose a smaller amount of money.

Limitations and Suggestions for Further Research

While the experiment and tasks ensured high internal validity, there are some limitations to the present study that should be addressed by future research. First, the Iowa Gambling Task was used to approximate real-life financial decisions under uncertainty. However, the decisions did neither involve high amounts of money nor the loss of participants' own money, which suffered in terms of realism. Mindfulness may have different effects on real-life financial decisions that have a long-term impact and involve a high amount of money, such as a house purchase. Further, the effects may also be different when participants' own money is at stake. Also, participants could decide for each of the 100 decisions of the IGT which deck they want to select, regardless of what they chose in the previous decision. However, real-life financial decisions do often have an influence on future financial decisions and can cause tradeoffs. In this case, the effects of a financial decision must be considered, and therefore, the decision must be evaluated carefully. Another limitation related to the IGT might be that the losses and gains of each deck did not change between the selections. Thus, deck A and B were always the disadvantageous decks and deck C and D were always the advantageous decks. If the decks were more randomized, the outcome may have been different as the results revealed that the mindfulness group had a tendency to choose deck A. Therefore, future studies with more randomized decision outcomes are recommended. Further, studies focusing on long-term financial decisions as well as the influence on other financial decisions are needed to investigate the effects of mindfulness further.

Secondly, the current study mainly focuses on emotions and emotion regulation as mediators for the relationship between mindfulness and financial decisions. Participants' emotions were measured right after they listened to the mindfulness or mind-wandering

recordings to investigate whether state mindfulness decreased the intensity of emotions. To get more robust results on whether the ability to regulate emotions after losses or wins has been enhanced through state mindfulness, it is suggested to conduct a study measuring emotions after each decision. As explained in the Literature Review, there are more factors influencing financial decisions such as heuristics, risk aversion and external circumstances. Thus, further research is recommended to explore the impact of state mindfulness on the mentioned factors and the outcome of financial decision making.

Finally, the manipulation checks failed and the mediators, measuring affect and temporal focus, did not show any differences between the conditions. Therefore, further studies with more naive participants are needed to get deeper insights into the effect of the recorded mindfulness induction. Further studies may also benefit from measures that are less susceptible to demand effects, such as implicit or indirect measures (Uhlmann et al., 2012). In addition, future studies focused on mindfulness training over a longer time period are suggested to investigate whether this also leads to worse financial decisions.

Conclusion

Even though mindfulness and its beneficial effects has gained wide attraction from academic and empirical research, the direct link between mindfulness and financial decisions is still little explored. This thesis contributes to the literature by providing new insights into the relationship between state mindfulness and financial decision making. The present study demonstrated that state mindfulness led to worse performance during financial decision making and documented that participants felt less motivated to achieve better outcomes. With its sections, this thesis this can be used as a guide to understand when mindfulness practice can be a helpful tool and when it can cause adverse effects.

