

DREAD AND TEMPORAL DISCOUNTING

by

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## **ABSTRACT**

Intertemporal choice revolves around weighing potential gains and losses when making decisions based on outcomes that come at different points in time. An important component of intertemporal choice is temporal discounting, the tendency to place more value on immediate vs. later rewards. Much of the literature has focused on discounting and delaying rewards as opposed to punishments or negative events. In addition, several other personality traits may also be associated with temporal discounting, such as neuroticism, extraversion, the behavioral inhibition system (BIS), and the behavioral activation systems (BAS). The primary objective of this study was to clarify the relationship between temporal discounting and negative events, specifically, dread. The secondary objective was to examine whether individual differences the aforementioned personality traits moderate the relationship between dread and temporal discounting. Results showed that dread significantly predicted temporal discounting such that higher dread was associated with a higher tendency to get negative events over with quicker. Results from the moderation analyses revealed no significant interaction between neuroticism/extraversion and dread. However, there was a significant interaction for both the BIS/BAS Reward Responsiveness and dread such that, across higher levels of dread, people with a stronger BIS as well as a stronger BAS Reward Responsiveness had a higher tendency to delay negative events than those with lower BIS/BAS Reward Responsiveness. Results from this study will contribute to the greater literature about

temporal discounting and enhance our understanding of how emotional states affect intertemporal choice.

## I. INTRODUCTION

A man arrives at a dentist appointment he made after having some jaw pains. When the dentist took a look at his jaws, they found out his wisdom teeth were growing improperly and told him that he must schedule an appointment within a specific timeframe. The man went home, and throughout the week he kept feeling this powerful emotion related to the surgery. He did not want to go, and he was terrified of going; but he had had enough of this apprehensive feeling that was eating away at him. He decided to schedule the appointment as soon as possible. What this man is currently feeling is dread, and his choice to schedule the appointment to the last day is part of a socioeconomic principle known as temporal discounting, or the reduction in value of something when offered later rather than immediately (Mazur, 1987). This phenomenon, also referred to as delay discounting, is a very common occurrence in life when having to weigh a choice between two options whose outcomes are given at different times in the future. The question also arises: what factors influence temporal discounting? The following section will give a brief preview of some of the factors identified in the literature.

One of the factors found to influence temporal discounting is dread, an uncomfortable, apprehensive emotion that is future oriented. This emotion causes so much discomfort that it can instigate a desire to get such an event over with (Berns et al., 2006). Depending on how an individual responds to these types of scenarios, he or she may opt to eliminate this feeling by going through an event as early as possible. On the other hand, an alternate response would be to push back the scenario and procrastinate. The response for each person depends on individual differences, specifically what kind of

things a person may dread and the intensity of the dread. This idea of accepting immediately or delaying, whether with positive or negative events, falls under a phenomenon known as intertemporal choice, a socioeconomic principle where people weigh the positive or negative consequences that will be available later when they make a decision now (Read, 2004). Going back to the example at the start, the man dreaded going to the dentist, and so his response was to go to the dentist as soon as possible. Although researchers focused on the concept of valuing rewards, this concept also extends to valuing punishments as well because each individual has their own personal view on what a desirable or favorable outcome would be; thus, a negative event, especially the negative reinforcement that occurs by getting it over and done with, also has value that can be discounted.

Aside from dread, individual differences in personality have been shown to influence temporal discounting. Research has focused on two components, the first being two facets of the Big Five Personality Traits: Neuroticism and Extraversion. People high on both traits have been shown to be more impulsive and desire rewards as soon as possible (Hirsh, Morisano, & Peterson, 2008; Manning et al., 2014; Ostaszewski, 1996;). The second component addresses two complementary motivational systems: the behavioral inhibition system (BIS), which promotes avoidance, primarily of negative outcomes; and the behavioral activation system (BAS), which promotes approach-related behaviors, usually in the pursuit of rewards and things that make us happy (Carver & White, 1994). When discounting negative events, higher levels of BIS are indicative of a stronger tendency to delay these events (Warnke et al., 2018), whereas with BAS, higher scores lead a person to acquire rewards sooner rather than delay (Zisseron & Palfai,

2007). One important note about the BAS is there are three subscales: drive, a measure of one's tendency to pursue rewards/goals; fun seeking, a measure of one's tendency to seek out new, entertaining experiences; and reward responsiveness, a measure of one's positive response to obtaining a desired goal or reward. (Scheres & Sanfey, 2006). All four aforementioned factors along with dread may have their own influences on temporal discounting.

There are some gaps in the literature that should be addressed. First off, much of the literature that has covered temporal discounting covers the discounting of rewards, specifically monetary rewards (Chapman, 1996). In comparison, there has been less focus on discounting negative events (Harris, 2012), otherwise known as negative discounting (Abdellaoui, Guitierrez, & Kemel, 2018). More studies need to be conducted to resolve this inconsistency in the literature for negative discounting in order to get a thorough understanding of temporal discounting in general that includes how it is modulated by outcomes with different valences. Second, there is some discrepancy about the effect of dread on negative temporal discounting. While some studies covered in the following literature review suggest that dread leads people to get negative experiences over with more quickly (Harris, 2012, Sun et al., 2020), other studies suggest the opposite; dread leads people to delay these experiences as much as possible (Frederick et al., 2002; Thaler, 1981). Rather than trying to resolve this debate by conducting more replications, it may be better to investigate the conditions under which negative emotional states like dread promote or reduce temporal discounting.

The goal of this study was to investigate if dread can predict temporal discounting and explore how individual differences in approach/avoidance moderate the relationship

between dread and temporal discounting. The main hypothesis was that dread would predict temporal discounting, such that individuals that score higher on dread will want to get a negative experience over with sooner rather than delay it. Temporal discounting for this study should be manifested as the preference for, or greater valuation of, the immediate option of getting something over with and discounting later times. Four additional variables will be incorporated in four separate moderation analyses: neuroticism, extraversion, the BIS, and BAS Reward Responsiveness. Reward responsiveness was used because it was the closest representation of behavioral activation in general (Taubitz, Pedersen, & Larson, 2015). Neuroticism and extraversion were predicted to moderate the relationship between dread and temporal discounting. Because neuroticism is associated with avoidance and avoidance with temporal discounting, it is reasonable to infer that more neurotic individuals will instinctively avoid dreadful events. Thus, for neuroticism, it was predicted that across higher levels of dread, people who were more neurotic would exhibit a higher tendency to delay negative events. For extraversion, it was predicted that, across higher levels of dread, extraverts would prefer getting negative events out of the way due to their more goal-oriented nature which could come into play if the goal is to eliminate dread (Pickett, 2019). This outcome is expected due to previous evidence showing that extraversion has an inverse relationship to avoidance (Amirkhan, Risinger, & Swickert, 1995). Therefore, it is likely extraverts will have a higher tendency to get negative/uncomfortable experiences out of the way quicker. For the BIS, it was predicted that, across higher levels of dread, people with a stronger BIS would also delay negative events more than those with a weaker BIS. It has been shown that BIS is positively linked to avoidance which is also linked to

temporal discounting for negative/aversive experiences such that individuals with a stronger BIS are more likely to exhibit avoidance behaviors (Sun et al., 2020). This suggests that BIS For BAS reward responsiveness, it is predicted that, across higher levels of dread, people with a stronger reward responsiveness system will prefer to get events over with rather than delaying. Although there is no evidence showing BAS Reward Responsiveness is related to negative temporal discounting, there is evidence showing that BAS Reward Responsiveness is positively connected to emotional relief (Berns et al., 2006; Carver, 2009) which can be achieved by experiencing an aversive event quicker to get the feeling of dread out of the way sooner. (Berns et al., 2006). Results from this study will contribute to the literature that focuses on temporal discounting for negative events as well as some insight as to what factors, if any, influence the relationship between dread and temporal discounting. The results of this study will promote a better understanding of the factors affecting decision-making, extending our understanding of intertemporal choice, with implications for both physical and psychological health and well-being.

