ERASMUS UNIVERSITY ROTTERDAM
Erasmus School of Economics

Master thesis submitted to obtain the degree of
Master of Science in Economics and Business, with a specialisation in Behavioural Economics

Mind the Gap
The Influence of Dispositional Mindfulness on Time Preferences

Student Name: Nora Sarah Krier
Student ID Number: 545527

Supervisor: Chen Li
Second Assessor: M. Hainguerlot

Date Final Version: June 29th, 2020.

Preface

Mind the Gap

The Influence of Dispositional Mindfulness on Time Preferences

By Nora Sarah Krier

Abstract

This thesis extends the literature on the effects of mindfulness to its influence on intertemporal decision-making. We first investigate whether an individual's mindfulness trait affects his patience and then if it affects time consistent behaviour. We also look at if a person's capability of exerting self-control mediates the relationship between mindfulness and patience. We measure patience through trade-offs between immediate rewards and rewards available at multiple later points in time. Further we measure mindfulness and self-control using the Mindfulness Attention Awareness Scale (MAAS) and the Elaboration on Potential Outcome Scale (EPO), respectively. We found no correlation between mindfulness and patience and do not expose the potential of self-control on regulating time preferences. Furthermore, contrary to the initial hypothesis, we found more mindful individuals to be less time consistent.

Table of Contents

1. Introduction

Mindfulness is increasingly prominent in private lives as well as industry and academia. Preliminary, mindfulness can be described as a psychological construct often associated with the meditation practices stemming from the eastern world in particular from the Buddhist contemplative traditions[1]. Mindfulness promises to alleviate stress and increase awareness and attention, leading to more self-regulation.

Academic research on mindfulness mostly focused on its efficacy in treating psychological and physiological ailments (Carlson et al., 2007; Khoury et al., 2015; Tang et al., 2015). Of particular interest in the context of this paper is the effect found on certain forms of attention, such as heightened selective and executive attention (Chiesa et al., 2011). Other literature pointed towards the interconnectedness of one of the core competencies of mindfulness, namely patience (Kabat-Zinn, 2003). For the purpose of this study, patience can be described as an inherent ability that steers our reactions when faced with intertemporal decisions and keeps us from being impulsive by being able to wait for the larger reward.

In light of those terms, this study aims to find a possible relation between mindfulness and the ability to be patient and time consistent. More specifically, a positive relation is hoped to be found, that is mediated by the ability to exert self-control. Therefore, the following research question is formulated:

"Does dispositional mindfulness affect intertemporal preferences?"

Every day, people have to face decisions, which can concern various subjects, and range from little importance to being crucial. While facing those, one has to deal with benefits, consequences, and one's own needs and wants. More often than not, those do not align, and frictions can occur. People often face trade-offs between present and future benefits, whether it concerns giving in to one's addiction, or consumer choices. It might be the case that choosing the immediate benefit and forgo the future one is rational, yet in many cases it is not. An attribute of patience is the ability to wait for larger rewards over time. However, decisions

[1] The term contemplative traditions originated from Shapiro et al., (2006)

about present and future benefits are not only about patience but also concern temporal discounting. This notion describes how people may view the "now" as more important, thus it appear to affect the amount of patience and time consistency that people display.

Outline

This paper starts with a theoretical framework, describing the notions of mindfulness, patience and self-control. It deals with their origin and current academic findings while the relevance for this research will be discussed further in this work when a conceptual model and the relevant hypotheses will be described. Thereafter, chapter four describes the methodology adopted, explaining how data was collected, followed by the chapter 5, which lays out the results of the data analysis. Chapter 6 concludes with a discussion of the results, limitations and future research implications of this work.

2. Theoretical Framework

This chapter introduces the concepts and explains their relationship based on the research question *"Does dispositional mindfulness affect intertemporal preferences?"*. The next sections define the aforementioned constructs, i.e. dispositional mindfulness, intertemporal decisions, and the hypothesised mediation effect of self-control. Later this chapter examines the relevant literature and argues for the interconnectedness of these concepts.

A terminological note is in order. In the next pages, some terms will be used interchangeably. Mindfulness, dispositional mindfulness (henceforth DM) and trait mindfulness hereby refer to the same meaning and will be used and explained throughout the paper. Additionally, referring to the central theme of patience, different terms will be used, such as intertemporal choices, decisions, preferences or impatience.

Dispositional Mindfulness

Mindfulness has often been linked to the practice of meditation, e.g. a spiritual state within the Buddhist tradition. In recent times, however, mindfulness has been decoupled from its spiritual roots and has become more relevant in the literature as a research construct. Each individual is capable of being mindful, such that "we are all mindful to one degree or another" (Kabat-Zinn, 2003, p. 145). The cultivation of mindfulness can be practised through interventions that are rooted in the practice of Buddhism, such as mindful meditation (Baer et al., 2004). It is suggested that through "regular practise of mindful meditation" positive attributes can be harnessed such as compassion, awareness and insight (ibidem 2004, p. 191).

However, one must note the difference between meditation and mindfulness, which has been confounded by the use of these terms in popular culture. The crucial distinction is that the former is a practice while the latter is a state of mind so that meditations is but one of the ways to achieve and cultivate mindfulness. For the purpose of this work, the relevant construct is mindfulness, regardless of the way in which it is achieved.

The Origin of Mindfulness

There are currently two schools of thought concerning mindfulness, attributed to Kabat-Zinn and Langer. On the one hand, the former is said to be the originator of the concept of mindfulness as it is known in the eastern world. He defines it as "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003, p. 145). His idea hinges on the Buddhist tradition and builds upon mindfulness meditation. It encompasses self-regulation of awareness, that is being able to direct one's attention towards external and internal stimuli, being non-judgmental and being aware of one's thought process (Hart et al., 2013). He contrasts mindfulness to the nonconscious state that guides our actions with limitations and an undisciplined mind and argues that mindfulness requires self-regulation and discipline.

In 1979, Kabat-Zinn developed a program, the mindfulness-based stress reduction program (MBSR), to "develop self-regulatory skills among patients for the relief of physical and psychological disorders, through daily practice of mindfulness meditation" (Hart et al., 2013, p. 456). In his works, he not only focuses on the notion of mindfulness but also on a structured methodology to attain it via the practice of meditation. He describes nine attributes which lay the foundation for being mindful, one of which is patience. Such an attribute needs to be cultivated and nurtured in order to grow one's mindfulness capabilities. According to Kabat-Zinn, patience gives people the possibility to acknowledge where they actually are in a specific moment and allows people to appreciate that certain things unfold in their own time, and cannot be rushed (Recovered Mindfully, 2015).

On the other hand, Langer (Langer & Moldoveanu, 2000, p. 2) conceptualises mindfulness as a mode of one's thoughts and consciousness defined by a "heightened state of involvement and wakefulness". Across her works, Langer contrasts mindfulness with mindlessness, defined as the superficial and habitual thought process that we experience throughout the day. It can be described as "running on autopilot", and while that can be beneficial to a certain degree, for it gives us more space in our minds to put our effort where needed, it can be harmful to other cognitive functions and our well-being. However, Langer also emphasises that mindfulness requires more than the absence of mindlessness. It involves (a) the ability to exert self-control over predisposition and automatic responses; (b) the ability to be aware of external stimuli; (c) the ability to actively engage with them (Hart et al., 2013).

The purpose of mindfulness in Langer's conceptualisation, "is to increase cognitive and behavioral control, thereby facilitating people's capacity to tolerate uncertainty, to be less reactive and more flexible, and to experience a more meaningful engagement with their environments" (ibidem 2013, p. 454). More recently, Langer links mindfulness with the effort of being creative. She argues that mindfulness fosters cognitive processes such as flexibility, curiosity, awareness or convergent thinking, which are conducive to creativity (ibidem 2013).

The comparison between the eastern school of thought of Kabat-Zinn and the western view of Langer brings their similarities and differences forward. Both emphasise the importance of self-regulation and awareness of one's external surrounding in contrast to the state of mindlessness. However, they differ in some instances, Kabat-Zinn accentuates the metacognitive process of accepting and gives a method to practice mindfulness, while Langer focuses more on the deliberate awareness of external stimuli and the role of creativity (Hart et al., 2013).

Table 1 shows a list of recent definitions of mindfulness from various authors. They all draw upon the same deep-rooted understanding of awareness but show different viewpoints in recent literature.

Table 1.

List of Definitions

Definition	Author
"bringing one's complete attention to the present experience on a moment-to-moment basis."	(Marlatt & Kristeller, 1999, p. 68)
"A receptive attention to and awareness of present moment events and experience."	(Brown et al., 2007, p. 212)
"Being attentively present to what is happening in the here and now."	(Herndon, 2008, p. 32)
"A mode, or state-like quality, that is maintained only when attention to experience is intentionally cultivated with an open, non-judgmental orientation to experience."	(Lau et al., 2006, p. 1447)

Based on the widely accepted work by Brown and Ryan (2003), this study maintains the distinction between mindfulness as (1) a trait, also known as dispositional mindfulness and (2) a state. As a trait, it refers to the inherent ability of a person, and the predisposition to exert mindfulness, that stays rather stable throughout their life but can be enhanced through mindfulness practice (Quaglia et al., 2016). A person with a higher mindfulness predisposition is more attentive and aware of their surroundings and inner feelings than a person with a lower predisposition. As a state, mindfulness refers to a momentary ability to exert mindfulness, that can be assessed after having undergone a mindfulness intervention of some sort, like meditation. This analysis focuses on the level of trait mindfulness.

The Interest in Mindfulness

The recent surge of research related to the effects of mindfulness has made clear that there is an increased interest in the concept by researchers and people in their everyday lives. A higher mindfulness disposition poses several health benefits. For instance, a paper by Tomlinson et al. (2018), identified three major psychological health themes that are linked to the effects of mindfulness. First, psychopathological symptoms such as depressive tendencies and anxiety are found to be negatively related to dispositional mindfulness (see, e.g. Bakker & Moulding, 2012; Deng et al., 2014; Jimenez et al., 2010; Raphiphatthana et al., 2016; Tan & Martin, 2016; Woodruff et al., 2014). Similarly, DM negatively relates to eating disorders (see, e.g. Lavender et al., 2009, 2011; Parisi et al., 2012; Pidgeon et al., 2013).