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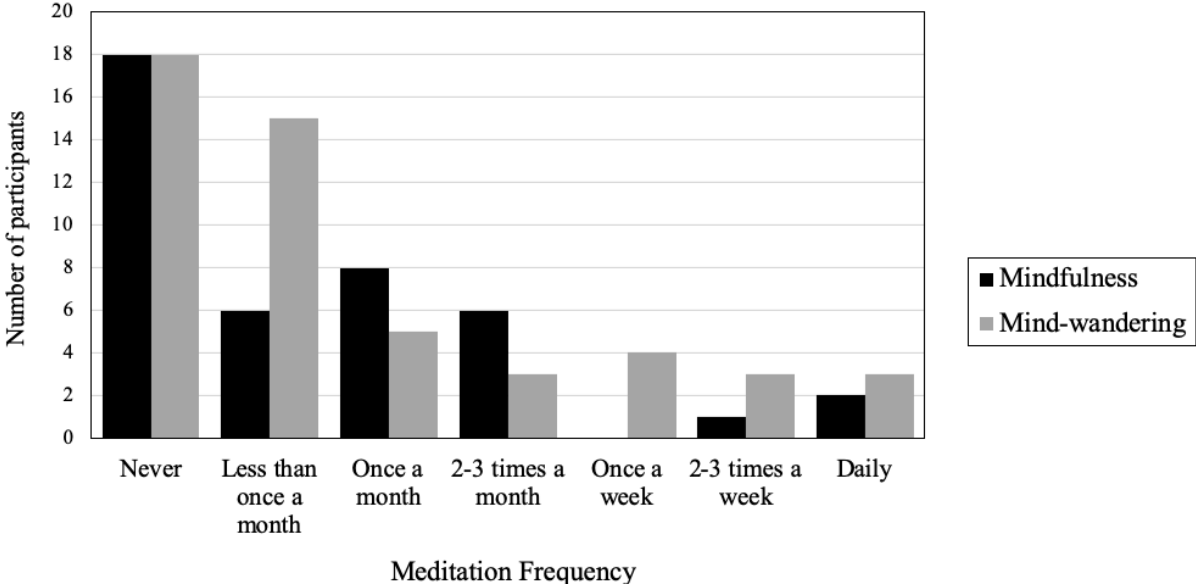
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APPENDIX A

Frequencies of Meditation Exercises Between Conditions



APPENDIX B**Toronto Mindfulness Scale (TMS; Lau et al., 2006)**

The following are some statements that describe how you feel right now. Please indicate the extent to which you agree with these statements. Although some of the statements seem repetitive, please try your best to answer them.

Right now, I...

- 0 “not at all” to 4 “very much”

1. experience myself as separate from my changing thoughts and feelings.
2. am more concerned with being open to my experiences than controlling or changing them.
3. am curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings, or sensations.
4. experience my thoughts more as events in my mind than as a necessarily accurate reflection of the way things 'really' are.
5. am curious to see what my mind is up to from moment to moment.
6. am curious about each of the thoughts
7. and feelings that I am having.
8. am receptive to observing unpleasant thoughts and feelings without interfering with them.
9. am more invested in watching my experiences as they arose, than in figuring out what they could mean.
10. approach each experience by trying to accept it, no matter whether it was pleasant or unpleasant.
11. remain curious about the nature of each experience as it arose.
12. am aware of my thoughts and feelings without overidentifying with them.
13. am curious about my reactions to things.
14. am curious about what I might learn about myself by just taking notice of what my attention gets drawn to.

State Mindfulness Attention Awareness Scale (state MAAS; Brown & Ryan, 2003)

The following are some statements that describe how you feel right now. Please indicate the extent to which you feel this way with the scale provided. Although some of the statements seem repetitive, please try your best to answer them.

Right now,

- 0 “not at all” to 5 “very much.”

1. I find it difficult to stay focused on what’s happening in the present.
2. It seems that I am “running on automatic” without much awareness of what I’m doing.
3. I feel like I am rushing through things without being really attentive to them.
4. I am doing things automatically without being aware of what I was doing.
5. I am preoccupied with the future or the past .

Temporal Focus Scale (TFS; Shipp, Edwards, & Lambert, 2009)

Read each item and indicate to which extent you feel right now.

Right now, I am..

- 0 "not at all" to 4 "extremely"

1. focused on the future or past
2. absorbed in the future or past
3. mostly thinking about the future or past

Positive and Negative Affect Scale (PANAS-X; Watson, Clark, & Tellegen, 1988)

Read each item and indicate to which extent you feel right now.

