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MORTALITY SALIENCE AND MORAL DILEMMAS:

THE IMPACT OF STRESS ON REGRET

IN TROLLEY PROBLEM DECISION-MAKING

A Thesis Presented to the Graduate Faculty

of Fort Hays State University in

Partial Fulfillment of the Requirements for

the Degree of Master of Science

by

Nicolas Perdomo

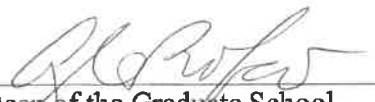
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ABSTRACT

The present study experimentally investigated the effects of stress, in the form of mortality salience, on decision regret in participants presented with the trolley problem. Participants (N = 166) were recruited through Amazon Mechanical Turk and randomly assigned to a mortality salience or threatening control topic (dental pain) writing prompt and either the standard trolley problems (i.e., the "switch" and "footbridge" dilemmas) or an experimental reversal where the default was five people on the tracks instead of the usual one. The effects of mortality salience on affective regret, the trolley reversal on cognitive regret, and the relationship between mortality salience and utilitarian choices were examined. While findings were not significant, this study did reveal that the experimental trolley reversal has a significant impact on choosing other than the status quo in the trolley problem. Further research examining the extraneous factors which may have contributed to nonsignificant results in this study is needed.

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INTRODUCTION

Morality has been the subject of philosophical debate for centuries and has influenced religions, politics, and culture throughout history. One of the central components of this philosophical area is the discernment between right and wrong. The Western tradition of this philosophical debate extends as far back as the fourth century in Classical Greece (Tassy et al., 2012). Modern research on moral decision-making typically involves tasks assigned to participants in a laboratory setting with moral tasks falling into two different categories (Garrigan et al., 2016). One is moral evaluations where participants judge whether another's action(s) are moral. The other is moral response decisions in which the participant must think about what they would do in a given hypothetical dilemma. Reasons for moral judgements are often difficult for people to explain. Additionally, peoples' moral beliefs may differ from their moral behaviors (Sauer, 2012). It is this gap of knowledge where research in moral dilemmas lies. Seeking to explain how people make moral decisions in difficult dilemmas, research focuses on what factors impact moral decision-making processes.

Throughout the COVID-19 (SARS-CoV-2) pandemic, research on real-world examples of moral decision-making has been centered around medical ethics (Andrade, 2019). Allocation of resources and triage priorities are some examples of moral dilemmas medical workers routinely face. These decisions can be described as either utilitarian or deontological in nature. Utilitarianism is an outcome-based morality that determines the morality of an act based on the consequences for overall wellbeing, whereas deontology is rule-based morality focusing on whether an action violates a moral norm (Gawronski & Beer, 2017). In medical decisions, utilitarianism is employed at times for the treatment of burn patients by degree of injury based on the resources and time the hospital has available (Mandal et al., 2016). On the other hand, the

doctor-patient relationship is deontological by nature. Decisions are made to benefit the patient the doctor is attending. Any other treatment would be considered negligent (Mandal et al., 2016). Both moral philosophies have their place in every day medical decisions. Depending on the level of care and treatment needed, it seems these philosophies can be applied in separate situations. Public health emergencies, however, are a situation in which the line becomes blurred.

In a public health emergency, the medical directive changes from trying to save individual lives to maximizing resource allocation to achieve the greatest number of lives saved (Aacharya et al., 2011). Triage systems, for example, categorize patients into five levels of need and evaluate whether they will get treatment. There are ethical concerns within the triage system. The determination of whether a patient requires emergency services may violate their autonomy since this evaluation is not a complete medical evaluation and the decision is made without the patient's consent. However, due to limited resources in a health emergency, maximization of resource allocation becomes crucial to avoid lives lost.