Secondly, a higher DM is inversely related to several cognitive processes, illustrated by the negative relation between DM and rumination (Alleva et al., 2014) or neuroticism (Wenzel et al., 2015). Finally, a higher DM has been found to have a positive impact on emotional regulation concerning stress or uncertainty leading to higher well-being (Bluth & Blanton, 2014; Coffey & Hartman, 2008).

In general, DM has been associated with higher subjective well-being. Likely because mindfulness enhances awareness and attention, which - in turn - appear to promote well-being. These are essential factors contributing to the ability to recognise and detect one's feeling and emotions in order to handle them appropriately. Further, in a recent study Fetterman et al. (2010) emphasised the role of mindfulness in effective self-regulation, which correlates highly with the inherent ability to be patient. However, in order to understand the value of mindfulness

and its relevance to a person's level of patience, the influence of mindfulness on emotion regulation or broadly speaking self-regulation, needs clarification.

Similarities of Mindfulness and Emotion Regulation

While emotion regulation and mindfulness first seem contradictory, there are points of contact. Gross describes *emotion regulation* "as a process by which individuals influence what emotions they have when they have them, and how they experience and express them" (Gross, 1998; as cited in Kobylińska & Kusev, 2019, p. 2). Gross (1998) differentiates between two dimensions; namely, *antecedent focused emotion regulation* and *response-focused emotion regulation*. The former describes the practice of altering emotions before they occur through *situation selection, situation modification, attentional deployment* and *cognitive change*, the latter focuses on the emotion after it occurred and touches upon strategies to *intensify, diminish, prolong* or *curtail* the generated emotions.

In the context of the latter case, a study by Lazarus and Folkman (1984) found *positive appraisal*, which is the practice of attributing "a positive valence to experience," to be a strong emotion regulating practice. While this seems at first glance to describe the opposite of mindfulness, which is inherently described as non-judgmental and decentred awareness and attention, there are some similarities. As Garland et al. (2009) put it "Positive reappraisal is a critical component of meaning-based coping that enables individuals to adapt successfully to stressful life events. Mindfulness, as a metacognitive form of awareness, involves the process of decentering, a shifting of cognitive sets that enables alternate appraisals of life events" (p. 1). Another study also notes that mindfulness is positively associated with positive reappraisal (Hanna et al., 2014).

The Value of Mindfulness on Decision Making

While the previously mentioned studies showed that mindfulness has a link to emotion regulation, other studies showed that the latter also has a positive link to decision making. For example, Fenton-O'Creevy and his co-authors (2011) show that high performing financial traders have a higher capability of emotional regulation. In the same manner, Loewenstein and Lerner (2003) find that *immediate emotions* that are felt at the decisive moment can influence choices tremendously and falsify people's judgement. In line with these findings, it is reasonable to assume that emotion regulation is beneficial for the decision making process.

Nevertheless, a few studies deal with the relation of mindfulness and decision-making directly. Karelaia and Reb (2015), argued for an influence of mindfulness in regards to each stage of a high-quality decision-making process. For instance, a higher DM increases *goal awareness*, thus it enhances decision consistency with one's objectives and is likely to ease decision implementation through the mechanism of downsizing the intention-behaviour gap (Chatzisarantis & Hagger, 2007). Other relevant papers argue in favour of the performance-enhancing effect of mindfulness in decision making differently. Hölzel et al. (2011) state that mindfulness has a positive effect on our memory processing and learning. Furthermore, Lakey et al. (2007) find a positive association between DM and recognition of risk.

An additional path in which DM and decision-making are interconnected is by the positive effect on self-control (self-regulation). "The attention and awareness that are central to mindfulness are (…) believed to be essential for detecting discrepancies between current states or levels of functioning" (Bowlin & Baer, 2012, p. 411). This, in turn, fosters actions to reduce the discrepancy (Ibidem 2012). Furthermore, high DM leads to more structured behaviour when confronted with unpleasant situations or decisions, that can be traced back to the strengthened ability to observe our thoughts and feelings (Hayes et al., 2011).

On this basis, it is possible to grasp why current research is becoming more interested in exploring DM and its multifold effects. Mindfulness is an inherent ability, which affects where one directs her attention to and how she regulates herself to nonjudgmentally observe her course of action. While self-control at first hand seemed to be contradictory to this, it has been shown that being mindfulness does not mean letting oneself go and lose control. Rather it enhances self-control in a non-restrictive manner and influences the way one takes decisions.

Intertemporal Choice

> *Intertemporal choices - decisions involving trade-offs among costs and benefits occurring at different times- are essential and ubiquitous. Such decisions not only affect one's health, wealth, and happiness but, may also, as Adam Smith first recognised, determine the economic prosperity of nations (Frederick et al., 2002, p. 351).*

The trade-off between eating a healthy snack and an unhealthy one can be considered an intertemporal choice. The immediate pleasure of indulging in the former is the reward now, while the latter with its long term health benefits, symbolises the later reward. Consequently, the trade-off consists of the difference in rewards (consequences) occurring at different times. Similarly, the choice between getting 10€ today or waiting and getting 15€ a week from now is an intertemporal choice. The concept can be applied to various situations, where two rewards or consequences are faced at different points in time (Read, 2004).

Intertemporal choices have been a focal point for various disciplines, such as economics and psychology. The first to describe the concept was the Scottish economist John Rae, with the help of psychological notions (Frederick et al., 2002). Tversky and Kahneman (1992) suggested that individual economic behaviour is influenced by impatience, and since then, numerous studies have shown the relation between cognitive abilities, rationality, self-control or patience, to economic behaviour. While most research covers how intertemporal decisions are taken, the way in which our attributes and cognitive abilities influence and help us make rational decisions has not been studied extensively. In this instance, rational decisions reflect taking actions that ensure maximisation of an individual's utility.

In order to measure intertemporal or simply put one’s patience or impatience, a few models have been proposed that allow quantifying a discount rate, showing the rate at which people discount the future. The following section elaborates on these methods and explains how intertemporal preferences are measured.

Discounting Models

The view on intertemporal decisions changed with the introduction of the discounted utility (henceforth also, DU) model by Paul Samuelson (1937). He attempted to quantify the relationship between immediate and delayed reward by assuming that all underlying parameters to the intertemporal choice can be combined into one parameter – the discount rate. Due to its simplicity, the model was and still is widely accepted and used. Even though Samuelson voiced concerns about the normative and descriptive validity of the model, policymakers make use of this simplified form of assessing the discount rate and have adopted it as a normative measure. The model takes the form of

$$U^t(c_t \dots, \dots, c_T) = \sum_{k=0}^{T-t} D(k)u(c_{t+k}),$$

where

$$D(k) = (\frac{1}{1+p})^k.$$

In this formula, $u(.)$ is the utility function over the consumption c_t at time period t. $D(k)$ is the individual discount function, that is "the relative weight [an individual] attaches in period t, to the well-being in period t+k" (Frederick et al., 2002, p. 355). The function p represents the individuals discount rate, the present value of something that will be received in the future.

The DU model makes six assumptions that are enumerated below;

1. Agents prefer a payoff sooner rather than later.
2. The discount factor is constant over time.
3. Total utility is the sum of discounted utility of each period.
4. Independence of consumption, such that consumption in one period does not affect consumption in another period.
5. Constant utility function across time, such that preferences do not change over time.
6. Independence of discounting from consumption, such that discounting is the same for different types of consumption

The constant discount factor assumptions leads to exponential and dynamically consistent discounting, simply describing that intertemporal preferences do not change over time. This phenomenon is called time consistency or dynamic consistency and is part of rational choice theory; it assumes that the weight placed on a specific utility remains the same

over time. Empirical data, however, shows that people tend to change their preferences over time, hence are time-inconsistent, and their discount rates decline over time. This phenomenon is often referred to as *decreasing impatience* (*common difference effect)* (Musau, 2009). There are other inconsistencies with the DU model that give reason to believe that the discount factor is not constant over time.

For instance, the *magnitude of payoff effect*, this is because the DU model does not make a distinction between the magnitude or size of a specific payoff, however empirical evidence suggest that people discount lower amounts more (Thaler, 1981). Another example is the *sign effect*, because the DU model does not differentiate between gains and losses. Again, empirical evidence suggests the opposite, namely that people discount losses at a lower rate than gains (Thaler, 1981).

A fourth issue is the *delay-speed up asymmetry* which describes the inequality between the preference of delaying or speeding up consumption. Loewenstein and Prelec's study (1992) showed that "the amount required to compensate for a delaying receiving a reward by a given interval, from *t* to *t+s*, was from two to four times greater than the amount subjects were willing to sacrifice to speed consumption up by the same time interval" (p. 578). Finally, a fifth anomaly is the *preference over-improving sequence* phenomenon, which "contradicts the DU model's positive rate of time preference assumption" (Musau, 2009, p. 16).

Having enumerated the critiques of the DU model, the alternative models will be discussed starting with the hyperbolic models. The hyperbolic models account for impatience regarding rewards that are received sooner, and for declining discount rates over time. They are characterised by a relatively higher discount rate for shorter time horizons and low discount rates for long time horizons. This refers to the decreasing impatience, addressed earlier (Musau, 2009). Generally, they take the form of

$$U^t(c_t \dots, \dots, c_T) = \sum_{k=0}^{T-t} D(k)u(c_{t+k}),$$

where

$$D(k) = \prod_{n=0}^{k-1}(\frac{1}{1+p_n}).$$

The same definitions of the terms apply as elaborated on before, with the difference that the discount function has changed and the discount factor is no longer constant over time but represents one's discount rate per period n such that p_n is declining in n. This implies dynamic inconsistency because the utility is now discounted inconsistently over time. This takes into account that preferences change over time. To illustrate this, if an individual prefers a relatively large reward (option B) in 3 weeks over a relatively smaller reward (option A) in 1 week and simultaneously prefers a relatively smaller reward (option A) today over a relatively larger reward (option B) in 2 weeks, then this individual's preferences are dynamically inconsistent. It implies that an individual's preferences change, as the moment of reward approaches, being consistent with the notion of decreasing impatience (Frederick et al., 2002).