## II. REVIEW OF LITERATURE

### What is dread?

Fear and dread are often used interchangeably, but they are ultimately different. Dread is a negative, future-oriented feeling capable of influencing underlying core processes of emotion in general (Berridge, 1995). Looking back at the example in the introduction, the man's apprehension was future-oriented and in response to an event of which he is afraid. Whether he realizes it or not, dread is playing a very important role in his overall emotion which in turn will affect his decision.

The evolutionary aspect of dread shows how dread can be very helpful in dangerous situations, but in modern society, we do not encounter many of the same threats compared to the prehistoric era where brutal predators are a major concern. Therefore, there is more to dread than just survival. Dread is a lingering emotion that affects the decisions we make despite no danger being involved. In a therapeutic setting, an individual may dread attending therapy sessions because of a possibility of tarnishing his or her reputation or chance to be a normal individual. (Jacobs, 2020). Social well-being is also involved in dread as our bodies look for alternatives to avoid future scenarios that could jeopardize our reputation and/or wellbeing.

In some previous studies, dread is often perceived as a type of burden. In some cases, the emotion itself is considered a cost to waiting. (Berns et al., 2006). Essentially, individuals who experience high levels of dread feel an intense need to eliminate this emotion however possible. The idea of dread as a burden is not limited to social settings, but it extends to many different aspects of one's life depending on the individual.

Although the focus is to discuss dread in psychological terms, it is worth noting

the philosophical side of dread. In his book, *'Dread' As a Philosophical Concept*, Grimsley (1956) emphasizes how dread becomes more prominent once we reach adulthood and have to concern ourselves more and more with spirituality, specifically the idea of sin or wrongdoing against God. In general, dread is a very undesirable experience. If the desire to eliminate this undesirable experience is strong, then individuals will opt for a way to do so. Yet, how a person may go about this (if they even chose to do so) varies depending on individual differences.

The focus of the current investigation is temporal discounting, the tendency to prefer immediate rewards over later ones (McKay, 2021). At some point, everyone uses this principle when weighing two options with positive or negative outcomes offered at different times; whatever option a person chooses means that the other is discounted. Future sections will delve into the specifics of temporal discounting, which have been delineated primarily via paradigms using rewards.

### **Intertemporal Choice and Temporal Discounting**

Intertemporal choice, in simple terms, is when a person assesses what options are given at a certain times and chooses whichever is more attractive to them. To postpone receiving a reward or punishment is called delaying, but the decision to delay is influenced by one's perception of the value for future rewards/punishments relative to the value of receiving them immediately (temporal discounting). When someone chooses one option, they discount the other. The example given at the introduction is an illustration of temporal discounting; the man chose the option of going to the dentist early, meaning that he discounted, or placed less value on, the latter option. There are many other factors that contribute a person's decision to either choose the immediate option or the delayed one.

Results from a study conducted by Liu and colleagues (2013) illustrate how telling someone to imagine either a positive or negative event can influence them to delay or accept the reward, respectively. Similarly, making the reward greater if the reward is delayed can influence temporal discounting (Harris, 2012). If the person is expecting a greater reward, chances are they may choose to delay the reward. These are just a few factors that can influence temporal discounting.

There is a wide variety of literature that covers temporal discounting for future rewards, but the main gap in the literature is that there is little focus on negative, future events (Harris, 2012). Temporal discounting is equally applicable to negative events as well (Sun et al., 2020). There is some inspiration from Berns and colleagues (2006) who conducted a study where participants could choose to receive a shock to the foot soon or later, but the earlier shock would be more painful. Participants opted for the early, more painful shock. The researchers concluded that incorporating dread into the study accounted for the variance in the results, stating that dread was associated with a participant's decision to delay the shock; most chose to get the shock over with. Liu and colleagues (2013) had participants read a vignette about getting bitten by a rabid dog and getting treated with a shot that would instill a lot of pain. They were asked whether they wanted to hear the bad news immediately or last minute. Around half of the participants chose to hear the news right away, which supports the idea that dread influences people to get something out of the way quicker. Although not everyone opted to hear the news right away, enough participants did to suggest that temporal discounting is common among people who are facing a dreadful situation.

A big component of temporal discounting appears to be the pursuit of positive

outcomes and the avoidance of negative ones. There are several factors that influence the decision to pursue positive/avoid negative experiences. The next section will introduce two brain systems called the Behavioral Inhibition System and the Behavioral Activation System, both of which are shown to be related to temporal discounting. These systems revolve around two primary components: anxiety and impulsivity, respectively (Carver & White, 1994). These two systems may yield insights into what drives a person to make decisions, especially about rewards and punishments.

### **BIS/BAS**

BIS and BAS stand for Behavioral Inhibition System and Behavioral Activation System, respectively (Carver & White, 1994). BAS is a motivational system meant to guide us toward positive outcomes whereas BIS is an inhibitory system to guide us away from negative outcomes. Put more simply, BAS is the “gas” that accelerates us toward good things whereas BIS is the brake that stops us from experiencing bad things. Our sensitivity to both of these systems is biologically based, but our reaction in any given situation depends on how the environment shapes them (Scholten et al., 2006). In short, BIS is the aversive motivational system and BAS is the goal-oriented motivational system. (Carver & white, 1994.) Some people are more inclined to be evasive of negative events than others while some people would prefer to get said event out of the way. If a person chooses to avoid the event or delay it, it is likely that the avoidance-related BIS being activated. Conversely, choosing to get a negative event out of the way in order to eliminate dread and obtain emotional relief (Carver, 2009) can be considered goal-oriented. Understanding how the BIS/BAS systems work is important because it makes intuitive sense that there is a connection between these systems and intertemporal choice.

To measure the BIS/BAS, researchers use Carver and White's BIS/BAS scale (see Appendix A).

While the BIS is associated with avoidance/anxiety, the BAS is more sensitive to approach-related behaviors, incorporating constructs such as motivational drive, fun seeking, and responsiveness to rewards. Many studies involving the BAS have been conducted to understand addictions, especially alcohol addiction (Zisseron & Tibor, 2007). Addictions have a major effect on behavior activation as it is an example of an element that is immediately gratifying to anyone that is addicted. Interestingly, the BAS has been found in several studies to have a positive correlation with extraversion (Day et al., 2019). This indicates that individuals that score higher on the BAS scale are more likely to be extraverted.