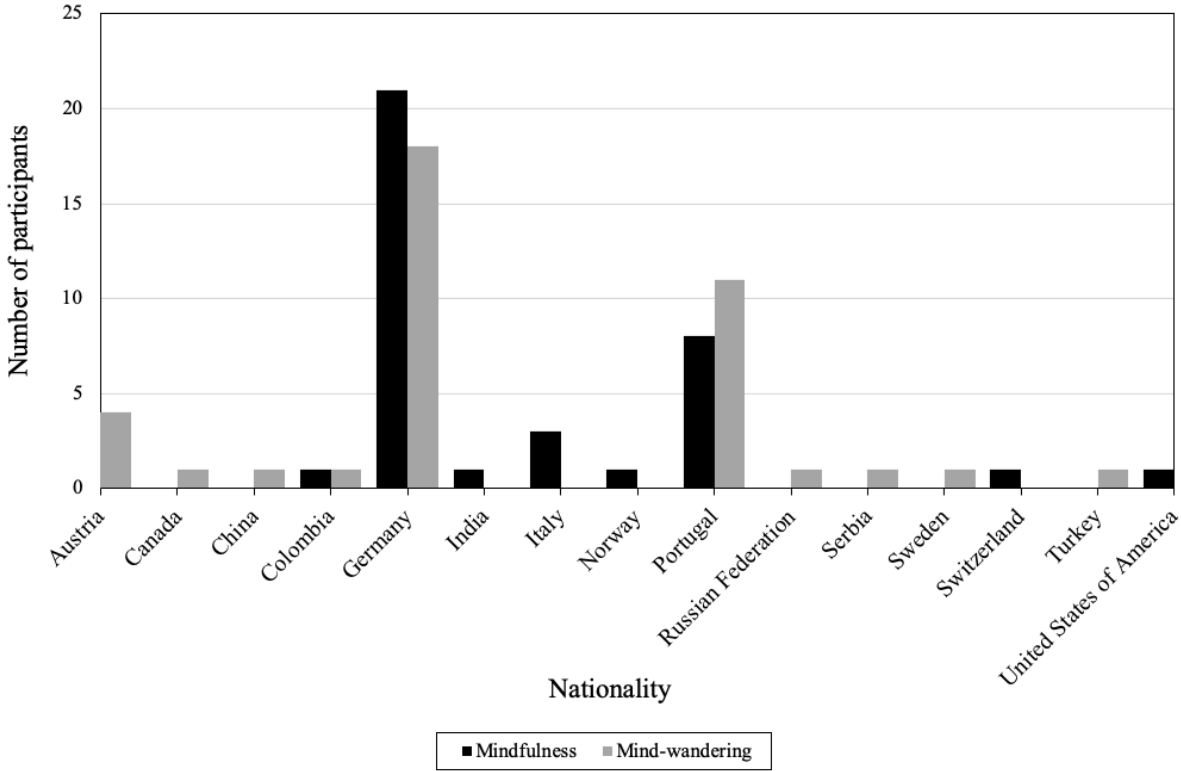
Right now, I am..

- 0 "not at all" to 4 "extremely."

- | | | |
|-------------------------------|-------------|-------------------|
| 1. cheerful | 21. shaky | 41. lively |
| 2. disgusted | 22. happy | 42. ashamed |
| 3. attentive | 23. timid | 43. at ease |
| 4. bashful | 24. alone | 44. scared |
| 5. sluggish | 25. alert | 45. drowsy |
| 6. daring | 26. upset | 46. angry at self |
| 7. surprised | 27. angry | 47. enthusiastic |
| 8. strong | 28. bold | 48. downhearted |
| 9. scornful | 29. blue | 49. sheepish |
| 10. relaxed | 30. shy | 50. distressed |
| 11. irritable | 31. active | 51. blameworthy |
| 12. delighted | 32. guilty | 52. determined |
| 13. inspired | 33. joyful | 53. frightened |
| 14. fearless | 34. nervous | 54. astonished |
| 15. disgusted with self | 35. lonely | 55. interested |
| 16. sad | 36. sleepy | 56. loathing |
| 17. calm | 37. excited | 57. confident |
| 18. afraid | 38. hostile | 58. energetic |
| 19. tired | 39. proud | 59. concentrating |
| 20. amazed | 40. jittery | |
| 60. dissatisfied with
self | | |

APPENDIX C

Distribution of Nationalities Between Conditions



APPENDIX D**Consent Form**

Title of Research Study: Study for Master Thesis of Bianca Peters

Principle Investigators: Professor Samantha Sim, Bianca Peters

Purpose of Research Study: The purpose of conducting this research study is to understand the relationship between mental tasks and financial decisions.