During the COVID-19 pandemic, the decision to initiate lockdowns had to be critically assessed. The costs in well-being from lockdown versus the cost of COVID-19 were considered when countries decided whether to or when to start lockdowns (Savulescu et al., 2020). Public health policy, in these situations, tries to take into consideration the population's personal rights and the long-term outcomes of lockdowns with varying levels of strictness and enforcement. The utilitarian choice may not be popular and may not avoid negative outcomes. Studies have found that public opinion on utilitarian resource allocation for healthcare also depends on the population being helped. When it comes to intensive care for critically ill infants, there is support for utilitarian choices to help children with the best chance of survival the most and attempting to save the greatest number of those children (Savulescu et al., 2020). Knowing the outcome helps

reinforce people's belief that the utilitarian choice is the one which gives the greatest benefit. In real life, the outcomes are not always known, and it is important to know under which circumstances a moral norm may be acceptably broken to save a greater number of lives.

Learning how emotions and reasoning may impact moral judgements, which may lead to public policy and affect the lives of millions, is the basis for moral judgement research utilizing moral dilemmas (Navarette et al., 2012). The types of dilemmas used are based in ethical principles and philosophical theories of morality which seek to explain how moral decisions are made.

Moral Decision-Making Research

The mental processes underlying moral decision-making have been studied for decades. Over the past twenty years, there has been a dramatic shift in this research area (Gawronski & Beer, 2017). Although moral decisions were previously thought to be made as a result of rational thought processes and the application of abstract moral principles, the emphasis on a rationalist approach has diminished. Instead, theories examining the role emotions and intuition play in moral decisions began to lead research. This shift in focus has been one towards psychological processes that impact decision-making.

Current research seeks to integrate these two approaches using moral dilemmas which give participants the option to choose between a utilitarian or deontological outcome. The contrast for participants making decisions in these moral dilemmas, researchers believe, is one between rational thought processes (i.e., utilitarianism) and emotions (e.g., deontology). To explain these competing factors, a third theory has taken hold in the field of moral decision-making research: the dual-process theory.

The dual-process theory is an attempt to reconcile previous contradictions in findings to achieve a synthesis. This theory is that moral decisions are based on many psychological systems, including both conscious reason and emotion, and that the intuitions during moral judgements involve both cognitive and affective processes in a dual-process system (Ugazio et al., 2011). Research investigating the dual-process theory uses fMRI to establish neural correlates during moral judgement tasks involving moral dilemmas.

The dilemmas presented to participants in these studies involve a choice between saving a greater number of people at the expense of a smaller number of people. The scenarios themselves differ with the amount of personal responsibility ascribed to the decision maker depending on if the task involves either impersonal (e.g., flipping a switch to cause an action) or personal actions (e.g., physically moving someone directly).

The personal moral scenarios have been found to involve more emotional processes, whereas the impersonal moral scenarios use more cognitive processes in the brain. In other words, cognitive mechanisms contribute to moral judgements based on the consequences of an action (utilitarianism) and emotional mechanisms contribute to moral judgements based on the means of an action (deontology) (Ugazio et al., 2011). In these studies, personal moral scenarios involve judging whether it is permissible to kill one person to save others while impersonal scenarios refer to those where the judgement is on whether it is acceptable for one person to be sacrificed, through other means not involving the participant acting directly, to save others.

Recent research has sought to expand on the dual process theory and incorporate the two types of processes. Suggesting that both emotions and conscious reasoning are involved, some findings indicate a competition between both processes to produce an outcome during the moment of the judgement. Neuroimaging research has given some credence to this theory

(Ugazio et al., 2011). Current research leans in this direction, considering the role psychological processes that include both emotions and rational thought at the same time have on moral decisions (Gawronski et al., 2017). One popular tool in these studies is the trolley dilemma (Ugazio et al., 2011).

The Trolley Dilemma

In a 1967 paper, Phillipa Foot outlines the following thought experiment: suppose one is driving a runaway tram that can only be steered from one track onto another. On the current track there are five people and on the other, only one. Anyone on the track the driver is on will be killed. The question is whether the driver should divert the tram towards the second track and kill the single worker or remain on the same track and kill the five workers. This thought experiment presents a forced binary choice for participants in empirical research on moral decisions. In psychological studies, variations of the trolley dilemma are used to distinguish between which processes are used in each type of dilemma and how they differ (Greene et al., 2001).