Previous work has revealed that the BIS and BAS are also associated with temporal discounting. The BIS is associated with more avoidant behaviors, such as delaying, for negative or aversive events (Jarmolowicz et al., 2014), whereas the BAS is associated with a stronger tendency to approach, usually to obtain rewards immediately (Zisseron & Palfai, 2007). Aside from these associations, there is not much literature that directly ties the BIS/BAS to temporal discounting. However, because the BIS/BAS are concerned with approach-avoidance and goal-oriented approach (Carver & White, 1994), two ideas that are reasonably connected to temporal discounting (through delaying negative things and going immediately after positive things), they are worthy of systematic examination.

## **The Big 5 Personality Traits**

At the heart of individual differences and the key reason for our choices is personality. (Mckay & Gutworth, 2021). Developed by Lewis Goldberg (1992), these five personality traits were created to capture all the dimensions of personality. The acronym OCEAN outlines these five traits: Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Of these traits, neuroticism and extraversion were included in this study, as most of the evidence connecting The Big 5 to temporal discounting mainly involves these two personality traits. (Hirsh, Morisano, & Peterson, 2008; Ostaszewski, 1996; Steinglass et al., 2017, Testori et al., 2019). Neuroticism is a measure of a person's propensity to experience negative emotions such as anger, sadness, and fear. Extraversion is a measure of a person's sociability, expressiveness, and their source of stimulus (e.g., going out to socialize and do exciting activities or stay at home and work on some artwork.) These personality traits are thought to be important predictors, not just of behavior, but decision making as well (Testori et al., 2019). This implies that the Big 5 personality traits play a role in decision making as well and may moderate intertemporal choice.

Neuroticism is an important trait from the Big 5 that has received a lot of attention in the literature, including intertemporal choice. Previous studies have demonstrated that neuroticism is positively correlated with temporal discounting (Hirsh, Morisano, & Peterson, 2008; Manning et al., 2014; Yeh, Myerson, & Green, 2021). This suggests that, when presented with earlier and later rewards, neurotic individuals will choose immediate rewards even if they are smaller. A common reason given for this is because people who exhibit high levels of neuroticism also exhibit high impulsivity (Manning et al., 2014). As

a result, immediate rewards are more attractive than later rewards.

A similar finding also exists with respect to extraversion, another trait from the Big 5 shown to influence temporal discounting, and several studies have been conducted examining this variable. In regard to temporal discounting, one study found that extraverts tend to discount larger, later rewards than introverts (Ostaszewski, 1996). What this means is extraverts exhibit more impulsive behavior and would rather gain smaller rewards more quickly than larger rewards at a later date. The rationale given for this finding was that extraverts – while they do tend to seek more stimuli—process time at a slower rate than introverts and thus would be more impulsive and eager to acquire rewards immediately.

Given that both scales tap into approach and avoidance tendencies, it is possible that a relationship between The Big 5 and the BIS/BAS exists. As shown before, extraverts tend to be more impulsive. This suggests that extraverts seek to pursue positive things and are thus influenced more by the BAS. Extraversion and the BAS have been shown to be associated with a focus on reward (Quilty et al., 2014). In terms of arousal, extraverts, compared to introverts, tend to seek more stimuli because of their high threshold for arousal, a major component of the BAS (Pascalis, Sommer, & Scacchia, 2018). Both studies have also outlined how neuroticism is closely tied with anxiety and thus resulting in more episodes of avoidance. Therefore, there may be a positive correlation between Extraversion and the BAS and a negative correlation between neuroticism and the BIS.

The present study was designed to determine whether dread is a significant predictor of temporal discounting and if any of the individual differences mentioned in

this study moderate the relationship between dread and temporal discounting. Dread was the main predictor variable measured by a scale consisting of 25 items depicting scenarios individuals are likely to dread. Ratings were performed on a Likert scale of 1 (not a lot) to 5 (very much). Temporal discounting was also measured using the same scenarios but records whether a person would get an event over with or delay it. Temporal discounting is measured on a scale of 1 (not very far) to 4 (as far as possible). The primary hypothesis was that dread would be a significant predictor of temporal discounting such that individuals who experienced more dread would be significantly less likely to delay experiencing an event, meaning they would want to get the event over with more quickly. A total of four moderation analyses were conducted following a significant relationship. The first set used neuroticism and extraversion separately, and the second set used BIS and BAS Reward Responsiveness separately. Out of the three BAS subscales, Reward Responsiveness was used because it is considered to be the most precise reflection of the BAS (Taubitz et al., 2015). Preliminary correlations were conducted beforehand to determine which variables could potentially moderate the relationship between dread and temporal discounting. This study was a survey-based study that used SONA and undergraduate classes to recruit participants. Data was collected using Qualtrics, and analysis of the data was performed in SPSS in conjunction with Microsoft Excel. This research will contribute to a greater understanding of dread's relationship with temporal discounting and what factors play an important role in this relationship. In general, this will contribute a new model to the greater literature that can be used to assess different contexts in which dread is indicative of a desire to get something out of the way quicker or delay it. The results of this study will extend our

understanding of how we make choices about future events to include negative discounting, as well as the role of individual differences in personality and motivation in intertemporal choice. A better understanding of temporal discounting has broad practical implications for both mental and physical health.

### **III. METHODOLOGY**

#### **Participants**

A total of 475 responses were recorded. Of these responses, 65 responses were removed for missing an entire section or failing to complete the study, leaving 410 total responses that made it into the analyses. Around 86% of all participants were between the ages of 18 and 21. All participants were undergraduate college students from Texas State University. This study was approved by the Texas State University Institutional Review Board.

#### **BIS/BAS**

The BIS/BAS scale by Carver & White (2013) consists of 24 personal questions answered on a 4-point scale with 1 being “very true for me” and 4 being “very false for me.” Questions 3, 9, 12, and 21 cover the BAS drive; Questions 5, 10, 15, 20, cover BAS fun seeking; and questions 4, 7, 14, 18, 22 cover BAS Reward Responsiveness. Questions 2, 8, 13, 16, 19, 22, and 24 cover the BIS. Questions 1, 6, 11, and 17 are fillers. Only items 2 and 22 will be reverse scored (See Appendix B for the BIS/BAS scale). Only the scale from BAS Reward Responsiveness were used as it is deemed to be the most pure and accurate representation of the BAS scale in general (Taubitz, 2015).

#### **The Big 5 Personality Traits**

The Big 5 personality test by Goldberg (1992) consists of 50 questions that are scored on a Likert scale of 1 (very inaccurate) to 5 (very accurate). The questions are labeled with numbers that correspond to a personality trait. 1 scores extraversion, 2 scores agreeableness, 3 scores conscientiousness, 4 scores neuroticism, and 5 scores openness to experience. Items indicated with a + sign are scored as normal whereas items

indicated with a – sign are reverse-scored. Five total scores were summed, one for each personality trait (See Appendix B for the Big 5 Personality Test). For this study, only the extraversion and neuroticism subscales were used.