Finally, one model that combines hyperbolic discounting and exponential discounting is the quasi-hyperbolic discounting model, first introduced by Phelps and Polak (1968). It combines them in that it accounts for the present bias when discounting the present but discounts according to exponential discounting when it concerns the future. This implies that for the imminent future, or very short period, the discount rates will be hyperbolic and after that time horizon has been reached, they will be exponential. Frederick et al., (2002), empirically show that this model captures human behaviour the most accurately. Simply put, it describes an individual who is patient in the long-run but impatient in the short-run. The Quasi-hyperbolic model takes the following form.

$$U^t(c_t \dots, \dots, c_T) = \sum_{k=0}^{T-t} D(k)u(c_{t+k}),$$

where

$$D(k) = \begin{cases} 1 & if \ \ h = 0 \\ \beta\delta^k & if \ \ k > 0 \end{cases}.$$

Again, as with the models before, $u(.)$ is the utility function over the consumption c_t at time period t and $D(k)$ the discount function. Here the difference lies in the per period discount rate. For the imminent choice between now and the next future moment in time, the discount rate is as follows $\frac{1-\beta\delta}{\beta\delta}$. Whereas the discount rate between any two periods (not including now), $\beta = 1$ such that it becomes $\frac{1-\delta}{\delta}$. This shows that dynamic inconsistency is

accounted for in the first period but not in the following ones and when $\beta = 1$, it becomes identical to the exponential DU model. Hence, the variable β represents the present bias.

Generally, the hyperbolic and quasi-hyperbolic functions are said to be a more accurate representation of human behaviour. However, this statement still faces much controversy in the research world and is still disputed and discussed over, as individuals show different behaviour and no one model can account for all. This study adopts the DU for its general acceptance and simplicity. However, it is noted that people differ in the way they discount the future and that discount rates can vary between subjects such as money or health.

The Relationship of Self-control, Mindfulness and Patience

The subjective discount rate of an individual tells us about their patience or impatience vis-à-vis certain intertemporal decisions. Studies exist that cover a range of different ways in which people discount, but the question arises of which circumstances or abilities influence our patience. Baumeister and Heatherton, (1996) show that one factor that differentiates people's level of patience and influences it is their ability to exert self-control. Self-control or self-regulation is described as the process in which an individual *initiates, adjusts* or *terminates* an action to attain a goal (Nenkov et al., 2008). It encompasses three essential processes, first having a clear idea of how things should be, second being able to compare one's state to their desired state and third and final being able to change if the current state does not correspond to the desired one (Carver & Scheier, 2001).

The ability to exert self-control poses various advantages for the individual as well as society. Scientific evidence suggests that it is positively correlated with individual well-being (Gailliot et al., 2007; Tangney et al., 2004) likely because it helps to comply with social norms and uphold shared values, which will ease social life and increase psychological well-being. Other domains exist where self-control shows positive effects, that are worth mentioning. First, self-regulation is positively correlated with better task performance (Mischel et al., 1988; Shoda et al., 1990) and display of morality and better interpersonal relations, all of which are socially desirable behaviours. Secondly, it is positively correlated to socially desirable personal attributes such as conscientiousness (Fee & Tangney, 2000). Lastly, it negatively relates to socially undesirable behaviours such as aggression, anger and criminal behaviour (Gottfredson & Hirschi, 1990; Kochanska et al., 2000; Pulkkinen & Hamalainen, 1995)

The theories on why people lose the ability to control themselves are numerous, but some noteworthy ones are brought forward by Hoch and Loewenstein (1991) and Baumeister and Heatherton (1996). The former treats the specific case of consumer self-control, and identifies *desire* and *willpower* as influencing factors explaining why individuals engage in time-inconsistent behaviour. That is namely behaviour that will be regretted afterwards and displays dynamic inconsistency explained beforehand. The latter gives a different explanation for the lack of self-regulation. In this case, the ability to transcend from the short term to long term goal plays a key role. People can have a tendency to show conflicting urges, such as eating healthy for long-term health but wanting a high-calorie dessert for the momentary pleasure. The concept of the intention-behaviour gap explains why we sometimes fail at exerting self-control but goes beyond the scope of this research.

It might also be the case that people are not actively aware of their inconsistent behaviour, and do not realise when they are in control of themselves or not. From (Strotz, 1955), it is known that this divergence may be prone to cause problems in self-regulation, such as addiction or obesity (Bleichrodt et al., 2016). This phenomenon also touches on the distinction between a naïve or a sophisticated person, which differentiates between an individual that is aware of their future preferences and one that is not (Loewenstein & Prelec, 1992). Since DM likely increases awareness and attention as it may help to exercise self-control as it "inhibits distraction from intrusive thoughts" (Baumeister & Masicampo, 2007, p. 257).

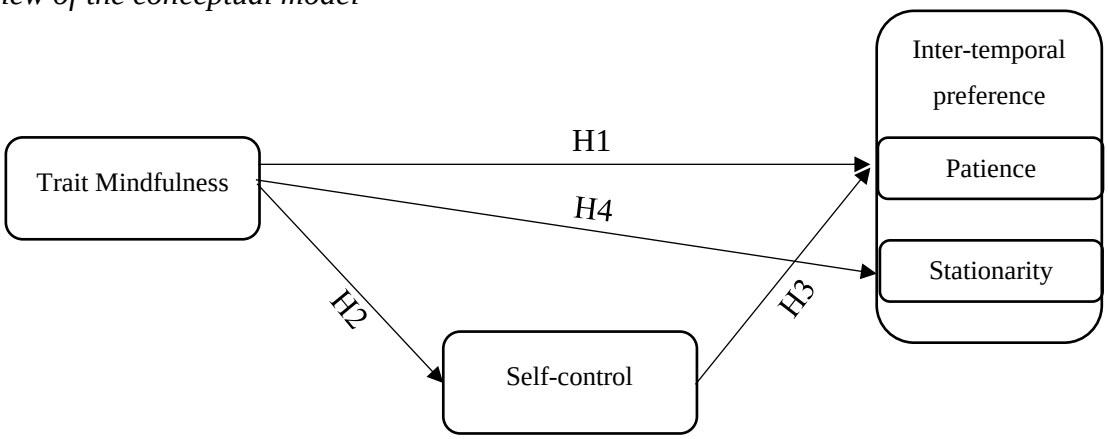
The relation between mindfulness and self-control can even be connected with the dual system theory developed by Daniel Kahneman (2012). According to the dual processing theory, there are two thought processes, system 2 and system 1. System 2 is responsible for regulating our attention and not letting our impulses take over so that "System 2 is in charge of self-control" (Kahneman, 2012, p. 26). System 1, in contrast, is responsible for snap decisions and immediate problem-solving based on heuristics. Being mindful makes use of our system 2, in that it influences our automatic response behaviour of system 1 by bringing non-judgemental attention to it (Ostafin et al., 2012).

3. Hypotheses

After building the theoretical framework with all the relevant information and components, the conceptual model is illustrated below. The model builds on previous academic findings and combines the field of dispositional mindfulness with intertemporal preferences mediated by the ability to exert self-control.

Figure 1

Overview of the conceptual model



This study anticipates that self-control significantly mediates the relation between trait mindfulness and patience. This corresponds to a mediation analysis and to study this, the first three hypotheses are formed. First, a higher level of mindfulness predisposition is related to more patience in intertemporal decisions (H1). Second, a higher level of mindfulness predisposition is related to more self-control (H2). Third, if those relations can be confirmed, it can be tested if self-control significantly mediates the relation between trait mindfulness and patience (H3). Lastly, a hypothesis that is independent of the mediation analysis is that a higher level of mindfulness predisposition is related to more time consistent behaviour (H4).

Besides the analysis of the main variables enumerated above, several control variables will be considered. These are gender, age, nationality, education and the level of contact a person has had with mindfulness practices. In addition, a person's financial situation and the difficulty of answering the questions have been controlled for in order to eliminate individuals from the sample that could potentially be outliers. The exact procedure will be explained in the following chapter.

4. Methodology

This chapter describes the research design and explains the details regarding the data collection and measurements. Then, it provides a description of the statistical methods employed to find an answer to the research question "Does dispositional mindfulness affect intertemporal preferences?"

Research Design

In order to answer the research question and the ongoing hypotheses, a self-administered questionnaire set-up has been chosen. It is important to note that dispositional mindfulness, as opposed to mindfulness, is a trait that people inherently possess, which cannot be manipulated by a short intervention; in the same way, self-control can only be formed over time, and while a short manipulation could potentially have a short-time effect, this was not the purpose of this work.

The set-up consists of an online administered survey measuring our previously explained variables. This leads to a relatively low internal validity as the experiment is not performed in a controlled environment with a manipulated independent variable. However, it promises a relatively high external validity as it is closer to depicting the real world, precisely because nothing is manipulated (Price et al., 2017).

Data collection

In order to answer the research question, primary data was used as it poses many advantages over secondary data use. A questionnaire with four sections was designed, distributed, and convenience sampling was executed. The first section elicited the individual discount factor, followed by the sections measuring the mindfulness and self-control level, which will be thoroughly explained in the following paragraphs. The last section incorporated the control questions and asked about the demographics of the participant. The online survey was built in the platform Qualtrics and diffused using various social media channels including Facebook, LinkedIn and WhatsApp. Due to the fact that the time-discounting questions concerned monetary decisions, the survey participation was limited to individuals 18 years or older. This ensures that the concept of earning, spending or saving money is familiar to the participant.