Foot's paper was written to address the doctrine of double effect of moral issues. According to the doctrine's logic, an act can be morally acceptable even if it has negative consequences as long as the consequences were not intended. Although in real life one can never know with certainty the outcome of every high-risk moral decision as cleanly as in this thought experiment, the intent matters as well (Foot, 1967).

Due to these considerations of moral philosophy and a focus on consequences, the trolley dilemma remains one of the most common tasks used in moral decision-making research. It is commonly divided into two versions: impersonal (switch) and personal (footbridge). The switch version involves judging whether it is morally acceptable to use a switch to divert a runaway trolley to a different track where it will kill one person and not the five people on the original

track. The footbridge version involves pushing one person from a footbridge onto the tracks in order to stop the train from hitting five people. Pushing someone onto the tracks in this scenario is considered a utilitarian moral judgement, sacrificing the needs of a few in order to provide for many. While utilitarian judgment is considered more strictly rational than deontological judgment, many studies have found both emotional and rational processing required for both.

This main philosophical distinction between the footbridge and switch versions of the trolley dilemma may be due to what is known as the Means Principle (Feltz & May, 2017). This principle states that, with all other conditions being equal, an action that leads to a bad outcome (e.g., one person's death) as a means to a positive outcome (e.g., saving several lives) is more difficult to justify than if that outcome is due to a side effect of a particular action.

Participants in trolley dilemma research show a difference in responses for the switch and footbridge versions due to this principle. In a meta-analysis on moral dilemmas involving choices, the difference in responses due to the Means Principle in moral judgments was significant (Feltz & May, 2017). Personal contact in moral dilemmas is an important moderating factor. In dilemmas without personal contact (i.e., the switch dilemma), utilitarian trolley decisions are seen less morally ambiguous than in those which involve personal contact (e.g., the footbridge dilemma) (Feltz & May, 2017). Personal contact forces participants to focus on the factor that is morally relevant: causing harm as a means to an outcome.

There has been criticism regarding the use of the trolley problem in moral decision-making research. One major argument is that it usually involves only two drastically different choices which may not be applicable to real world moral decision situations. The outcome is also assumed to be known, which can be unrealistic in real life situations (Goodall, 2010).

However, the trolley problem is likely used in moral decision-making research precisely because of the factors that are criticized. It is useful because it helps identify responses about the correct action and specific areas of strong agreement or disagreement. By changing the rules of the dilemma, the responses themselves can be explored even if those who respond do not understand their own reasoning (Goodall, 2010). Participants who make a utilitarian judgement often are inconsistent with their explanations. An experiment presented both the switch and footbridge versions of the trolley dilemma to participants. Participants were then presented with a reversal (i.e., the footbridge version then the switch version). Instead of the usual choice between intervening by pulling the switch or pushing a person onto the tracks or simply not intervening and allowing the trolley to continue on its path, the participants were asked about the legal and moral acceptability and the intentionality of either course of action. Researchers found some inconsistencies in the responses. While most participants found pushing the person off the footbridge as more intentional than pulling the switch, this percentage lowered when the order of these dilemmas was reversed. This suggests that there may be an emotional activation during the footbridge dilemma which led to participants being more sensitive to moral violations, which include intentionality (Lanteri et al., 2008). Finally, the outcome itself is known in this situation. In a hypothetical moral dilemma such as the trolley problem, participants are presented with every possible outcome which does not accurately reflect the information present during a real-world moral dilemma. According to the doctrine of double effect, however, the morality of an act does not change even if a negative consequence is known beforehand.

One factor in the research that affects utilitarian moral judgements has been found to be emotions. In a study on the trolley problem, emotional arousal was associated with a reduced tendency to choose the utilitarian option (Navarrete et al., 2012). Emotional arousal was greater

when the dilemma resolution involved an action and not an omission of an action (Navarrete et al., 2012). This is consistent with the dual-process model that suggests emotional conflict occurs when forced to choose between reducing harm and rational utilitarianism (Navarrete et al., 2012).