### **Dread ratings**

Dread ratings were computed for each participant. Higher scores indicated the participant dreaded the item, and lower scores indicated the participant did not dread the item. Twenty-five scenarios were presented in a matrix table; participants rated each scenario on a Likert scale of 1 (not at all) to 5 (a lot) with respect to how much they would dread the event. These events were future oriented and intended to invoke the feeling of dread. An example of a question presented in this section was: “Telling a friend they are not invited to your birthday party” (see Appendix C).

### **Temporal Discounting ratings**

For this study, temporal discounting was quantified in terms of delay rates. Higher scores indicate that a participant preferred to delay the experience whereas lower scores indicate a person preferred to go through the experience sooner. In this study, higher scores were indicative of temporal discounting as individuals chose to discount earlier options for the later ones. This is similar to how temporal discounting for aversive experiences was investigated in the study by Harris (2012). Temporal discounting ratings were computed for each participant. Participants answered on a scale of 1 (immediately) to 4 (as far as possible). The same scenarios used for dread were also used in temporal discounting (See Appendix D).

## **Procedure**

Undergraduate students were recruited through SONA and through a CANVAS announcement from selected courses in the Department of Psychology. Those who wished to participate proceeded with the survey and were free to discontinue the process should they begin experiencing any distress from the survey. In chronological order, participants completed the first section where they read the scenarios and gave dread and temporal discounting ratings. Then, they filled out the BIS/BAS scale. In the last section, participants completed the Big 5 personality test. Demographics and information to grant extra credit were collected at the end of the survey. The survey length was no more than 30 minutes.

## **Analytic strategy**

All individual scales were scanned for missing data before performing final computations. Data for a participant was deleted when responses for an entire section were missing. Of the 475 responses, 65 were removed for missing entire sections or failing to complete the rest of the survey, leaving 410 responses. After clearing out the 65 participants, percentage of missing data was less than 1%. All missing responses for each sub scale was replaced with the series mean as this method has been remained a reliable way to address data with little to several missing values across individual scales. (Dodeen, 2003). All outliers identified in the preliminary analysis were retained in the data set. Chronbach's alpha for the dread and temporal discounting items were .81 and .83, respectively. Chronbach's alpha for The Big 5 and the BIS/BAS scales were .67 and .76, respectively.

A simple regression was conducted and was later followed up with four separate

moderation analyses. The main predictor variable for this study is dread, and the outcome variable is temporal discounting. There were four separate moderation analyses that include the following variables: Neuroticism, Extraversion, BIS, and BAS Reward Responsiveness. Both simple slopes tests were calculated using the Excel template developed by Dawson and Richter (2006).

Outliers present in this study were not removed nor were they changed in any manner. Looking at the scales, it is reasonable to have participants with extreme answers. Data analysis was conducted using SPSS and Excel.

## **Results**

Table 1 lists all the descriptive statistics and zero-order correlations for all variables used in this study. A simple linear regression was used to determine if dread is a significant predictor of temporal discounting. Results showed that dread significantly predicted temporal discounting,  $B = .56$ ,  $t = 18.57$ ,  $p < .001$ , 95% CI [.46, .60]. In general, individuals that scored higher on dread were significantly more likely to delay negative events and thus discount earlier ones. Furthermore, dread accounted for 46% of the variance,  $R^2 = .46$ ,  $F(1, 408) = 344.99$ ,  $p < .001$ . To explore what other factors could moderate the relationship between dread and temporal discounting, two sets of moderation analysis were conducted after the simple regression analysis. One set encompassed moderators using the personality traits neuroticism and extraversion; the other used BIS and BAS Reward Responsiveness as moderators. All variables were centered prior to the analyses.

Table 2 lists all the coefficients,  $t$  values,  $p$  values, confidence intervals, and semi-partial correlations for all variables within each regression model. The first set of

moderation models incorporated neuroticism and extraversion; both moderators were in their own separate models. For neuroticism, the model was significant,  $R^2 = .43$ ,  $F(3, 406) = 102.31$ ,  $p < .001$ . There was a main effect for dread,  $B = .53$ ,  $t(409) = 16.02$ ,  $p < .001$ . There was no main effect for neuroticism,  $B = -.04$ ,  $t(409) = -.62$ ,  $p = .537$ . There was no significant interaction between neuroticism and dread,  $B = -.001$ ,  $t(409) = -.12$ ,  $p = .905$ . Similarly, the model for extraversion and dread was significant,  $R^2 = .43$ ,  $F(3, 406) = 103.65$ ,  $p < .001$ . Once again, a significant effect for dread was found,  $B = .53$ ,  $t(409) = 16.92$ ,  $p < .001$ . There was no significant effect for extraversion,  $B = -.09$ ,  $t(409) = -1.62$ ,  $p = .105$ . There was also no significant interaction effect,  $B = .001$ ,  $t(409) = .33$ ,  $p = .742$ .

The next moderator investigated was BIS. The model was significant,  $R^2 = .44$ ,  $F(3, 406) = 107.83$ ,  $p < .001$ . There was a significant effect for dread,  $B = .56$ ,  $t(409) = 16.63$ ,  $p < .001$ . There was also a significant effect for BIS,  $B = .32$ ,  $t(409) = 2.62$ ,  $p = .009$ . Higher scores on the BIS predicted higher scores on temporal discounting. Additionally, results yielded a significant interaction between dread and BIS,  $B = .02$ ,  $t(409) = 2.11$ ,  $p = .036$ . Around 6% of the variance was uniquely accounted for by the interaction between dread and BIS. A simple slopes analysis revealed that the slope for low BIS was significant  $t(409) = 3.23$ ,  $p < .001$ , as well as the slope for high BIS,  $t(409) = 2.00$ ,  $p = .04$ . In other words, at low levels of dread, individuals with lower BIS were more likely to delay negative experiences. However, across high levels of dread, individuals with low BIS were significantly less likely to delay an event (see Figure 1).

The last moderation model involved BAS Reward Responsiveness. The model was significant,  $R^2 = .44$ ,  $F(3, 406) = 106.78$ ,  $p < .001$ . There was a significant main

effect for dread,  $B = .53$ ,  $t(409) = 17.54$ ,  $p < .001$ . There was no main effect for BAS Reward Responsiveness,  $B = .24$ ,  $t(409) = 1.35$ ,  $p = .178$ . The interaction between dread and BAS Reward Responsiveness was significant,  $B = .04$ ,  $t(409) = 2.58$ ,  $p = .009$ . Around 1% of the variance was uniquely accounted for by the interaction between dread and BAS Reward Responsiveness. A simple slopes analysis revealed an interaction similar to BIS and Dread: across lower levels of dread, those with lower BAS Reward scores were more likely to delay negative events more than those with high BAS,  $t(409) = .96$ ,  $p = .33$ . Across high levels of dread, individuals with high BAS RR were significantly more likely to delay an event than individuals with low BAS RR,  $t(409) = 1.34$ ,  $p = .02$  (see Figure 2). A simple slopes analysis reveals that the slope for low BAS RR was significant,  $t(409) = 1.00$ ,  $p = .33$ , and the slope for high BAS RR was significant as well,  $t(409) = 1.32$ ,  $p = .18$ .