Study Procedures and Duration: To participate in the study, you must be above 18. For this study, you will first complete a 15-minute audio-guided mental task, then complete short surveys, make a series of financial decisions and complete some demographic questions. The experiment takes no more than 60 minutes.

Benefits of Study: You will receive a breakfast menu voucher of 2.75 € as well as an additional payment contingent for performance in the lab. Your participation in this study is voluntary, your refusal to participate or your withdrawal from this study will involve no penalty and you may discontinue participation at any time.

Possible Risks of Study: There are no anticipated risks or adverse effects in this study beyond what one would typically experience in daily life.

Confidentiality and Privacy of Research Data: The information provided by all respondents will be anonymous and confidential and will be used for research purposes only. The survey responses

contain no identifying information. Also, no one will have access to your completed survey except for the Principal Investigators (PI) and the research team. As such, please answer all questions as honestly and accurately as possible.

Please select "I consent" and click ">>" to begin.

If you do not wish to participate in the survey, you may close the browser now to exit.

APPENDIX E

IGT Instructions Displayed in the Experiment

Now you are going to play a "gambling game", which will take around 5-10 minutes. At the beginning of the game, you get a **loan of \$2,000**.

You need to choose **one of the 4 buttons** A, B, C, or D with your mouse. You will make this choice **100 times**. It is not necessary to stick with only one choice for all the 100 times.

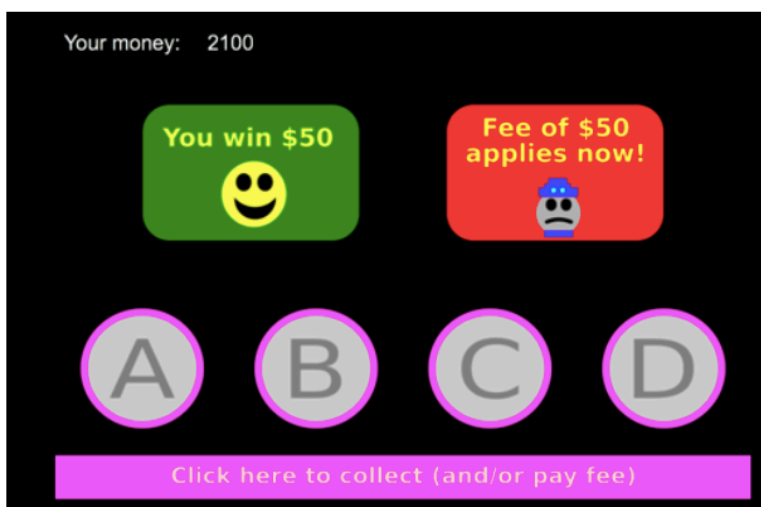
Depending on your choice (A, B, C or D), you will **always win some money**, but sometimes you may also have to pay a **fee to the bank**.

Winning money adds to your money, paying a fee takes from your money.

After each choice, you should click on "Click here to collect (and/or pay fee)" button. This will **adjust your money on the top left-hand corner of the screen**.

After choosing A, B, C or D 100 times, the total of your money will tell us how well you performed in this financial choice task.

At the end of the whole experiment, **you will receive 0,10 € for every \$ 100** of your money left. If you achieved a negative value of your money, **the losses will be written off** and you do not have to pay anything.



Example picture from the task

Please answer the following questions to make sure you understood the task.