Emotions

In a 2001 study by Greene et al., participants responded to a series of dilemmas which included the switch and footbridge versions of the trolley problem. Dilemmas were split between “moral” and “non-moral” based on the response from participants during a pilot study (Greene et al., 2001). Non-moral dilemmas gave participants the decision between traveling by bus or train with a time constraint, or between two coupons to use at a store, whereas moral dilemmas were variations of the trolley dilemma. Dilemmas were further split into “personal” dilemmas versus “impersonal” dilemmas. Personal referred to up-close situations like pushing someone in the footbridge dilemma, and impersonal referred to situations where there was no direct harm like the trolley dilemma or keeping money from a lost wallet. As a result, the switch version of the trolley dilemma was coded as “moral-impersonal” and the footbridge version was coded as “moral-personal”.

Participants judged whether the actions taken in these dilemma resolutions (i.e., pushing the man off the footbridge) were morally appropriate or not (Greene et al., 2001). fMRI readings showed that in the moral-personal conditions participants brains registered higher activity in emotional centers of the brain and lower activity in areas associated with working memory, which has been associated with less activity during periods of emotional processing when compared to times of cognitive processing.

With fMRI scans, researchers determined the brain areas active in moral-personal conditions were significantly different than in moral-impersonal and non-moral conditions. This

increased activation correlated with more emotional processing resulting in longer reaction times (Greene et al., 2001). This study confirmed that the switch and footbridge dilemmas engage participants' brains according to the dual-process model: a conflict of emotional and rational thought. Moral dilemmas in general elicit strong emotional reactions, with personal moral dilemmas eliciting significantly stronger emotions than impersonal moral dilemmas (Horne & Powell, 2016).

Inducing different kinds of emotions can impact moral judgement (Horne & Powell, 2016). In moral tasks involving personal responsibility, disgust and anger have been found to change the perceived permissibility of a moral choice. The use of anger and disgust as emotional inducements is related to the approach-withdrawal hypothesis. This hypothesis, put forward by researchers investigating the connection between emotions and motivation, states that approach emotions are linked to those that elicit behavior involving approaching a person, place, or thing. By contrast, withdrawal emotions elicit the opposite behavior.

The emotions themselves may have other effects, whether positive or negative, anger and disgust are both considered negative emotions but have different motivations (i.e., approach and withdrawal). Anger, an approach emotion, was shown to increase judgements of moral permissibility. Disgust, on the other hand, is a withdrawal emotion and was shown to decrease judgements of moral permissibility (Ugazio et al., 2012). Although anger and disgust have been consistently found to impact judgements in moral dilemma research, the causal link is weaker than some studies suggest (Horne & Powell, 2016). Different emotions may be at play when justifying moral judgements. Since moral decisions are often emotionally charged, changing the emotional factor by changing the perceived personal responsibility will likely elicit different moral judgements.

Anticipatory emotions also affect moral dilemma decisions. A study found that utilitarian (i.e., sacrificing a life to save a greater number of lives) and non-utilitarian (i.e., not making a sacrifice in order to save a greater number of lives) options used to resolve moral dilemmas elicit different reported intensities of emotions (e.g., anger, action and inaction regret). Utilitarian choices resulted in more action regret, especially when the act was intentional (i.e., the footbridge dilemma). This regret was closely tied to personal responsibility. In the switch dilemma, which was more impersonal, participants who chose to pull the switch reported higher anger and inaction regret (Pletti et al., 2016). Participants tended to choose the option with the least emotional cost even in switch type dilemmas.

Inaction regret was also more significant in the non-utilitarian, footbridge-type options. This suggests that choosing the utilitarian option is driven not only rational cost-benefit analysis but also by a need to avoid stronger negative feelings, like inaction regret (Pletti et al., 2016). However, this study only examined emotions participants reported, which may underestimate the effect by limiting emotions to only conscious emotions participants could perceive and identify.