**Table 1.***Descriptive Statistics and Zero-Order Correlations*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Dread	72.51	13.30					
2. Temporal Discounting	50.07	10.84	.68**				
3. Neuroticism	26.33	6.56	-.38**	-.26*			
4. Extraversion	29.06	7.34	-.02***	-.18*	.20**		
5. BIS	12.74	3.69	-.46**	-.21**	.51**	.20**	
6. BAS RR	8.23	2.30	.04	.02	-.04	-.14*	.32**

*Note.* *M* means mean, and *SD* indicates standard deviation. BAS RR stands for BAS Reward Responsiveness. \* indicates  $p < .05$ , \*\* indicates  $p < .001$ .

**Table 2**

*Unstandardized Betas, t-values, Significance, 95% Confidence Intervals, Semi-Partial Correlations*

<i>Model</i>	<i>Variable</i>	<i>Unstandardized</i>				<i>Correlations</i> <i>Semi-partial</i>
		<i>B</i>	<i>t</i>	<i>p</i>	<i>95% CI</i>	
1	Dread	.53	17.54	.000**	[.48, .60]	.66
2	Dread	.53	16.02	.000**	[.46, .59]	.60
	Neuroticism	-.04	-.62	.537	[-.17, .09]	-.02
	Dread*Neuroticism	-.01	.12	.905	[-.01, .01]	-.01
3	Dread	.53	16.92	.000**	[.46, .59]	.63
	Extraversion	-.91	-1.62	.105	[-.20, .02]	-.06
	Dread*Extraversion	.01	.33	.742	[-.01, .01]	.01
4	Dread	.56	16.63	.000**	[.50, .63]	.62
	BIS	.32	2.62	.009*	[.08, .56]	.10
	Dread*BIS	.02	2.11	.036*	[.01, .03]	.08
5	Dread	.53	17.58	.000**	[.47, .59]	.65
	BAS RR	.24	1.40	.178	[-.11, .58]	.05
	Dread *BAS RR	.04	2.58	.010*	[.01, .06]	.10

*Note.* \* indicates significance at  $p < .05$ , \*\* indicates significance at  $p < .001$

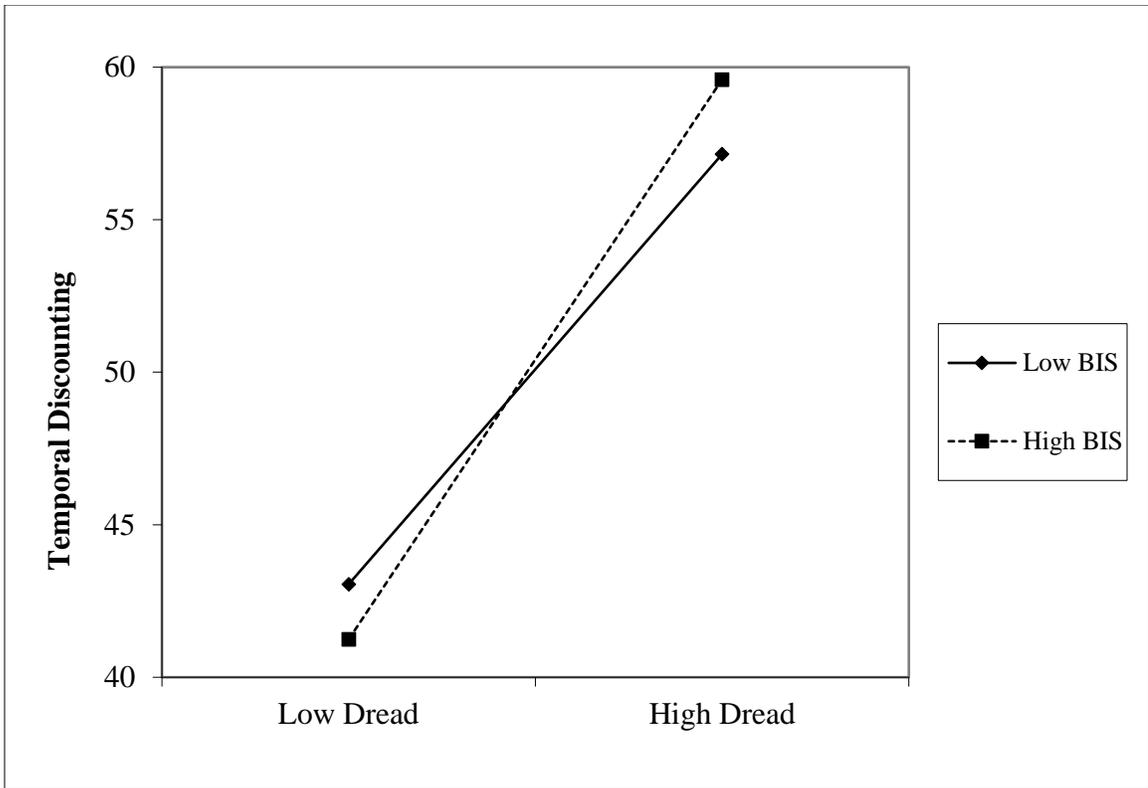


Figure 1. Simple Slopes Interaction: Differences Between Low and High Scores on BIS Across Low and High Levels of Dread