1. If you chose A in the first round, are you required to choose B in the second round of 100 rounds?
 - a. Yes
 - b. No



2. If the situation above happens during the task, how much will your money (top left-hand corner) be adjusted by?
 - a. My money will be adjusted by -50
 - b. My money will be adjusted by 0
 - c. My money will be adjusted by +50
3. Let's say that your money is \$ 1,200 at the end of the task. What is going to happen at the end of the study?
 - a. You get 120 € on top on top of the breakfast voucher
 - b. You get 1,20€ on top of the breakfast voucher
 - c. You only get the breakfast voucher |
4. Let's say your money is \$ -500 at the end of the task. What is going to happen at the end of the study?
 - a. You need to pay 5,00 €, but you get the breakfast voucher
 - b. You get 0 € on top of the breakfast voucher
 - c. You do not get the breakfast voucher
 - d. You get 5,00 € top of the breakfast voucher

Extracts from the IGT during the Experiment

Instructions

In this task, you play a "gambling" game. You need to choose one of 4 buttons (A, B, C, or D) with the mouse.

Each time, you can win some money, but you may sometimes also have to pay a fee to the bank. After each trial, you need to collect your money, which will adjust your pot of money.

You start with a loan of **\$2000**.

There are **100** trials (taking 5 minutes or so).

Go on until it stops and see how much you can make on top the loan of \$2000.

Press space bar to start. Good luck!

Instructions

Your money: 2000

You win \$100

A B C D

Click here to collect (and/or pay fee)

Selection of Disadvantageous Decks (A and B)

Your money: 2100

You win \$100

Fee of \$250 applies now!

A B C D

Click here to collect (and/or pay fee)

Your money: 1950

You win \$50

Fee of \$50 applies now!

A B C D

Click here to collect (and/or pay fee)

Selection of Advantageous Decks (C and D)

Your money: 1950

You win \$50

A B C D

Click here to collect (and/or pay fee)

APPENDIX F

Factor Matrix for the TMS

Factor Matrix^a

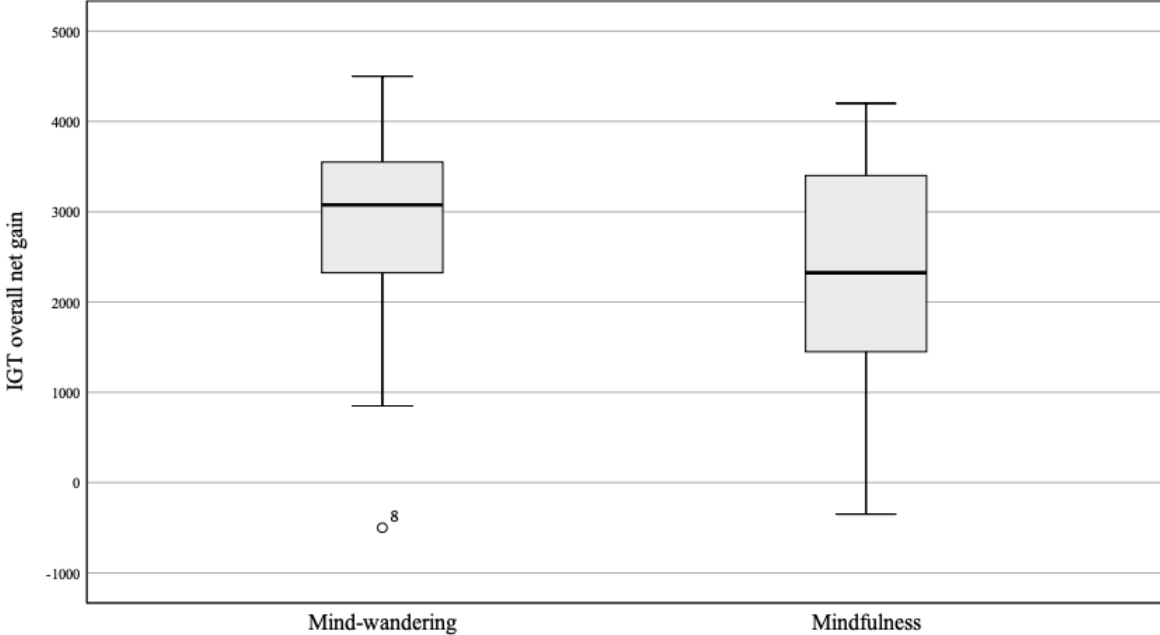
	Factor			
	1	2	3	4
Right now, I experience myself as separate from my changing thoughts and feelings.		0,505		
Right now, I am more concerned with being open to my experiences than controlling or changing the.				
Right now, I am curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings, or sensations.	0,626			
Right now, I experience my thoughts more as events in my mind than as a necessarily accurate reflection of the way things 'really' are.				0,491
Right now, I am curious to see what my mind is up to from moment to moment.	0,461		0,552	
Right now, I am curious about each of the thoughts and feelings that I am having.	0,614			
Right now, I am receptive to observing unpleasant thoughts and feelings without interfering with them.	0,467			
Right now, I am more invested in watching my experiences as they arose, than in figuring out what they could mean.	0,414	0,590		
Right now, I approach each experience by trying to accept it, no matter whether it was pleasant or unpleasant.			-0,515	
Right now, I remain curious about the nature of each experience as it arose.	0,767			
Right now, I am aware of my thoughts and feelings without overidentifying with them.				
Right now, I am curious about my reactions to things.	0,672			
Right now, I am curious about what I might learn about myself by just taking notice of what my attention gets drawn to.	0,785			