Previous research on factors impacting moral decision-making have suggested that knowing the outcome of moral decisions can help detect changes in moral decision-making due to factors such as stress (Starcke et al., 2012). Emerging trends in this research indicate that the impact of stress on moral decisions needs further study. One can imagine that in a real-life situation, faced with the choice of putting yourself at risk to help another or saving yourself would be highly stressful.

Stress

Stress is the physiological and psychological response to experiencing a stimulus that produces a fight-or-flight response in the nervous system. The same brain regions involved in

moral decision-making are sensitive to stress (Starcke et al., 2012) and acute stress impacts the decision-making process (Nowacki et al., 2019). Stress also affects the processing of emotional data (Starcke et al., 2011), which is elicited during moral dilemma tasks. The impact of stress on decision-making is a growing area of research. Due to how stress affects the brain and behavior, it is important to examine different ways that stress can impact the decision-making process.

Cortisol is released as a result of the stress response and has been used in psychological research to measure the physiological stress response. Cortisol has also been found to be involved in cognitive processes (Nowacki et al., 2019). Research on the effects of stress on decision-making has found that the type of stressor and moral dilemma used impact the decision-making process.

Physical stress inductions are not necessarily more conclusive or consistent in their effects than other stress induction tasks. A study on the effects of stress on decision-making in men and women found that different stress inductions (e.g., physiological vs combined physiological and psychological) had different effects on participants' risky choices during decision-making tasks (Nowacki et al., 2019). Men took more risk in physical stress conditions (i.e., dipping a hand in ice water for 3 minutes), whereas women made more risky choices in combined physical and psychological stress conditions (i.e., participants were told their behavior would be analyzed in addition to the ice water hand submersion). Although previous studies have found gender differences in decisions under stress (Singer et al., 2017; Starcke et al., 2011), this study may have led to mixed results. There were differences between male and female participants, with male participants displaying higher risk-taking during physiological stress induction than male participants in the control group but no significant difference in the female groups. The researchers suggested the induction (i.e., submerging a hand into cold water) may have affected common physiological stress measurements, like blood pressure, which was not

measured during this study as well as hormonal changes which were also not measured (Nowacki et al., 2019).

Studies examining how stress impacts moral decisions through a prosocial lens have found mixed results, as well. In these studies, choices are divided into either egoistic, those performed for personal benefit, and altruistic, those made for the benefit of others (Starcke et al., 2012). The physiological stress response has a relationship with egoistic decision-making. (Starcke et al., 2011). One study found a positive relationship between the cortisol response and egoistic choices in highly emotional moral dilemmas where the higher the increase in salivary cortisol the more egoistic decisions were made (Starcke et al., 2012). However, research in this area has not had consistent results.

One study found that stress led to more altruistic decisions in moral dilemmas (Singer et al., 2017). In this study, higher cortisol levels were related to a higher amount of altruistic decisions, which were linked to higher decision certainty and overall positive self-reported emotions. This study found that previous research did not control for gender differences due to the gender effects in the neuroendocrine stress response and to combat this, used only men in the study and controlled for personality variables that may impact the effect of stress on decision-making (Singer et al., 2017). However, this study had a small, solely male sample without accounting for personality factors which may lead to more prosocial decisions (i.e., agreeableness). This study also used every day moral dilemmas exclusively which limits the generalizability.

More research is needed to examine what processes invoke the stress response enough to affect the decision-making. Although findings have varied based on the type of inducement and moral dilemma, there exist consistent trends in the data. The physiological stress response (e.g.,

increase in cortisol) has a relationship with egoistic decision-making (Starcke et al., 2011). While one study showed no significant group differences, a positive relationship was found between participants' physiological stress (i.e., cortisol response) and egoistic decision-making. The larger the increase in stress, the more egoistic their decision-making became. Stress also leads to fewer utilitarian choices, longer decision times, and fewer utilitarian judgments in both personal and impersonal dilemmas (Starcke et al., 2012). The trolley problem is a moral dilemma prompt that involves variables related to decision-making (e.g., decision avoidance, regret, and guilt) elicited through the choices offered. The switch and footbridge versions are impersonal and personal variations of the task. The way stress impacts these decisions in these dilemmas directly may be through its impact on cognitive control, which can override emotional responses to difficult dilemmas. Therefore, a stressor with higher cognitive load, like mortality salience, is needed to examine the effects of stress on moral dilemmas.