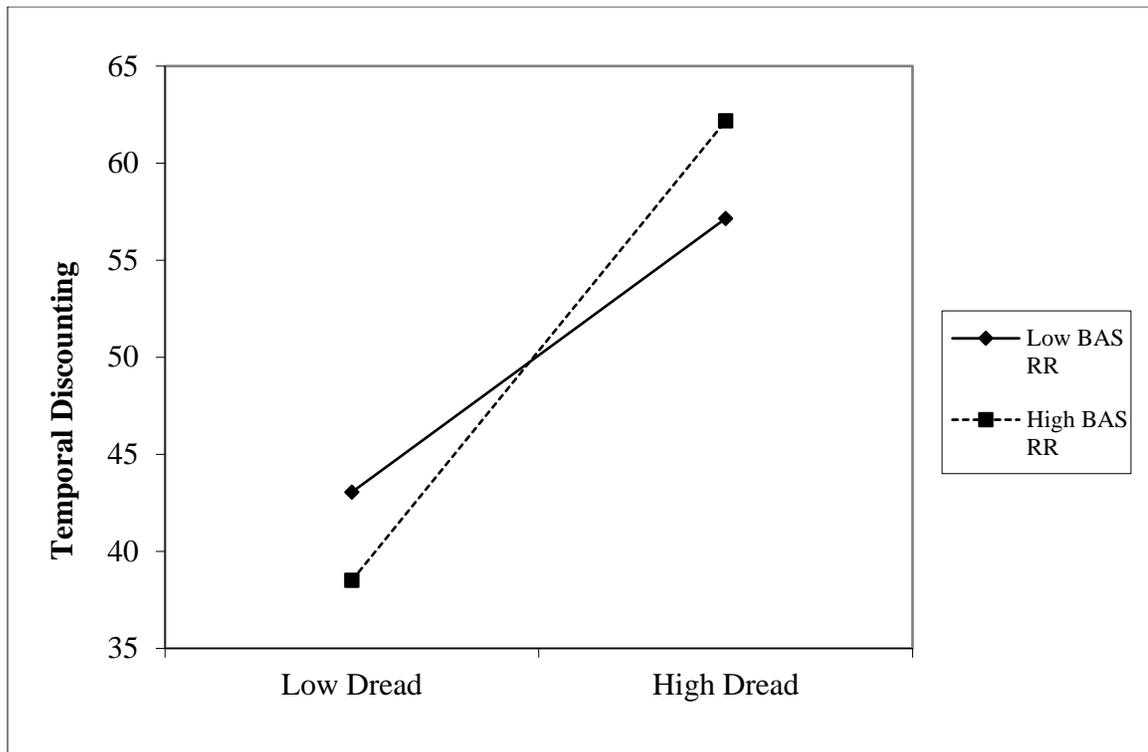


Figure 2. Simple Slopes Interaction: Differences Between Low and High Scores on Behavioral Activation Reward Responsiveness Across Low and High Levels of Dread.

## IV. DISCUSSION

Temporal discounting is the tendency to value immediate rewards over rewards offered at a later time. However, much less is known about this phenomenon when decision outcomes are negative. The focus of the current study was to examine temporal discounting in the context of dread, a negative emotional state. The literature suggests that there is some conflict between the results of various studies examining temporal discounting with negative outcomes. Some findings suggest that people prefer to delay losses or negative events (Frederick et al., 2002; Thaler, 1981). Others present the opposite findings, suggesting that individuals prefer to experience negative outcomes immediately rather than to delay (Harris, 2012; Michel et al., 1969). These inconsistencies yield uncertainty as to how people will delay negative experiences and whether temporal discounting is moderated by personality. The primary objective of this study was to examine the relationship between temporal discounting and dread. Harris (2012) published the first study which specifically focused on how dread can affect temporal discounting and found that dread led to people preferring to get a negative experience out of the way quicker rather than to delay it. Her work suggests that dread is indeed a factor that can influence temporal discounting. A secondary objective of this research was to examine whether individual differences modulate this relationship in order to get a better understanding of how dread functions across different personality profiles, such as traits indexed by the Big 5 Personality Inventory and the BIS/BAS avoidance/approach systems. Unlike the regression analysis, these moderation analyses were exploratory. Of the five personality traits, there is evidence showing that neuroticism and extraversion are associated with temporal discounting, including that

associated with negative events (Manning, 2014; Hirsh et al., 2010; Steinglass et al., 2017). Neurotic people are more avoidant of negative outcomes and thus may be more inclined to delay any negative event or outcome. Extraverts, on the other hand, tend to be more impulsive and may prefer an immediate resolution, regardless of whether the outcome is positive or negative. (Hirsh et al., 2010; Liu et al., 2013). In short, both these personality traits are connected to temporal discounting and showed potential in being moderators for dread and temporal discounting.

In terms of the BIS and BAS, the BIS is associated with higher delay rates for negative events (Sun et al, 2020) while the BAS was associated with less delay rates for positive outcomes (Pegg, Jeong, & Kuwajawa, 2021). Like neuroticism and extraversion, the BIS/BAS' connection with temporal discounting illustrated by the literature make them reasonable candidates for the moderation analyses. The purpose of this study was to investigate if dread is a significant predictor of temporal discounting and if this relationship was moderated by the following factors: extraversion, introversion, the BIS and Bas Reward Responsiveness systems.

Although the results for the regression analysis assessing if dread predicted temporal discounting did show a significant relationship between dread and delay discounting, the direction of this relationship did not support the initial hypothesis which stated that high levels of dread would be less likely to delay dreadful events in order to get said event over with. Instead, the data favor the alternate explanation: individuals who have higher levels of dread have a higher tendency to delay or push back dreadful scenarios as far as possible. These results, although they do not support the initial hypothesis, are consistent with work that suggest dread leads to delaying negative events

(Frederick et al., 2002; Thaler, 1981) Both studies used similar scenarios, and Thaler (1981) even used visual stimuli to elicit dread, something the present study did not do. One possible reason for these inconsistencies could be the object or situation that is being dreaded. Berns and colleagues (2006) discovered that people will get a painful experience out of the way as soon as possible even if the pain is more intense than after a delay. However, the dread of a small shock to the foot is very different than the dread of having something embarrassing happening on a blind date. Additionally, Harris (2012) found that, while individuals preferred to get most aversive experiences out of the way – the main point that served as the basis for the original hypothesis in the present study – there were certain events (such as a dentist appointment) that individuals chose to delay more than the other items. She was able to analyze the different categories to see which elicited higher tendencies to delay vs. tendencies to get something out of the way because of how she organized the scenarios. Looking back, certain scenarios, such as the COVID-testing and questions about dating did elicit more dread than others. It could be that the scenarios in the present study elicited more intense feelings of dread than the ones in Harris' study.

The next set of secondary hypotheses involved two specific personality traits: neuroticism and extraversion. To reiterate, the first hypothesis explored the relationship between dread and temporal discounting and stated that dread would be associated with a higher tendency to get a negative event out of the way more quickly. With the moderation analyses, the question of what factors moderate the relationship between dread and temporal discounting was addressed. For the two personality traits that made it into the final model, it was predicted that across higher levels of dread, people who were more

neurotic would be more likely to delay a negative event. For extraversion, the opposite prediction was made. Across higher levels of dread, those who were more extraverted would also want to get negative events out of the way quicker. Data from the moderation analysis with neuroticism and the moderation analysis with extraversion did not support either of these hypotheses. Furthermore, there have been no other studies that use the same moderation models for neuroticism and extraversion. In speculation, it could be that dread simply operates independently from either of these variables and does not interact with them despite there being a significant association between dread and neuroticism/extraversion (Löckenhoff et al., 2016; Morrone-Strupisky, 2004). Based on this, it may be that neuroticism and extraversion do not perform any moderation and instead function as significant predictors themselves (Hirsh, Morisano, & Peterson, 2008; Manning et al., 2014; Ostaszewski, 1996).