Extraction Method: Principal Axis Factoring.

a. 4 factors extracted. 18 iterations required.

APPENDIX G

Boxplot with the IGT Overall Net Gain Between Conditions to Detect Outliers



APPENDIX H

Frequencies of Total Deck A and Deck B Selections Between Conditions

Deck A * Condition Crosstabulation

Count	Condition		
	MFN	MW	Total
Deck A .00	1	1	2
1.00	0	1	1
2.00	1	2	3
3.00	0	2	2
4.00	2	1	3
5.00	0	2	2
6.00	1	0	1
8.00	0	4	4
9.00	1	1	2
10.00	0	3	3
11.00	2	0	2
12.00	2	1	3
13.00	0	2	2
14.00	0	2	2
15.00	1	0	1
16.00	1	2	3
17.00	0	1	1
18.00	1	0	1
19.00	2	1	3
20.00	1	0	1
21.00	1	3	4
22.00	4	0	4
23.00	1	2	3
24.00	0	1	1
25.00	2	1	3
26.00	2	1	3
27.00	1	0	1
28.00	0	1	1
29.00	1	2	3
30.00	3	1	4
34.00	1	1	2
38.00	1	0	1
40.00	2	0	2
45.00	1	0	1
67.00	1	0	1
98.00	1	0	1
Total	38	39	77

DeckB * Condition

Count	Condition		
	MFN	MW	Total
Deck B .00	0	1	1
1.00	2	2	4
2.00	3	2	5
3.00	0	2	2
4.00	0	1	1
5.00	2	1	3
6.00	2	1	3
8.00	2	2	4
9.00	2	0	2
10.00	1	0	1
11.00	0	5	5
12.00	1	0	1
13.00	0	1	1
15.00	1	1	2
16.00	2	1	3
18.00	2	2	4
19.00	1	1	2
20.00	1	1	2
21.00	0	1	1
22.00	3	1	4
23.00	1	1	2
24.00	0	1	1
25.00	4	0	4
26.00	0	2	2
27.00	1	0	1
28.00	0	1	1
29.00	2	1	3
30.00	1	4	5
32.00	0	2	2
34.00	1	0	1
37.00	1	0	1
40.00	1	0	1
52.00	1	0	1
55.00	0	1	1
Total	38	39	77

Note. *MFN* and *MW* represent mindfulness and mind-wandering, respectively.