To increase survey participation, a monetary incentive was provided. The participants had the option to provide their e-mail address at the end of the questionnaire to enter a prize draw, allowing them to win one of two vouchers for a 20€ Amazon gift card. The incentive was not conditional on the response but solely on the participation (Edwards et al., 2002). While some sources say that a monetary incentive for online survey recruiting can lead to low-quality responses (Shatz, 2016), other studies find that it does not negatively influence the quality of the results (Samuels & Zucco, 2012).

Measurements

Dependent variable - Patience

In order to gather insights about an individual's patience, or willingness to wait, a subjective discount rate has to be elicited[2]. The subjective discount rate is the rate at which an "individual is willing to trade current consumption for future consumption" (Coller & Williams, 1999, p. 107). Simply put, it tells us the rate at which a person discounts the future. Numerous studies have used similar methods to elicit a subjective discount rate (see, e.g. Coller & Williams, 1999; Horowitz, 1991; Loewenstein, 1988; Thaler, 1981), which all proved fruitful.

In this particular study, a total of 5 questions have been used to elicit and construct a subjective discount rate. All questions concerned a positive monetary amount to be received and followed the wording, "*would you like to receive 100€ at point T or 100€ + x at point T+t."* Each question consisted of a set of 16 choices following the logic of a multiple price list (MPL) depicted in Figure 2, which represents a typical question format. A subject had to decide for each row which option to choose. Note that the option on the left (Option A) consecutively stays the same and that only the right option (Option B) improves. Once the subject preferred Option B, this choice was taken as a switching point.

To avoid the elicitation of an interval, a modification to the method was undertaken. In other words, if a subject chose Option A for four times in a row and chose Option B in the fifth row, then the switching point used in the calculation was taken as the mean between the fourth

2. We employed the exponential discounted utility model to calculate the subjective discount rate.

and fifth row. In this specific case, it would mean the switching point would be 135€. This number is taken into the calculation for the discount factor, which in turn is taken as a measurement for the discount rate, which calculated according to exponential discounting, is then 10.52%. A higher discount rate corresponds with higher impatience, as it shows a higher preference for immediate reward compared to a delayed reward.

An MPL format proposes many advantages. It is relatively easy to understand and transparent for the participant and provides an incentive for truthful answers (Andersen et al., 2006). However, it has a few disadvantages, such as that it only elicits intervals and that it is susceptible to framing effects.

Figure 2

Typical Question Format - Intertemporal choice

		Option A	Option B	
1	100€ Today			100€ in 3 Months
2	100€ Today			110€ in 3 Months
3	100€ Today			120€ in 3 Months
4	100€ Today			130€ in 3 Months
5	100€ Today			140€ in 3 Months
6	100€ Today			150€ in 3 Months
…	…			…
16	100€ Today			250€ in 3 Months

The first three of the five questions did not incorporate a front-end delay, meaning *T* referred to the present moment (today). The delay in time for each question was chosen as 3, 6 and 12 months, to elicit a short-term monthly discount rate.

Dependent Variable – Time Consistency

In order to gather information on the time-inconsistent or consistent behaviour of the participants, two out of the five questions had a front-end delay of one month with the latter option (Option B) delayed by one month as well, resulting in 4 and 13 months. In practice, this takes the form of Figure 3. A comparison is possible because the time interval between Option A and Option B remains the same.

Figure 3

Typical Question Format – Time Inconsistency

		Option A	Option B	
1	100€ in 1 Month			100€ in 4 Months
2	100€ in 1 Month			110€ in 4 Months
3	100€ in 1 Month			120€ in 4 Months
4	100€ in 1 Month			130€ in 4 Months
5	100€ in 1 Month			140€ in 4 Months
6	100€ in 1 Month			150€ in 4 Months
…	…			…
16	100€ in 1 Month			250€ in 4 Months

In a later stage, to quantify time-inconsistent and time consistent behaviour, a binary variable is constructed. The variable takes value "1" when the person behaves time consistent in that his preferences do not change over time. If however, the participant behaves time-inconsistent and his preferences change, the variable takes the value "0".

Independent variables

One of the two main independent variables is the level of dispositional mindfulness of an individual. In order to quantify it, the Mindfulness Attention Awareness Scale (MAAS) by Brown and Ryan (2003) is used. The MAAS is a self-reported scale of measurement that evaluates the frequency of so-called mindful moments over time. It attempts to capture the self-regulatory aspect of being mindful and is "focused on the presence or absence of attention to and awareness of what is occurring in the present rather than on attributes such as acceptance, trust, empathy, gratitude" (Brown & Ryan, 2003, p. 824). It has also been shown to have predictive power over well-being and self-control, as explained in the second chapter. The MAAS compromises 15 statements measured originally on a 6 point Likert scale ranging from almost always (1) to almost never (6). For the purpose of convenience and unity, a 7 point Likert scale was adopted in this study.

The validity of the MAAS has been proven numerous times by Brown and Ryan (2003) through the employment of different studies and a reliability-analysis of the construct resulted in a Cronbach's alpha of 0.844. Although other scales for measuring mindfulness exist, the MAAS was selected due to the following reasons. First, simplicity because it requires

calculating the mean score of the 15 statements. Second, the level of complexity fits this study due to time constraints. Lastly, purity because it is a measure of trait/dispositional mindfulness and does not combine state and trait or meditational measures. The statements are provided below in Figure 4.

Figure 4

MAAS Questionnaire

1	I could be experiencing some emotion and not be conscious of it until sometime later.
2	I break or spill things because of carelessness, not paying attention, or thinking of something else.
3	I find it difficult to stay focused on what's happening in the present.
4	I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
5	I tend not to notice feelings of physical tension or discomfort until they really grab my attention
6	I forget a person's name almost as soon as I've been told it for the first time.
7	It seems I am "running on automatic" without much awareness of what I'm doing.
8	I rush through activities without being really attentive to them.
9	I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there.
10	I do jobs or tasks automatically, without being aware of what I'm doing.
11	I find myself listening to someone with one ear, doing something else at the same time.
12	I drive places on "automatic pilot" and then wonder why I went there.
13	I find myself preoccupied with the future or the past.
14	I find myself doing things without paying attention
15	I snack without being aware that I'm eating.

The second independent variable is a measure of self-control. For this purpose, the Elaboration on Potential Outcomes Scale (EPO) designed by Nenkov et al. (2008) was used. The scale captures a predisposition of thinking about the future consequences of actions and relates to individual self-control when confronted with different choices. Initially, the scale is made up of a total of 13 statements, divided into three sections: the general evaluation, the positive outcome focus and the negative outcome focus. Due to the scope of this research, only the general evaluation section was retained and used for further analysis. The six remaining statements were evaluated on a 7 point Likert scale varying from strongly agree (1) to strongly disagree (7). The reliability analysis of the sub-scaled yielded a Cronbach's alpha of 0.931, which is well above the 0.7 threshold. Figure 5 presents the final six questions that participants encountered and were used in the analysis.

Figure 5

EPO Questionnaire

1	Before I act I consider what I will gain or lose in the future as a result of my actions.
2	I try to anticipate as many consequences of my actions as I can.
3	Before I make a decision I consider all possible outcomes.
4	I always try to assess how important the potential consequences of my decisions might be.
5	I try hard to predict how likely different consequences are.
6	Usually I carefully estimate the risk of various outcomes occurring.

Control variables

In addition to the dependent and independent variables, a number of control variables were measured to control for various influences, namely, gender, age, education level, nationality, the level of contact with mindfulness practices and the current financial situation. The latter two were included to control for people who actively practice mindfulness training and to control for the absolute need of 100€, which was the starting amount used in the intertemporal decision questionnaire. Age, gender and nationality were selected based on the paper that provided the measurement scale for dispositional mindfulness (Brown & Ryan, 2003), as those factors can have an active role in influencing a person's level of mindfulness. Education was taken into account based on the fact that it stands in high correlation to cognitive ability (Parisi et al., 2012), which in turn are influenced by the exerted level of mindfulness according to Langer.

To control for individuals who had difficulties answering the intertemporal preference questions, two control questions were integrated, asking how challenging they found the questions and how certain they were about their answers. Overall the results (Figure 6 and Figure 7) show that the intertemporal choice questions did not pose too many problems for the participants. Over 60% found the questions not challenging or slightly challenging, while only 7% found them very challenging. Furthermore, over 60% are very certain of their answers, and only 6% are not certain at all. These questions were used to detect people who might have had difficulties with the questionnaire and be able to analyse the specific cases in more detail.

Figure 6

Level of the perceived difficulty of the intertemporal choice questions

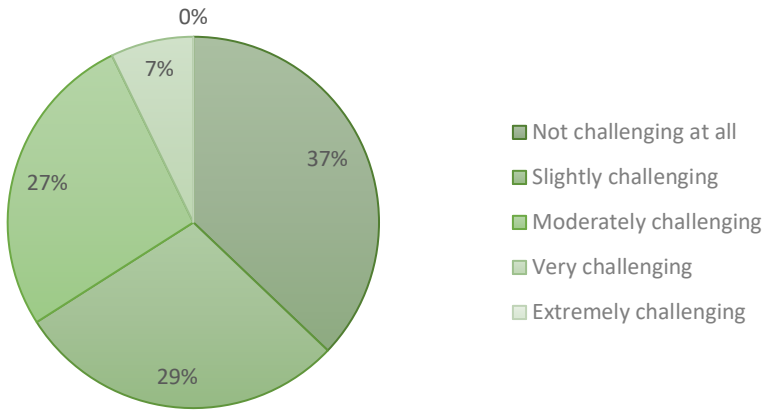
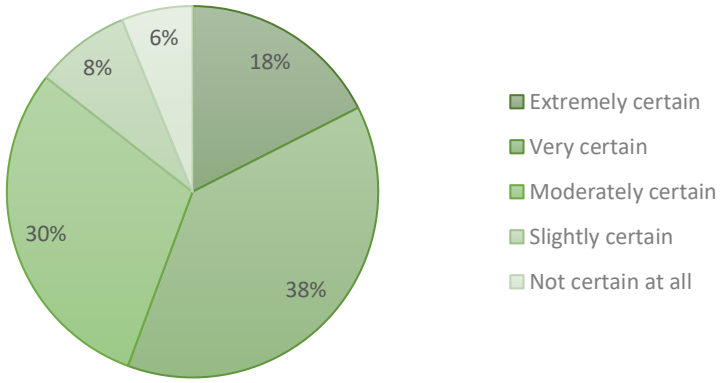


Figure 7

Level of certainty of answers to the intertemporal choice questions



5. Results

This chapter presents the statistical analysis and its outcome. First, it elaborates on the descriptive statistics of the sample, and then it describes the handling of the raw data. Thereafter, the four main hypotheses and their statistical significance will be analysed to answer the main research question.