The final set of secondary hypotheses incorporated the BIS and BAS Reward Responsiveness. For the BIS model, it was hypothesized that across higher levels of dread, individuals who had a stronger BIS would be more likely to delay negative experiences more than those with a lesser BIS. For the BAS Reward Responsiveness model, it was predicted that, across higher levels of dread, those with a higher BAS Reward Responsiveness would choose the immediate options rather than delaying. Only the BIS moderation hypothesis was supported; not only was the effect significant, but the interaction effect was in line with the hypothesis. For BAS Reward Responsiveness, the interaction effect was significant, but the results did not support the hypothesis. Across high levels of dread, there was still a significant interaction between BAS Reward Responsiveness and Dread; individuals with higher reward responsiveness were more

likely to delay negative events. Essentially, both variables had the same moderation effect which is interesting considering that they measure completely different systems (Heubeck et al., 1998). However, this does not mean they cannot have the same influence as seen in this study. Results from the BIS moderation model are consistent with the literature that stipulate BIS as a measure of avoidance for negative outcomes and behaviors (Carver & White, 1994; Hirsh et al., 2016). However, these studies do not take into account that experiencing prolonged dread is in itself an aversive experience (Berns et al., 2006). In terms of temporal discounting, the results are also consistent with the notion that individuals with a stronger BIS tend to delay negative events more (While the hypothesis for BAS Reward responsiveness was not supported, the results made sense. Both systems are responsible for measuring their own specific affects (positive or negative) and are generally unrelated to each other, but they still reveal similar information about impulsivity and avoidance (Carver & White, 1994). In general, results from the BIS moderation coincide with the literature that characterize the BIS as the motivation system primarily responsible for avoidance-related behaviors. For BAS Reward Responsiveness, the literature does not stipulate a direct connection with behavioral activation and avoidance because this connection has not been studied. The present study was the first to explore this connection. Hence, this is a unique finding that suggests BAS Reward Responsiveness is associated with behavioral inhibition at least across higher levels of dread. In general, the results from the moderation analyses suggest that people with high levels of BIS and BAS Reward Responsiveness are more inclined to delay dreadful experiences when the dread is more intense.

There are a few limitations to this study. First and foremost, this study uses a

convenience sample limited to undergraduate students at Texas State University which limits its generalizability to the undergraduate student body. Previous studies on temporal discounting used more diverse samples, but a smaller sample size. Therefore, the sacrifice for power came at the cost of external validity. Furthermore, out of all 410 responses, 80% were responses from females. This poses an issue as the distribution of the genders is very uneven and thus, results would be further constricted in their generalizability to the greater population. Gender would most likely need its own model or at least should have been added as a covariate. This was overlooked during the study, an issue that could have been easily avoided. Additionally, because this is a survey-based study, there is the possibility that some individuals were not completely honest with their responses and rushed to complete the study. If this is the case, then some of the data is misleading. Another issue lies in the nature of the dread items. Many of the dread questions were developed to illustrate scenarios that would elicit dread of embarrassment or uncertainty (Harris, 2012; Liu et al., 2013). However, there was no direct reference for the development of these questions; they were instead developed as a result of informal conversations with other individuals. Essentially, there was no real organization of the dread items into specific sections, such as social (e.g., going on a blind date) medical (e.g., going to the dentist), or academic (e.g., presentations). In short, external validity, lack of incorporating any relevant covariates, and lack of organization for the dread items need to be addressed in any replications or follow-ups.

There are some future directions this topic can take. This study, while it contributes to the general literature, does not resolve the debate about how dread predicts temporal discounting. Follow-up studies should continue finding evidence of dread's true

effect on temporal discounting. Resolving the debate may be a matter of conducting different types of analyses that explore other factors that influence the relationship between dread and temporal discounting. It is likely that, in the context of different variables, dread could lead to higher delay rates or less. This may require different methods of analyses (like a moderation). Another direction studies can take is to continue focusing on college students. Many college students have verbally admitted that they choose to delay important things like presentations, conferences, and other academic-related activities because of dread. Such studies should verify if dread has a connection/effect on temporal discounting for college students and if this type of delaying is maladaptive. In general, knowing how and why an individual delays negative events is just as – if not more – important than knowing how one delays rewards. Delaying a shock to the foot is one thing but delaying an important hospital visit meant to address a clinical concern (e.g., a fractured bone) is dangerous. If dread really does lead people to delay events perceived as negative, then interventions must be taken to address this feeling of dread and either mitigate or eliminate it.

To summarize, this study was designed to focus on dread and its ability to predict temporal discounting and investigate what factors moderate this relationship. The results found that dread is associated with higher delaying rates, meaning individuals will want to delay a negative event as far as possible. For neuroticism and extraversion, there was no significant interaction with dread. Lastly, it was found that the BIS/BAS Reward Responsiveness moderate the relationship between dread and temporal discounting; across higher levels of dread, people with stronger BIS and BAS Reward Responsiveness were more likely to delay events rather than get them out of the way quicker. Results

from this study add to the greater literature of dread and temporal discounting while adding a new element in the form of interaction effects. Knowing what factors moderate the relationship between dread and temporal discounting can give insight as to what contexts dread has a positive relationship on temporal discounting or negative.

In conclusion, this study shows how dread predicts temporal discounting and how the BIS/BAS Reward Responsiveness moderate this relationship, further contributing to the greater literature about negative discounting and contributing unique findings in the form of moderation models that build upon and enhance our understanding of dread and temporal discounting. It is with high hopes that results from this study will assist future researchers in exploring additional factors in order to move onto addressing clinical concerns related to delaying negative experiences.

## APPENDIX SECTION

### Appendix A

#### BIS/BAS

Each item of this questionnaire is a statement that a person may either agree with or disagree with. For each item, indicate how much you agree or disagree with what the item says. Please respond to all the items; do not leave any blank. Choose only one response to each statement. Please be as accurate and honest as you can be. Respond to each item as if it were the only item. That is, don't worry about being "consistent" in your responses. Choose from the following four response options:

- 1 = very true for me
- 2 = somewhat true for me
- 3 = somewhat false for me
- 4 = very false for me

1. A person's family is the most important thing in life.
  2. Even if something bad is about to happen to me, I rarely experience fear or nervousness.
  3. I go out of my way to get things I want.
  4. When I'm doing well at something I love to keep at it.
  5. I'm always willing to try something new if I think it will be fun.
  6. How I dress is important to me.
  7. When I get something I want, I feel excited and energized.
  8. Criticism or scolding hurts me quite a bit.
  9. When I want something I usually go all-out to get it.
  10. I will often do things for no other reason than that they might be fun.
  
  11. It's hard for me to find the time to do things such as get a haircut.
  12. If I see a chance to get something I want I move on it right away.
  13. I feel pretty worried or upset when I think or know somebody is angry at me.
  14. When I see an opportunity for something I like I get excited right away.
  15. I often act on the spur of the moment.
  16. If I think something unpleasant is going to happen I usually get pretty "worked up."
  17. I often wonder why people act the way they do.
  18. When good things happen to me, it affects me strongly.
  19. I feel worried when I think I have done poorly at something important.
  20. I crave excitement and new sensations.
  
  21. When I go after something I use a "no holds barred" approach.
  22. I have very few fears compared to my friends.
  23. It would excite me to win a contest.
  24. I worry about making mistakes.
-

Items other than 2 and 22 are reverse-scored.

BAS Drive: 3, 9, 12, 21

BAS Fun Seeking: 5, 10, 15, 20

BAS Reward Responsiveness: 4, 7, 14, 18, 23

BIS: 2, 8, 13, 16, 19, 22, 24

Items 1, 6, 11, 17, are fillers.