Frequencies of Total Deck C and Deck D Selections between Conditions

<i>Deck C * Condition</i>				<i>Deck D * Condition</i>			
Count	Condition			Count	Condition		
	MFN	MW	Total		MFN	MW	Total
Deck C 1.00	1	1	2	Deck D .00	2	0	2
2.00	0	1	1	1.00	0	1	1
3.00	0	1	1	3.00	2	0	2
4.00	1	0	1	6.00	1	0	1
10.00	0	1	1	8.00	1	0	1
12.00	2	2	4	9.00	0	1	1
13.00	1	0	1	10.00	1	0	1
14.00	1	0	1	11.00	1	0	1
16.00	1	0	1	12.00	1	0	1
17.00	1	0	1	14.00	0	2	2
18.00	1	0	1	15.00	1	1	2
19.00	0	1	1	16.00	1	0	1
20.00	0	1	1	17.00	2	1	3
22.00	0	2	2	18.00	1	0	1
23.00	0	1	1	19.00	0	2	2
24.00	1	3	4	20.00	1	2	3
25.00	2	3	5	21.00	2	2	4
26.00	2	0	2	22.00	0	4	4
27.00	6	0	6	23.00	1	2	3
28.00	1	0	1	24.00	1	0	1
30.00	1	0	1	25.00	2	1	3
31.00	1	0	1	26.00	2	2	4
32.00	0	1	1	27.00	1	2	3
34.00	1	2	3	28.00	2	1	3
35.00	0	2	2	29.00	1	1	2
36.00	1	0	1	30.00	1	0	1
38.00	2	0	2	31.00	1	0	1
39.00	1	1	2	32.00	2	1	3
40.00	1	1	2	33.00	1	1	2
42.00	2	0	2	35.00	0	1	1
43.00	0	1	1	36.00	0	1	1
44.00	0	1	1	37.00	1	0	1
45.00	0	1	1	38.00	1	1	2
46.00	1	1	2	40.00	0	1	1
49.00	0	1	1	43.00	1	0	1
51.00	0	2	2	44.00	1	1	2
52.00	1	1	2	52.00	0	1	1
55.00	0	1	1	59.00	0	2	2
56.00	0	1	1	64.00	0	1	1
59.00	0	1	1	67.00	1	0	1
63.00	0	1	1	70.00	1	0	1
69.00	1	0	1	79.00	0	1	1
72.00	2	1	3	92.00	0	1	1
83.00	0	1	1	96.00	0	1	1
87.00	1	0	1				
98.00	1	0	1				
99.00	0	1	1				
Total	38	39	77	Total	38	39	77

Note. *MFN* and *MW* represent mindfulness and mind-wandering, respectively.

APPENDIX I

Mediation Analysis for Affect and Temporal Focus Scale

Table 2. Regression Coefficients, Standard Errors and Model Summary Information for Positive Affect, Negative Affect, Temporal Focus Scale Serial Multiple Mediator Model

Antecedent	Consequent															
	M ₁ (PA)		M ₂ (NA)		M ₃ (TFS)		Y (IGT)									
	Coeff.	SE	p	Coeff.	SE	p	Coeff.	SE	p							
X (MFN)	a ₁	.25	.16	.13	a ₂	.14	.61	a ₃	.28	.35	c'	-560.37	234.32	.02		
M ₁ (PA)		-	-	-		-	-				b ₁	-218.97	167.93	.20		
M ₂ (NA)		-	-	-		-	-				b ₂	-136.77	216.49	.53		
M ₃ (TFS)		-	-	-		-	-				b ₃	-100.83	105.83	.34		
Constant	i _{M₁}	2.81	.11	<.001	i _{M₂}	1.43	.10	<.001	i _{M₃}	3.30	.20	i _Y	4149.33	812.23	<.001	
		R ² = .03				R ² = .004				R ² = .01				R ² = .11		
		F(1,75) = 2.30, p = .13				F(2,74) = .26, p = .61				F(3,73) = .89, p = .35				F(4,72) = 2.30, p = .67		

Note. MFN = Mindfulness Condition, PA = Positive Affect, NA = Negative Affect, TFS = Temporal Focus Scale, IGT = IGT overall net gain.

Table 3. Partially Standardized Indirect Effects of Mediators on the Relationship of Mindfulness and IGT Overall Net Gain

Mediators	Bootstrap estimate (SE)	95% Confidence intervals	
		LL	UL
Total	-.04 (.08)	-.18	.14
M ₁ (PA)	-.05 (.05)	-.17	.04
M ₂ (NA)	-.01 (.04)	-.09	.09
M ₃ (TFS)	-.03 (.04)	-.05	.15

Note. PA = Positive Affect, NA = Negative Affect, TFS = Temporal Focus Scale.