Data Handling

After a diffusion period of two consecutive weeks, a total of 202 participants completed the survey. First, the data was controlled for missing answers, which resulted in 57 incomplete questionnaires that were then removed. Secondly, the data was controlled for non-monotonic answers in the intertemporal time section of the questionnaire. This includes subjects who displayed more than one switching point in the multiple price list. This resulted in 35 answers being discarded from the sample. Finally, 13 subjects did not indicate a switching point for particular questions and did not provide an accurate measure of their discount rate. They were deleted from the sample. The resulting sample includes 97 participants.

In order to conduct the analyses, two main independent variables were measured on a 7 point Likert scale. The mean score of the 15 mindfulness attention awareness score questions (MAAS) was calculated and taken as a measure for individual mindfulness. A high mean score indicates high mindfulness. Additionally, the elaboration on potential outcomes scale (EPO) was treated in the same manner, such that a mean score was taken of the six questions, but contrary to the former variable, a high score reflects low self-control.

The control variables are coded in a manner that suits their functions. The gender of the participants was coded into a variable named Female, which was used as a dummy variable, indicating 1 = “female” and 0 = “male”. In the same manner, the financial situation of the subject was taken as 1 = “desperately needing 100€” and 0 = “not needing 100€”. The variables, nationality, education and level of mindfulness practitioner were coded as follows. Two categories for practitioners, describing people who practise mindfulness (=1) and people who don’t (=0), were recoded. The nationality of the participants was after careful analysis coded first into six categories for the respective nationalities (Dutch, French, Luxembourgish, German, Italian, Other) and second, coded into European and Non-European. This was done

to see if additional information could be drawn from the individual nationalities. For the variable education, the four initial levels were categorised (Highschool, Bachelor, Master, PhD). The variable age was kept in its original continuous form.

Descriptive Statistics

The 97 participants are 60 females (62%) and 37 males (38%). The average age of the sample was *M*=29.1 years old (*SD*=10.7; range 18 - 66 years). In total, 19 (19.6%) people reported to have a high-school diploma, 30 people (30.9%) have a bachelor diploma, the majority, namely 46 (47.4%) people have a Master's degree and only 2 (2.1%) had a PhD. In terms of nationality, the majority, 45 people (46.4%), indicated "other" as their choice, indicating Non-European. This resulted in 52 (53.6%) people being European. Of those 52 people, 34 (35.1%) indicated being Luxembourgish, 5 (5.2%) people reported being Italian, and 5 people indicated being Dutch. Germany was represented with 7 (7.2%) people, and only 1 (1%) person indicated being French. The level of practitioner that people indicated for themselves is presented in Table 2. As mentioned before, people who sometimes and regularly practise mindfulness were coded as active practitioners resulting in overall 30 (30.9%) people.

Table 2

Level of mindfulness practice

Levels	Counts	% of Total	Cumulative %
I have never practised mindfulness	39	40.2%	40.2%
I occasionally practised mindfulness in the past	28	28.9%	69.1%
I sometimes practise mindfulness	17	17.5%	86.6%
I regularly practise mindfulness	13	13.4%	100%

To control for multicollinearity, a point-biserial correlation is performed to determine the relationship between the indicated familiarity with mindfulness practice (1 or 0) and the mindfulness (MAAS) score. There was no significant correlation between the two variables (r_{pb} = .072, n = 97, p = .481). While this result shows that there is no multicollinearity, it also shows that there is no relation between the mindfulness score and the indicated practice familiarity, which is an interesting outcome as common intuition would suggest a correlation. This result, allows for a statistical analysis, but raises the question, whether the mindfulness practice familiarity, realistically records an individual's level of mindfulness. Nevertheless, for the remainder of this

paper, the level of mindfulness practice will be used as a guideline and control variable to make use of the further insight that it might show in the following statistical analyses.

The mean score for individual mindfulness across the 97 participants shows a range of 3.2, with a minimum of 2.46 going up to a maximum of 5.66. The mean score M = 4.04 and standard deviation = 0.806 indicate that there was low variation and people did not differ that much in their score. For the measure of self-control, the elaboration of potential outcome scale, the mean score across all participants shows a higher range of 4.67 with a minimum of 1.00 and a maximum of 5.67. The mean score M = 2.54 (SD = 1.00) indicates a rather low number, indicating that people self-reported high self-control.

The indicated individual monthly discount rates range from to 0.95% all the way to 16.28% with a mean of M = 6.46% (SD = 4.06). The analysis of the data showed that people had the tendency towards the middle option to switch from one option to the other, however, 10 participants, always switched in the second row, no matter which time frame they were confronted with. It is speculated that those individuals saw the multiple price list as an investment choice and converted the amounts into returns on 100€. Such that the choice between 100€ today or 110€ in 12 months can be seen as a 10% return on investment of 100€.

Hypothesis testing

To recall, the four hypotheses are listed below.

H1: A high level of mindfulness predisposition is related to more patience in intertemporal decisions.
H2: A high level of mindfulness predisposition is related to a high level of self-control.
H3: Self-control significantly mediates the relationship between trait mindfulness and patience.
H4: A higher level of mindfulness predisposition is related to more time consistent behaviour.

For Hypothesis 1, 2 and 3, a mediation analysis, according to the Baron and Kenny (1986) approach is used. The hypotheses are formed accordingly and will be dealt with in one analysis. If the first hypothesis cannot be supported, then the mediation effect can be discarded. However, for completion, all three hypotheses will be tested, to see the full extent of it.

To test hypothesis 4, whether a higher level of mindfulness is related to more time consistent behaviour, a dummy variable has been constructed indicating whether the subject behaved time consistent (=1) or not (=0). This leads to the use of a binomial logistic regression to analyse the effect of dispositional mindfulness as the dependent variable is dichotomous.

As the regressions are performed, the four assumptions of normality, linearity, homoscedasticity, and absence of multicollinearity are tested. No regression showed any indicator of concern. For illustration purposes, the assumptions of Model 6, which is described in Table 3 are illustrated in Appendix A. Normality was observed on the normal P-P Plot and can be seen in Figure 8 (Appendix A). Homoscedasticity is not of concern either, as can be seen in Figure 9 representing the scatterplot. Multicollinearity is checked for by the VIF values, which are well below 5.00. Finally, given that the residuals are normally distributed and homoscedastic, linearity can be assumed.

Table 3 incorporates Model 1 and Model 2 that test hypothesis 1. Model 1 includes only the dependent variable mindfulness and the independent variable measure of patience. It can be concluded that the independent variable does not reliably predict the dependent variable ($p = .827$). The coefficient of mindfulness, although positive, is extremely small and not significant. As the control variables are incorporated in Model 2, this does not change, and the variables do not predict the dependent variable ($p = .571$). Although the mindfulness coefficient increases a small amount, it stays insignificant. The incorporated control variables are not significant either. Consequently, there is no evidence supporting hypothesis 1.

In Table 3, Model 3 and 4 inspect the relation between mindfulness and self-control. Model 3 does not incorporate the control variables but is highly insignificant ($p = .969$). Mindfulness does not predict the level of self-control. Although the coefficient goes in the right direction as it is negative, it is insignificant. As the control variables are added into Model 4, the coefficient becomes positive for mindfulness but stays insignificant. Similarly, the control variables show no significant effect on the level of self-control. Therefore, hypothesis 2 is not supported.

In the same Table, Model 5 and 6 conclude the mediation analysis. As hypothesis 1 could not be supported, hypothesis 3 can by definition, also not be supported as it supposes the mediation effect of self-control between mindfulness and patience. Both coefficients of

mindfulness and self-control are marginally small and are insignificant. Therefore, hypothesis 3 is not supported, and there is no mediation effect of self-control.

Table 3

Regression results

	Patience		**Self-control**		**Patience**	
Independent variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Control variables						
Female		.004		.015		.004
		(.009)		(.226)		(.009)
Age		.000		.003		.000
		(.000)		(.010)		(.000)
European		-.004		.108		-.004
		(.009)		(.216)		(.009)
Financial Situation		.010		.204		.011
		(.011)		(.285)		(.011)
Mindfulness Practice		.006		-.175		.006
		(.009)		(.229)		(.009)
Education		-.006		-.153		-.006
		(.004)		(.105)		(.004)
Constant	.060***	.061***	2.647***	2.672***	.059***	.063***
	(.021)	(.026)	(.526)	(.653)	(.024)	(.029)
Main Effects						
Mindfulness	.001	.004	-.026	.012	.001	.004
	(.005)	(.006)	(.128)	(.138)	(.005)	(.006)
Mediating Effect						
Self-control					.001	-.001
					(.004)	(.004)
Overall Model						
R_2	.001	.061	.000	.041	.001	.061
Adjusted R_2	.000	.000	.000	.000	.000	.000

Note: *, **, *** indicate statistical significance at the 10%, 5%, and 1% level.