The fact that there are three BAS-related scales and only one BIS-related scales was not planned or theoretically motivated. The factors emerged empirically, from an item set that was intended to capture diverse manifestations of the BAS, according to various theoretical statements. It is likely that a broader sampling of items on the BIS side would also have resulted in more than one scale. I do not encourage combining the BAS scales, however, because they do turn out to focus on different aspects of incentive sensitivity. In particular, Fun Seeking is known to have elements of impulsiveness that are not contained in the other scales.

## Appendix B

Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Indicate for each statement whether it is 1. Very Inaccurate, 2. Moderately Inaccurate, 3. Neither Accurate Nor Inaccurate, 4. Moderately Accurate, or 5. Very Accurate as a description of you.

		Very Inaccurate	Moderately Inaccurate	Neither Nor Inaccurate	Moderately Accurate	Very Accurate	
1. Am the life of the party.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(1+)
2. Feel little concern for others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(2-)
3. Am always prepared.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(3+)
4. Get stressed out easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(4-)
5. Have a rich vocabulary.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(5+)
6. Don't talk a lot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(1-)
7. Am interested in people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(2+)
8. Leave my belongings around.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(3-)
9. Am relaxed most of the time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(4+)
10. Have difficulty understanding abstract ideas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(5-)
11. Feel comfortable around people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(1+)
12. Insult people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(2-)
13. Pay attention to details.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(3+)
14. Worry about things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(4-)
15. Have a vivid imagination.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(5+)
16. Keep in the background.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(1-)
17. Sympathize with others' feelings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(2+)
18. Make a mess of things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	(3-)

19. Seldom feel blue.	O	O	O	O	O	(4+)
20. Am not interested in abstract ideas.	O	O	O	O	O	(5-)
21. Start conversations.	O	O	O	O	O	(1+)
22. Am not interested in other people's problems.	O	O	O	O	O	(2-)
23. Get chores done right away.	O	O	O	O	O	(3+)
24. Am easily disturbed.	O	O	O	O	O	(4-)
25. Have excellent ideas.	O	O	O	O	O	(5+)
26. Have little to say.	O	O	O	O	O	(1-)
27. Have a soft heart.	O	O	O	O	O	(2+)
28. Often forget to put things back in their proper place.	O	O	O	O	O	(3-)
29. Get upset easily.	O	O	O	O	O	(4-)
30. Do not have a good imagination.	O	O	O	O	O	(5-)
31. Talk to a lot of different people at parties.	O	O	O	O	O	(1+)
32. Am not really interested in others.	O	O	O	O	O	(2-)
33. Like order.	O	O	O	O	O	(3+)
34. Change my mood a lot.	O	O	O	O	O	(4-)
35. Am quick to understand things.	O	O	O	O	O	(5+)
36. Don't like to draw attention to myself.	O	O	O	O	O	(1-)
37. Take time out for others.	O	O	O	O	O	(2+)
38. Shirk my duties.	O	O	O	O	O	(3-)
39. Have frequent mood swings.	O	O	O	O	O	(4-)
40. Use difficult words.	O	O	O	O	O	(5+)
41. Don't mind being the center of attention.	O	O	O	O	O	(1+)
42. Feel others' emotions.	O	O	O	O	O	(2+)
43. Follow a schedule.	O	O	O	O	O	(3+)
44. Get irritated easily.	O	O	O	O	O	(4-)
45. Spend time reflecting on things.	O	O	O	O	O	(5+)
46. Am quiet around strangers.	O	O	O	O	O	(1-)

47. Make people feel at ease.	<input type="radio"/>	(2+)				
48. Am exacting in my work.	<input type="radio"/>	(3+)				
49. Often feel blue.	<input type="radio"/>	(4-)				
50. Am full of ideas.	<input type="radio"/>	(5+)				

Note. These five scales were developed to measure the Big-Five factor markers reported in the following article: Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment, 4*, 26-42.

The numbers in parentheses after each item indicate the scale on which that item is scored (i.e., of the five factors: (1) Extraversion, (2) Agreeableness, (3) Conscientiousness, (4) Emotional Stability, or (5) Intellect/Imagination) and its direction of scoring (+ or -). These numbers should not be included in the actual survey questionnaire. For further information on scoring IPIP scales, click the following link:

## Appendix C

**Dread** This section will present brief scenarios that people typically dread. For something to be dreadful, it must be a future-oriented event that instills a feeling of apprehension. For the following scenarios, rate how much you dread each one.

	Not at all	Moderately Inaccurate	Somewhat	Quite a bit	A lot
1. Preparing to get bloodwork done	○	○	○	○	○
2. Giving a presentation in front of the class.	○	○	○	○	○
3. Driving home at night after a night shift	○	○	○	○	○
4. Going to see the dentist	○	○	○	○	○
5. Asking a person you like out on a date	○	○	○	○	○
6. Checking your final grade on an exam you found difficult.	○	○	○	○	○
7. Telling someone you are romantically interested in them.	○	○	○	○	○
8. Leaving in the middle of a big lecture due to something urgent.	○	○	○	○	○
9. Receiving a text from your mother/father saying: “call me as soon as you can. We need to talk.”	○	○	○	○	○
10. Getting tested for COVID-19.	○	○	○	○	○
11. Being alone at your place	○	○	○	○	○
12. Finals	○	○	○	○	○
13. Heights	○	○	○	○	○
14. Having all the attention on you.	○	○	○	○	○
15. Going on a boat ride.	○	○	○	○	○
16. Being late to a meeting.	○	○	○	○	○
17. Going shopping for clothes.	○	○	○	○	○
18. Boarding an airplane.	○	○	○	○	○
19. Having to write essays	○	○	○	○	○
20. Going in elevators.	○	○	○	○	○
21. Driving on a crowded highway.	○	○	○	○	○
22. Being in charge of a team project	○	○	○	○	○
23. Finding out if you have a chronic illness.	○	○	○	○	○
24. Going to work.	○	○	○	○	○
25. Receiving news about a terminal illness you have.	○	○	○	○	○

## Appendix D

**Temporal Discounting** is the the principle of preferring immediate things over things that come late. In the context of this study, an important component of this idea is whether an individual is willing to either postpone an event or get it over with.

For the following scenarios, rate how far back you would push back this event. (Would you rather get it over with as soon as possible or as late as possible?)

	Get it over with as soon as possible	Get it over with, but not too soon	Push it back, but not too far	Push it back as much as possible
1. Preparing to get bloodwork done	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Giving a presentation in front of the class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Driving home at night after a night shift	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Going to see the dentist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Asking a person you like out on a date	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Checking your final grade on an exam you found difficult.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Telling someone you are romantically interested in them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Leaving in the middle of a big lecture due to something urgent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Receiving a text from your mother/father saying: "call me as soon as you can. We need to talk."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Getting tested for COVID-19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Being alone at your place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Finals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Heights	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Having all the attention on you.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Going on a boat ride.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Being late to a meeting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Going shopping for clothes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Boarding an airplane.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Having to write essays	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- |   |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| 20. Going in elevators.                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 21. Driving on a crowded highway.                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 22. Being in charge of a team project                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 23. Finding out if you have a chronic illness.        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 24. Going to work.                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 25. Receiving news about a terminal illness you have. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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