APPENDIX J

Mediation Analysis for Attentiveness, Fear, Self-Assurance, Sadness, Fatigue, Serenity

Table 4. Regression Coefficients, Standard Errors and Model Summary Information for Attentiveness, Fear, Self Assurance in the Serial Multiple Mediator Model

Antecedent	Consequent															
	M ₁ (A)		M ₂ (F)		M ₃ (SA)		Y (IGT)									
	Coeff.	SE	p	Coeff.	SE	p	Coeff.	SE	p							
X (MFN)	a ₁	.21	.16	.19	a ₂	.18	.16	.26	a ₃	.20	.51	c'	-548.75	229.64	.02	
M ₁ (A)		-	-	-		-	-	-		-	-	b ₁	-13.15	244.31	.96	
M ₂ (F)		-	-	-		-	-	-		-	-	b ₂	-588.39	257.56	.03	
M ₃ (SA)		-	-	-		-	-	-		-	-	b ₃	-79.05	174.79	.65	
Constant	i _{M1}	3.11	.11	<.001	i _{M2}	1.38	.11	<.001	i _{M3}	3.30	.28	<.001	i _Y	2864.32	898.41	.002
		R ² = .02			R ² = .017			R ² = .01			R ² = .21					
		F(1,75) = 1.76, p = .19			F(2,74) = 1.30, p = .26			F(3,73) = .43, p = .51			F(7,69) = 2.63, p = .02					

Note. MFN = Mindfulness Condition, A = Attentiveness, F = Fear, SA = Self Assurance, IGT = IGT overall net gain.

Table 5. Regression Coefficients, Standard Errors and Model Summary Information for Sadness, Fatigue, Serenity in the Serial Multiple Mediator Model

Antecedent	Consequent															
	M ₄ (S)		M ₅ (FA)		M ₆ (SE)		Y (IGT)									
	Coeff.	SE	p	Coeff.	SE	p	Coeff.	SE	p							
X (MFN)	a ₄	.11	.14	.41	a ₅	-.09	.23	.71	a ₆	.22	.23	.34	c'	-548.75	229.64	.02
M ₄ (S)		-	-	-		-	-	-		-	-	-	b ₄	742.17	249.04	.004
M ₅ (FA)		-	-	-		-	-	-		-	-	-	b ₅	81.61	123.23	.51
M ₆ (SE)		-	-	-		-	-	-		-	-	-	b ₆	-46.94	167.57	.78
Constant	i _{M4}	1.55	.10	<.001	i _{M5}	2.96	.16	<.001	i _{M6}	3.68	.16	<.001	i _Y	2864.32	898.41	.002
		R ² = .01			R ² = .002			R ² = -.01			R ² = .21					
		F(4,72) = .68, p = .41			F(5,71) = .14, p = .71			F(6,70) = .94, p = .34			F(7,69) = 2.63, p = .02					

Note. MFN = Mindfulness Condition, S = Sadness, FA = Fatigue, SE = Serenity, IGT = IGT overall net gain.

Table 6. Partially Standardized Indirect Effects of the Mediators on the Relationship of Mindfulness and IGT Overall Net Gain

Mediators	Bootstrap estimate (SE)	95% Confidence intervals	
		LL	UL
Total	-.05 (.13)	-.26	.25
M ₁ (A)	-.003 (.07)	-.10	.19
M ₂ (F)	-.10 (.10)	-.32	.09
M ₃ (SA)	-.009 (.04)	-.11	.06
M ₄ (S)	.08 (.11)	-.11	.34
M ₅ (FA)	-.007 (.38)	-.11	.06
M ₆ (SE)	-.01 (.05)	-.15	.08

Note. A = Attentiveness, F = Fear, SA = Self Assurance, S = Sadness, FA = Fatigue, SE = Serenity.