In order to test hypothesis 4, a binominal logistic regression was performed. Based on the previous results, the mediation effect of self-control has not been incorporated into the analysis. Model 1 in Table 4 incorporates only the independent and dependent variable, and explains 2.9% (R_2 = .029) and is significant at the 10% level (X_2 = 2.826, p = .093). Since mindfulness is a continuous variable, and the odds ratio is under 1, it can be said that with every point increase of the mindfulness score the odds of behaving time consistent are multiplied by .640. Since 0.640 is below 1, any odds being multiplied by it will decrease. Thereafter, as the mindfulness score increases, the odds of behaving time consistent decrease. The negative coefficient supports this result and is significant at the 10% level (p = .099).

Model 2 incorporates the control variables. It explains 15.8% (R_2 = .158) and is significant at the 10% level (X_2 = 16.703, p = .054). Similar to before, the odds ratio of mindfulness is below 1, and even lower compared to Model 1. However, mindfulness stays negative and significant at the 5% level (p = .024). In Model 2, it can be said that with every point increase of the mindfulness score, the odds of behaving time consistent are multiplied by .475. Since this is below 1, any odds being multiplied by it will decrease, meaning that as the mindfulness score increases, the odds of behaving time consistent decrease.

Interestingly, some control variables showed a significant effect. For instance, someone that is Non-European has odds of behaving time consistent are .420 the odds of someone who is European. This translates into that Europeans are more likely to behave time consistent than Non-Europeans. This effect is supported by the negative coefficient and significant at the 10% level (p = .078). Additionally, gender shows a significant positive effect (p = .009). Being male compared to being female has a positive effect on the probability of behaving time consistent. For a male, the odds of behaving time consistent are 3.802 the odds for a female. This means that men are more likely to behave time consistent than women.

Regarding these results, hypothesis 4 can be rejected. Model 1 and Model 2 clearly show the opposite of the hypothesized relation - lower dispositional mindfulness is related to more time consistent behaviour.

Table 4

Results of the logistic regression

	Model 1				Model 2			
Predictor	B	SE	OR	W	B	SE	OR	W
Constant	1.305	1.094	3.686	1.422	2.330	1.641	10.281	2.017
Mindfulness	-.446*	.270	.640	2.729	-.745**	.330	.475	5.104
Age					-.014	.023	.986	.381
No Mindful Practice					.533	.529	1.705	1.017
Base: Active Mindful Practice								
Non-European					-.868*	.493	.420	3.101
Base: European								
Male					1.336***	.513	3.802	6.787
Base: Female								
Bachelor					-.089	.675	.915	.017
Master					-.394	.635	.674	.385
PhD					.435	1.597	1.545	.074
Base: High-school								
Good Financial Situation					.268	.659	1.307	.165
Base: Bad Financial Situation								

Summary Statistics	X_2	*df*	*p*	X_2	*df*	*p*
Full Model	2.826	1	.093	16.703	9	.054
Hosmer and Lemeshow	4.132	8	.845	4.640	8	.795

*Note: *, **, *** indicate statistical significance at the 10%, 5%, and 1% level.*

6. Discussion

This chapter summarises the results of this work, and then it discusses their implications and deals with the limitations. Thereafter, it provides theoretical and practical recommendations for future research; finally, it concludes.

Discussion

This study investigated the relationship between dispositional mindfulness and patience and the mediation effect of exerting self-control. Four hypotheses were formed and analysed with the help of primary data, to explore the relation between mindfulness and intertemporal decisions and answer the main research question.

"Does dispositional mindfulness affect intertemporal preferences?"

The performed tests show no statistical evidence linking a higher dispositional mindfulness level to more patience. However, the result, although small, show a general effect in the right direction with a positive coefficient. This finding goes against the initial idea of Kabat-Zinn described in the second chapter, actively linking patience and mindfulness. However, one must note the difference in quantifying patience, as this study suggested and the meaning that mindfulness practitioners attach to this term. Higher patience or the possibility to acquire patience is a key characteristic or skill that the mindfulness movement advertises itself with. Given that mindfulness training can, in fact, heighten patience, consequently, an individual with a higher level of dispositional mindfulness should also display a higher ability to exert patience. However, this link could not be proven and might require further research.

Given these results, the hypothesized mediator role of self-control between mindfulness and patience can be discarded. Based on previous study results such as the research of Baumeister and Masicampo (2007), a link was expected to be found based on the theory that mindfulness fosters self-control through mechanisms such as the ability to be aware of one's choices and ability to focus. This link could not be proven, and no statistical evidence was found to support this claim. However, one has to take into account that many measurements for self-control exist and that the EPO, employed here, might not accurately capture self-control as a whole.

Additionally, this contradicts the literature by Baumeister and Heatherton (1996), who claim that self-control plays a vital role in the ability to be patient. Since not many studies exist about this hypothesized relation, it is important to analyse it in more detail and different settings. While this study found none, Baumeister and Heatherton did, which could mean that the relationship is not yet fully understood and needs more research.

On the subject of time consistent behaviour, surprisingly the experimental findings go against common intuition concerning mindfulness and time consistent behaviour. According to which it is to be expected that a high level of mindfulness would be conducive to time consistent behaviour. In the pure view of this work, it would be speculative to attempt explaining why the experimental results go against the theory. Further research is needed to elucidate the reason for these unexpected results.

In conclusion, this paper has given an insight into the claims linking mindfulness with intertemporal decisions. The relation between mindfulness and patience could not be supported, indicating that someone that is more mindful is not necessarily more patient. Secondly, there was no evidence supporting the claim that more mindful people behave more time consistent.

Limitations

Despite the contribution to the field of research on patience and mindfulness, this research suffers from a few limitations. The main limitation is the size and quality of the sample. The challenging recruitment of honest and engaged subjects willing to carefully read the questionnaire appeared to have led to a high number of subject that had to be deleted from the sample after the closure of the survey. A total of 105 (52%) of the 202 subjects could not be considered useful, representing more than half the original sample size. The resulting small sample size leads to the difficulties in detecting possible relations.

Another limitation concerns self-reported data. It is widely known that participants can exert a so-called social desirability bias when confronted with questions about their behaviour. Due to the personal allure of some questions, subjects could feel pressured to answer in a socially desirable way and dishonestly hide their actual behaviour.

Secondly, no manipulation has been undertaken to strengthen the level of mindfulness or prime the state mindfulness. The nature of the constructs of dispositional mindfulness does not allow for a short manipulation. A longitudinal panel study where a mindfulness intervention over a few weeks takes place with an assessment before the intervention and after was not possible due to time and budget constraints.

Thirdly, the use of the elaboration on potential outcome (EPO) questionnaire could have included a more elaborate questionnaire concerning general self-control. The EPO questionnaire was shortened to suit the purpose of the research better but might have lost some predictive power in the process. It is primarily used in the domain of marketing and concerns the elaboration of potential outcomes of monetary consumer decisions. Due to the fact that the questionnaire asked about receiving a monetary gain rather than consuming/buying a product and thereby spending money, this could have had misleading effects.

Lastly, the method to elicit the individual discount factor may have some possible biases. The use of the multiple price list (MPL) format could potentially lead to framing effects. As the subject is confronted with a list of *experimenter induced values,* it could potentially be misleading and draw them towards the middle (Andersen et al., 2006*).* Furthermore, the technical support on which the survey was created did not allow a function of forced monotonicity. This led to some subject indicating two switch points in one given MPL, resulting in their removal from the sample.

Recommendations for future research

The recommendations for future research build upon the aforementioned limitations that this study faced and are combined with the knowledge gained by the researcher throughout the execution of the study. Given that no significant relationship was found, future research should nevertheless try to elaborate on the mechanism between patience and dispositional mindfulness, with different measurements and methods to account for the various methods of quantification of these psychological concepts and traits.

The limitations concerning the sample size and recruitment of participants can be combined with the problem related to the use of a cross-sectional study. Future research could address it by executing a longitudinal study and recruiting a higher number of participants. In

the context of a university-based study, an incentive scheme featuring course credit could potentially remove the selection bias and motivate students to participate. Moreover, this would exclude the factor of intrinsic motivation as a bias from the study. Further, it will arguably make the research more robust as an actual causal effect between intertemporal decisions and their level of mindfulness could be studied.

Future studies could also elaborate on the questionnaires and extend the possible connection between mindfulness and patience to find the mechanisms behind the relationship. A possible way to do this would be to include other domains concerning intertemporal decisions, such as health concerns instead of only monetary gains related questions. Furthermore, to keep subjects from switching twice or not understanding the MPL, a switching MPL could be introduced where people state one switching point for the whole list and do not answer each row. Nevertheless, also other discount rate elicitation methods could be considered. The direct method, which does not make assumptions about subjects utility function, poses an insightful alternative to the classic MPL (Attema et al., 2016).

Overall, future research should not look away from studies related to mindfulness. It is a vast topic that has not yet been fully understood and analysed. Mindfulness is an inherent characteristic and skill, that should never be considered by itself.

7. Conclusion

This study set out to find an answer to the question "does dispositional mindfulness affect intertemporal preferences?" Empirical evidence suggests that the inherent degree of mindfulness has a physiological and psychological effect on human beings. However, this research did not find this effect of mindfulness on a person's ability to be patient. Furthermore, the role of self-control or self-regulation, often mentioned as a conduit of mindfulness could not be proven to be related. However, these results do not prove that there is no relationship. As the study suffers from limitations, it is recommended to modify the methodology and investigate the claim that mindfulness fosters patience further. The second analysis, concerning time consistent behaviour, showed rather surprising results and went against common intuition. A relation between low mindfulness and time-consistent behaviour was observed and significantly proven. This brings up controversial results, as common theory of self-regulation and rationally would predict an inverse relation. The speculations about this finding, however, are too fragile and go beyond the scope of this research. Future research should focus on using robust measures to grasp the psychological construct of mindfulness as it is still in its infancy. Nevertheless, in our modern fast-paced world, where political, economic, social as well as the private entities are constantly confronted with uncertainties and environmental changes, taking a closer look at cognitive attributes, such as mindfulness and its linked parameters, could be beneficial. More precisely, the impact of mindfulness on decision making, as illustrated in the literature review, seems crucial when compared to recent crisis and events (e.g. Covid-19 pandemic, blacklivesmatter movement, social inequality). Several institutions could benefit from the potential to nonjudgmentally observe rather than grade incidents and to recognise risk from this point of view leading to easier decision implementations. Leading to the mentioned decreased intention-behaviour gap, mindfulness can be seen as a useful tool to cope with the adaptive cycle of modern society. Therefore, the aim of this study could be seen as a contribution to a paradigm shift towards cognitive abilities when talking about decision making and implementation.