Decision Avoidance

Avoiding a decision is often an option in real-life situations which may have positive and negative emotional repercussions. Research into decision avoidance has discovered many contributing factors. Preference stability is the way in which people's decisions remain stable while making consecutive choices (Anderson, 2003). A choice that alters the status quo may have perceived negative consequences beyond the energy expended making the choice (i.e., the action cost). Anticipated regret is another major contributor in the literature to decision avoidance. The degree to which participants perceive themselves to be responsible for the outcome contributes to anticipated regret. People choose the same outcome to experience lesser regret and thus avoid greater regret that would be felt by switching (Inman & Zeelenberg, 2002). The literature suggests that decision avoidance is a mechanism to reduce post-decision regret

(Anderson, 2003). To reduce regret, this study will utilize a forced choice scenario with the trolley dilemma.

Terror Management Theory

Terror Management Theory (TMT) was developed to explain how the awareness of one's own mortality develops meaning through the need to protect oneself psychologically (Greenberg et al., 1986). In TMT, anxiety arises from the awareness of one's own death acting along with the instinct for self-preservation. To help protect against this source of anxiety, belief in a value system acts as a buffer. This buffer consists of belief in the validity of one's worldview and the values associated with it and a belief that one is meeting those standards and contributes to one's self-esteem (Burke et al., 2010; Rosenblatt et al., 1989).

TMT suggests that people will react to stimuli that negatively challenges their worldview, giving them anxiety (Rosenblatt et al., 1989). The most common way to test this theory has been through the mortality salience hypothesis which posits that people will defend against death awareness through denial or thinking positively about the future (Burke, Martens, & Faucher, 2010).

Mortality Salience

When humans are aware of their inevitable deaths (mortality salience), a high degree of cognitive load is elicited in moral decision-making tasks. Cognitive resources are put under duress and affect thought processes. This effect has been used in researching the dual-process theory of moral judgement. Findings showed that those under mortality salience conditions are less likely to give utilitarian responses to moral dilemmas (Trémolière et al., 2012).

Mortality salience is typically manipulated through prompts that ask the participant to write either about their own death or, usually negative, nondeath related control topics (e.g., pain

or social rejection). Previous research has shown that mortality salience elicits different effects than similar nondeath thoughts (Burke et al., 2010). Most mortality salience studies use the Mortality Attitudes Personality Survey (Rosenblatt et al., 1989), which consists of two open-ended short answer questions asking participants to write about what will happen to them as they die and what emotions the thought of that event elicits in them. The control group prompt is typically a threatening or negative topic (e.g., physical pain, a debilitating condition, or social exclusion). Many experiments using mortality salience manipulations use a delay task in order to increase the effectiveness of the death thoughts on consciousness. In the current study, the delay task will be a shortened Big Five Inventory (BFI-10; Rammstedt & John, 2007).

The Current Study

Moral decision-making is impacted by stress. The status quo effect also impacts how people choose in moral dilemmas. In order to understand how stress and decision avoidance interact in life-or-death moral decision-making, this study will examine the effects of mortality salience on moral decisions. The independent variables in this study will be trolley dilemma default and mortality salience. The dependent measures will be decision avoidance, and both cognitive and affective post-decision regret. Decision avoidance is the tendency to not take an action which differs from the presented default in the trolley dilemma. Post-decision regret is the self-reported feeling of both affective and cognitive regret felt by the participant after their choice has been made. This study will use a variation of the default for the switch and footbridge versions of the trolley dilemma. The original trolley dilemma involves the trolley approaching the tracks with one person tied up and five people tied up on a different track. The participant can elect to change the course of the trolley from the track with one person towards the track with five people. This will be condition A of the dilemma. The secondary condition, B, will

reverse the default and start with the trolley headed towards the five people with the option to change course towards one person. The footbridge dilemma will also have the same A and B conditions, with one person on the footbridge versus five on the track and five people on the footbridge versus one on the track.