References

Alleva, J., Roelofs, J., Voncken, M., Meevissen, Y., & Alberts, H. (2014). On the Relation Between Mindfulness and Depressive Symptoms: Rumination as a Possible Mediator. *Mindfulness*, *5*(1), 72–79. https://doi.org/10.1007/s12671-012-0153-y

Andersen, S., Harrison, G. W., Lau, M. I., & Rutström, E. E. (2006). Elicitation using multiple price list formats. *Experimental Economics*, *9*(4), 383–405. https://doi.org/10.1007/s10683-006-7055-6

Attema, A. E., Bleichrodt, H., Gao, Y., Huang, Z., & Wakker, P. P. (2016). Measuring Discounting without Measuring Utility. *American Economic Review*, *106*(6), 1476–1494. https://doi.org/10.1257/aer.20150208

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of Mindfulness by Self-Report: The Kentucky Inventory of Mindfulness Skills. *Assessment*, *11*(3), 191–206. https://doi.org/10.1177/1073191104268029

Bakker, K., & Moulding, R. (2012). Sensory-Processing Sensitivity, dispositional mindfulness and negative psychological symptoms. *Personality and Individual Differences*, *53*(3), 341–346. https://doi.org/10.1016/j.paid.2012.04.006

Baron, R. M., & Kenny, D. A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182.

Baumeister, R. F., & Heatherton, T. F. (1996). Self-Regulation Failure: An Overview. *Psychological Inquiry*, *7*(1), 1–15. JSTOR. https://www.jstor.org/stable/1449145

Baumeister, R. F., & Masicampo, E. J. (2007). Relating Mindfulness and Self-Regulatory Processes. *Psychological Inquiry*, *18*(4), 255–258. https://doi.org/10.1080/10478400701598363

Bleichrodt, H., Gao, Y., & Rohde, K. I. M. (2016). A measurement of decreasing impatience for health and money. *Journal of Risk and Uncertainty*, *52*(3), 213–231. https://doi.org/10.1007/s11166-016-9240-0

Bluth, K., & Blanton, P. W. (2014). Mindfulness and Self-Compassion: Exploring Pathways to Adolescent Emotional Well-Being. *Journal of Child and Family Studies*, *23*(7), 1298–1309. https://doi.org/10.1007/s10826-013-9830-2

Bowlin, S. L., & Baer, R. A. (2012). Relationships between mindfulness, self-control, and psychological functioning. *Personality and Individual Differences*, *52*(3), 411–415. https://doi.org/10.1016/j.paid.2011.10.050

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*(4), 822–848. https://doi.org/10.1037/0022-3514.84.4.822

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical Foundations and Evidence for its Salutary Effects. *Psychological Inquiry*, *18*(4), 211–237. https://doi.org/10.1080/10478400701598298

Carlson, L. E., Speca, M., Faris, P., & Patel, K. D. (2007). One year pre–post intervention follow-up of psychological, immune, endocrine and blood pressure outcomes of mindfulness-based stress reduction (MBSR) in breast and prostate cancer outpatients. *Brain, Behavior, and Immunity*, *21*(8), 1038–1049. https://doi.org/10.1016/j.bbi.2007.04.002

Carver, C. S., & Scheier, M. F. (2001). *On the Self-Regulation of Behavior*. Cambridge University Press.

Chatzisarantis, N. L. D., & Hagger, M. S. (2007). Mindfulness and the Intention-Behavior Relationship Within the Theory of Planned Behavior. *Personality and Social Psychology Bulletin*, *33*(5), 663–676. https://doi.org/10.1177/0146167206297401

Chiesa, A., Calati, R., & Serretti, A. (2011). Does mindfulness training improve cognitive abilities? A systematic review of neuropsychological findings. *Clinical Psychology Review*, *31*(3), 449–464. https://doi.org/10.1016/j.cpr.2010.11.003

Coffey, K. A., & Hartman, M. (2008). Mechanisms of Action in the Inverse Relationship Between Mindfulness and Psychological Distress. *Complementary Health Practice Review*, *13*(2), 79–91. https://doi.org/10.1177/1533210108316307

Coller, M., & Williams, M. B. (1999). Eliciting Individual Discount Rates. *Experimental Economics*, *2*(2), 107–127. https://doi.org/10.1023/A:1009986005690

Deng, Y.-Q., Li, S., & Tang, Y.-Y. (2014). The Relationship Between Wandering Mind, Depression and Mindfulness. *Mindfulness*, *5*(2), 124–128. https://doi.org/10.1007/s12671-012-0157-7

Edwards, P., Roberts, I., Clarke, M., DiGuiseppi, C., Pratap, S., Wentz, R., & Kwan, I. (2002). Increasing response rates to postal questionnaires: Systematic review. *BMJ (Clinical Research Ed.)*, *324*(7347), 1183. https://doi.org/10.1136/bmj.324.7347.1183

Fee, R. L., & Tangney, J. P. (2000). Procrastination: A Means of Avoiding Shame or Guilt? *Journal of Social Behavior and Personality*, *15*(5), 18. http://search.proquest.com/openview/1d0188281572a611392764e0267ebc8f/1?cbl=1819046&pq-origsite=gscholar

Fenton-O'Creevy, M., Soane, E., Nicholson, N., & Willman, P. (2011). Thinking, feeling and deciding: The influence of emotions on the decision making and performance of traders. *Journal of Organizational Behavior*, *32*(8), 1044–1061. https://doi.org/10.1002/job.720

Fetterman, A. K., Robinson, M. D., Ode, S., & Gordon, K. H. (2010). Neuroticism as a Risk Factor for Behavioral Dysregulation: A Mindfulness-Mediation Perspective. *Journal*

of Social and Clinical Psychology, *29*(3), 301–321. https://doi.org/10.1521/jscp.2010.29.3.301

Frederick, S., Loewenstein, G., & O'Donoghue, T. (2002). Time Discounting and Time Preference: A Critical Review. *Journal of Economic Literature*, *40*(2), 351–401. JSTOR. https://www.jstor.org/stable/2698382

Gailliot, M. T., Baumeister, R. F., DeWall, C. N., Maner, J. K., Plant, E. A., Tice, D. M., Brewer, L. E., & Schmeichel, B. J. (2007). Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology*, *92*(2), 325–336. https://doi.org/10.1037/0022-3514.92.2.325

Garland, E., Gaylord, S., & Park, J. (2009). The Role of Mindfulness in Positive Reappraisal. *Explore (New York, N.Y.)*, *5*(1), 37–44. https://doi.org/10.1016/j.explore.2008.10.001

Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime* (pp. xvi, 297). Stanford University Press.

Gross, J. J. (1998). *The Emerging Field of Emotion Regulation: An Integrative Review*. *2*, 271–299.

Hanna, A., Klaassen, F., O'Brien, B., & Pidgeon, A. (2014). Cultivating a Resilient Response to Stress through Mindfulness and Cognitive Re-appraisal: A Pilot Randomised Control Trial. *GSTF Journal of Psychology*, *1*(2). https://doi.org/10.5176/2345-7872_1.2.13

Hart, R., Ivtzan, I., & Hart, D. (2013). Mind the Gap in Mindfulness Research: A Comparative Account of the Leading Schools of Thought. *Review of General Psychology*, *17*(4), 453–466. https://doi.org/10.1037/a0035212

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2011). *Acceptance and Commitment Therapy, Second Edition: The Process and Practice of Mindful Change*. Guilford Press.

Herndon, F. (2008). Testing mindfulness with perceptual and cognitive factors: External vs. internal encoding, and the cognitive failures questionnaire. *Personality and Individual Differences*, *44*(1), 32–41. https://doi.org/10.1016/j.paid.2007.07.002

Hoch, S. J., & Loewenstein, G. F. (1991). Time-Inconsistent Preferences and Consumer Self-Control. *Journal of Consumer Research*, *17*(4), 492. https://doi.org/10.1086/208573

Hölzel, B. K., Carmody, J., Vangel, M., Congleton, C., Yerramsetti, S. M., Gard, T., & Lazar, S. W. (2011). Mindfulness practice leads to increases in regional brain gray matter density. *Psychiatry Research: Neuroimaging*, *191*(1), 36–43. https://doi.org/10.1016/j.pscychresns.2010.08.006

Horowitz, J. K. (1991). Discounting money payoffs: An experimental analysis. *Handbook of Behavioral Economics*, *2*, 309–324.

Jimenez, S. S., Niles, B. L., & Park, C. L. (2010). A mindfulness model of affect regulation and depressive symptoms: Positive emotions, mood regulation expectancies, and self-acceptance as regulatory mechanisms. *Personality and Individual Differences*, *49*(6), 645–650. https://doi.org/10.1016/j.paid.2010.05.041

Kabat-Zinn, J. (2003). Mindfulness-Based Interventions in Context: Past, Present, and Future. *Clinical Psychology: Science and Practice*, *10*(2), 144–156. https://doi.org/10.1093/clipsy.bpg016

Kahneman, D. (2012). *Thinking, fast and slow*. Penguin Books.

Karelaia, N., & Reb, J. (2015). Improving decision making through mindfulness. In J. Reb & P. W. B. Atkins (Eds.), *Mindfulness in Organizations* (pp. 163–189). Cambridge University Press. https://doi.org/10.1017/CBO9781107587793.009

Khoury, B., Sharma, M., Rush, S. E., & Fournier, C. (2015). Mindfulness-based stress reduction for healthy individuals: A meta-analysis. *Journal of Psychosomatic Research*, *78*(6), 519–528. https://doi.org/10.1016/j.jpsychores.2015.03.009

Kobylińska, D., & Kusev, P. (2019). Flexible Emotion Regulation: How Situational Demands and Individual Differences Influence the Effectiveness of Regulatory Strategies. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.00072

Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. *Developmental Psychology*, *36*(2), 220–232.

Lakey, C., Campbell, W. K., Brown, K., & Goodie, A. (2007). Dispositional Mindfulness as a Predictor of the Severity of Gambling Outcomes. *Personality and Individual Differences*, *43*, 1698–1710. https://doi.org/10.1016/j.paid.2007.05.007

Langer, E. J., & Moldoveanu, M. (2000). Mindfulness Research and the Future. *Journal of Social Issues*, *56*(1), 129–139. https://doi.org/10.1111/0022-4537.00155

Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., Shapiro, S., Carmody, J., Abbey, S., & Devins, G. (2006). The toronto mindfulness scale: Development and validation. *Journal of Clinical Psychology*, *62*(12), 1445–1467. https://doi.org/10.1002/jclp.20326

Lavender, J. M., Gratz, K. L., & Tull, M. T. (2011). Exploring the Relationship between Facets of Mindfulness and Eating Pathology in Women. *Cognitive Behaviour Therapy*, *40*(3), 174–182. https://doi.org/10.1080/16506073.2011.555485

Lavender, J. M., Jardin, B. F., & Anderson, D. A. (2009). Bulimic symptoms in undergraduate men and women: Contributions of mindfulness and thought suppression. *Eating Behaviors*, *10*(4), 228–231. https://doi.org/10.1016/j.eatbeh.2009.07.002

Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal, and Coping*. Springer Publishing Company.

Loewenstein. (1988). Frames of Mind in Intertemporal Choice. *Management Science*, *34*(2), 200–214. https://doi.org/10.1287/mnsc.34.2.200

Loewenstein, G., & Lerner, J. S. (2003). The role of affect in decision making. *Handbook of Affective Science*, *619*(642), 3.

Loewenstein, & Prelec, D. (1992). Anomalies in Intertemporal Choice: Evidence and an Interpretation. *The Quarterly Journal of Economics*, *107*(2), 573–597. JSTOR. https://doi.org/10.2307/2118482

Marlatt, G. A., & Kristeller, J. L. (1999). Mindfulness and meditation. In *Integrating spirituality into treatment: Resources for practitioners* (pp. 67–84). American Psychological Association. https://doi.org/10.1037/10327-004

Mischel, W., Shoda, Y., & Peake, P. K. (1988). The Nature of Adolescent Competencies Predicted by Preschool Delay of Gratification. *Journal of Personality and Social Psychology*, *54*(4), 10.

Musau, A. (2009). Modeling Alternatives to Exponential Discounting. *University of Agder*, 70. https://mpra.ub.uni-muenchen.de/16416/

Nenkov, G. Y., Inman, J. J., & Hulland, J. (2008). Considering the Future: The Conceptualization and Measurement of Elaboration on Potential Outcomes. *Journal of Consumer Research*, *35*(1), 126–141. https://doi.org/10.1086/525504

Ostafin, B. D., Bauer, C., & Myxter, P. (2012). Mindfulness Decouples the Relation Between Automatic Alcohol Motivation and Heavy Drinking. *Journal of Social and Clinical Psychology*, *31*(7), 729–745. https://doi.org/10.1521/jscp.2012.31.7.729

Parisi, J. M., Rebok, G. W., Xue, Q.-L., Fried, L. P., Seeman, T. E., Tanner, E. K., Gruenewald, T. L., Frick, K. D., & Carlson, M. C. (2012). *The Role of Education and Intellectual Activity on Cognition* [Research Article]. Journal of Aging Research; Hindawi. https://doi.org/10.1155/2012/416132

Phelps, E. S., & Pollak, R. A. (1968). On Second-Best National Saving and Game-Equilibrium Growth. *The Review of Economic Studies*, *35*(2), 185–199. JSTOR. https://doi.org/10.2307/2296547

Pidgeon, A., Lacota, K., & Champion, J. (2013). The Moderating Effects of Mindfulness on Psychological Distress and Emotional Eating Behaviour. *Australian Psychologist*, *48*(4), 262–269. https://doi.org/10.1111/j.1742-9544.2012.00091.x

Price, P., Jhangiani, R., Chiang, I.-C., Leighton, D., & Cuttler, C. (2017). *Research Methods in Psychology* (3rd ed.). https://opentext.wsu.edu/carriecuttler/

Pulkkinen, L., & Hamalainen, M. (1995). Low self-control as a precursor to crime and accidents in a Finnish longitudinal study. *Criminal Behaviour and Mental Health*, *5*(4), 424–438. https://heinonline.org/HOL/P?h=hein.journals/cbmh5&i=418

Quaglia, J. T., Braun, S. E., Freeman, S. P., McDaniel, M. A., & Brown, K. W. (2016). Meta-analytic evidence for effects of mindfulness training on dimensions of self-reported dispositional mindfulness. *Psychological Assessment*, *28*(7), 803–818. https://doi.org/10.1037/pas0000268

Raphiphatthana, B., Jose, P. E., & Kielpikowski, M. (2016). How do the facets of mindfulness predict the constructs of depression and anxiety as seen through the lens of the tripartite theory? *Personality and Individual Differences*, *93*, 104–111. https://doi.org/10.1016/j.paid.2015.08.005

Read, D. (2004). Intertemporal choice. *Blackwell Handbook of Judgment and Decision Making*, 424–443.

Recovered Mindfully. (2015, April 24). *9 Attitudes Jon Kabat Zinn*. https://www.youtube.com/watch?v=2n7FOBFMvXg

Samuels, D. J., & Zucco, C. (2012). Using Facebook as a Subject Recruitment Tool for Survey-Experimental Research. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2101458

Samuelson, P. A. (1937). A Note on Measurement of Utility. *The Review of Economic Studies*, *4*(2), 155. https://doi.org/10.2307/2967612

Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, *62*(3), 373–386. https://doi.org/10.1002/jclp.20237

Shatz, I. (2016). Fast, Free, and Targeted: Reddit as a Source for Recruiting Participants Online. *Social Science Computer Review*, *35*(4), 537–549. https://doi.org/10.1177/0894439316650163

Shoda, Y., Mischel, W., & Peake, P. K. (1990). Predicting Adolescent Cognitive and Self-Regulatory Competencies From Preschool Delay of Gratification: Identifying Diagnostic Conditions. *Development Psychology*, *26*(6), 9.

Strotz, R. H. (1955). Myopia and Inconsistency in Dynamic Utility Maximization. *The Review of Economic Studies*, *23*(3), 165–180. https://doi.org/10.2307/2295722

Tan, L. B. G., & Martin, G. (2016). Mind full or mindful: A report on mindfulness and psychological health in healthy adolescents. *International Journal of Adolescence and Youth*, *21*(1), 64–74. https://doi.org/10.1080/02673843.2012.709174

Tang, Y.-Y., Hölzel, B. K., & Posner, M. I. (2015). The neuroscience of mindfulness meditation. *Nature Reviews Neuroscience*, *16*(4), 213–225. https://doi.org/10.1038/nrn3916

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success. *Journal of Personality*, *72*(2), 271–324. https://doi.org/10.1111/j.0022-3506.2004.00263.x

Thaler, R. (1981). Some empirical evidence on dynamic inconsistency. *Economics Letters*, *8*(3), 201–207. https://doi.org/10.1016/0165-1765(81)90067-7

Tomlinson, E. R., Yousaf, O., Vittersø, A. D., & Jones, L. (2018). Dispositional Mindfulness and Psychological Health: A Systematic Review. *Mindfulness*, *9*(1), 23–43. https://doi.org/10.1007/s12671-017-0762-6

Tversky, A., & Kahneman, D. (1992). Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty*, *5*, 297–323.

Wenzel, M., von Versen, C., Hirschmüller, S., & Kubiak, T. (2015). Curb your neuroticism – Mindfulness mediates the link between neuroticism and subjective well-being. *Personality and Individual Differences*, *80*, 68–75. https://doi.org/10.1016/j.paid.2015.02.020

Woodruff, S. C., Glass, C. R., Arnkoff, D. B., Crowley, K. J., Hindman, R. K., & Hirschhorn, E. W. (2014). Comparing Self-Compassion, Mindfulness, and Psychological Inflexibility as Predictors of Psychological Health. *Mindfulness*, *5*(4), 410–421. https://doi.org/10.1007/s12671-013-0195-9

Appendix A

Figure 8

Normal P-P Plot of Regression Standardized Residual - DV: Patience - (Individual Discount Rate)

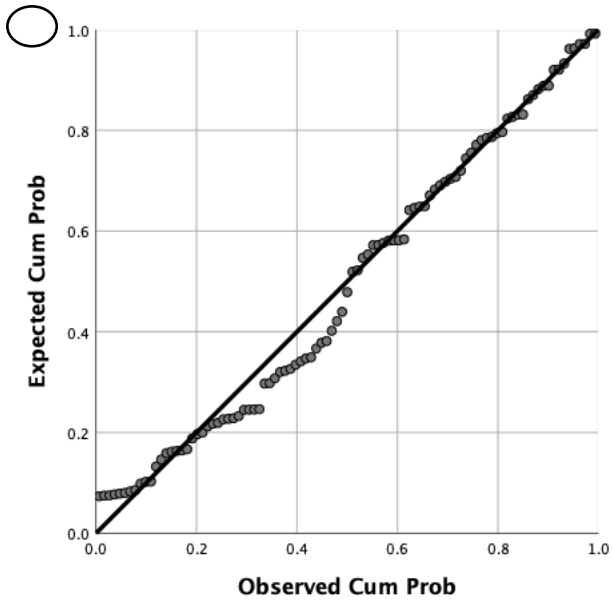


Figure 9

Scatterplot - DV: Patience - (Individual Discount Rate)