Stress will be induced using mortality salience. Participants will be split into two conditions: mortality salience and control. Most studies using mortality salience use the Mortality Attitudes Personality Survey (Rosenblatt et al., 1989), two open-ended questions that ask participants to write about what will happen to them as they die and then to write down the emotions that thought provokes (Burke et al., 2010). Inducing mortality salience has been shown to have different effects than nondeath topics that have similar negative characteristics (e.g., pain, social rejection). Therefore, the control topic will also be two open-ended questions but will ask participants to write about what will happen to them if they were to undergo a painful dental procedure and then to write down the emotions that thought provokes. This threatening control topic of dental pain is a common control topic used in mortality salience studies (Klackl & Jonas, 2019). This study will use a 2 (trolley problem default: modified and standard) x 2 (mortality salience: primed and unprimed) between-subjects factorial design.

Hypotheses

Hypothesis 1: Participants primed with mortality salience and in the trolley dilemma reversal condition will experience more post-decision regret.

Hypothesis 2: Participants primed with mortality salience will experience more post-decision affective regret.

Hypothesis 3: Participants in the trolley dilemma reversal condition will experience more cognitive regret.

Hypothesis 4: Participants primed with mortality salience will make more utilitarian (i.e. saving five people by sacrificing one person) choices in the trolley dilemmas.

Methods

Participants

Though meta-analysis has not revealed a significant gender or age effect, mortality salience has a particularly strong effect on students in college but no significant effect for age or gender (Burke et al., 2010). This suggests that it is not the age group necessarily that contributes to the effect which warrants further investigation into samples beyond the standard of college aged individuals (i.e., 18-21 years old). It also affects Americans more than in studies which examined Europeans, Israelis, and Asians. Suggesting that American psychological and behavioral patterns differ from other Westerners. For the purposes of this study, the sample was American adults between the ages of 21 and 65.

A random sample of participants were selected with Amazon Mechanical Turk (MTurk). The study recruited a total of 166 participants between the ages of 21 and 65 ($M = 39.07$, $SD = 10.61$). The demographics questionnaire (Appendix I) shed light on this sample. Of these participants, 68 (41.0%) identified as women and 98 (59.0%) identified as men. The majority of participants identified as White (77.7%), followed by Black or African American (11.4%), Asian (7.2%), Other (2.4%), American Indian or Alaska Native (.6%), with one who chose not to identify (.6%). Within this sample, most did not identify as Hispanic or Latinx (81.9%), followed by those that did (17.5%), with one who chose not to say (.6%). Those who chose Other as their ethnicity (2.4% of the total sample), the majority wrote in “Hispanic” (1.2%), followed by “White & Asian” (.6%), “Biracial” (.6%), and one who chose to not specify (.6%). The majority of this sample had completed a Bachelor’s degree (60.8%), followed by those who had also

completed a Master's degree (15.7%), those who had completed Some College, Associate Degree, or Trade School (12.0%), those who had completed High School (8.4%), those who had completed a Ph.D. or higher (2.3%), and one who chose not to say (.6%). Those who choose to participate were given \$0.50 as compensation through MTurk. All APA ethical guidelines were followed (APA, 2017; Appendix A).

Design

This study was a 2 (trolley problem default: modified and standard) x 2 (mortality salience: primed and unprimed) between-subjects factorial design. This was an experimental study. Trolley problem default and mortality salience were randomly assigned to half of the participants in the sample.

Materials

Mortality Attitudes Personality Survey. The mortality salience manipulation was designed to prime the participants with thoughts of their own death (Appendix B). It consisted of two open-ended questions asking participants “to write about (a) what will happen to them as they physically die, and (b) the emotions that the thought of their own death arouses in them” (Rosenblatt et al., 1989). This was considered the standard manipulation in mortality salience research (Shatin, 2012).

Mortality Salience Manipulation Check. A manipulation check was created for this study and added for the mortality salience condition. This consisted of two questions related to anxiety and stress related to the thought of physically dying. These questions were rated on a 5-point Likert scale, ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

Threatening Control Topic. In studies utilizing mortality salience prompts, the control topic is one unrelated to death (Appendix C). The most common alternative is one related to

dental pain (Klackl & Jonas, 2019). Participants were asked, similarly to the mortality salience condition, to write about (a) what will happen to them as they undergo a painful dental procedure, and (b) the emotions that the thought of the painful dental procedures arouses in them.

Threatening Control Topic Manipulation Check. A manipulation check was created for this study and added for the threatening control topic, or mortality salience unprimed, condition. This consisted of two questions related to anxiety and stress related to the thought of undergoing a painful dental procedure. These questions were rated on a 5-point Likert scale, ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

Big Five Inventory (BFI-10). To space out the timing of the mortality salience manipulation and the moral dilemma, participants completed the BFI-10 as a delay task (Appendix D). The BFI-10 was a 10-item version of the Big Five Inventory (BFI). The 10 items measured the five different personality traits according to the Five Factor model (i.e., extraversion, agreeableness, conscientiousness, and neuroticism). Each of the five factors was represented by two questions: extraversion (items 1 and 6), agreeableness (items 2 and 7), conscientiousness (items 3 and 8), neuroticism (items 4 and 9) and openness (items 5 and 10) (Balgiu, 2018). Items were rated on a 5-point Likert scale, ranging from 1 (*Disagree strongly*) to 5 (*Agree strongly*) and five of the items (1, 3, 4, 5, and 7) are reverse scored. The BFI-10 has good validity across all 5 personality traits. The BFI-10 also has substantial convergent and discriminant validity when compared to similar measures (Rammstedt & John, 2007). The BFI-10 demonstrated acceptable test-retest correlation ($r = .72$) over a period of 6 to 8 weeks.

Trolley problem. The trolley problem consisted of a reading where participants were given a description of the thought experiment and presented with options in a questionnaire

format. They chose between changing the course of the trolley (Appendix E) or leaving it on the same course (Appendix F). This dilemma was modified from the original to fill a gap in the literature. The dilemma was changed for one condition to have five people laying on the track as opposed to the standard one as the default. The manipulation was form B of the dilemma used in the experiment. For the other form, A, the standard rules applied, and the default was one person as opposed to the five on the track. The participant took on the role of a bystander near a switch that could change the track the trolley is on. In morality research the choices were coded with saving five as “utilitarian” or choosing not to push as “deontological”.

Trolley Dilemma Manipulation Check. A manipulation check was created for this study and assigned to all participants after completing both trolley dilemma questions (i.e., switch and footbridge). These questions related to perceived responsibility for the hypothetical death(s) of those remaining on the track, regardless of decision. These questions were rated on a 5-point Likert scale, ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

Regret Elements Scale. The Regret Elements Scale (RES) was designed to measure post-decisional regret (Buchanan et al., 2016). The RES was a 10-item measure of two factors: the affective and cognitive components of regret (Appendix G). Five items measured the affective component of regret (e.g., “I am experiencing self-blame about the way I made my decision”), whereas the other five measured the cognitive component of regret (e.g., “Things would have gone better if I had chosen another option”). All questions were on a 7-point Likert scale from 1 (*Strongly disagree*) to 7 (*Strongly agree*). The RES has good reliability (overall $\alpha = .81$, affective $\alpha = .84$, cognitive $\alpha = .82$) (Goldstein-Greenwood et al., 2020). The RES has two subscales: RES-A and RES-C, referring to affective and cognitive regret, respectively. Each subscale was scored as a total and the combined score were used.

Procedure

Participants ($N = 166$) were recruited through Amazon Mechanical Turk. They were offered financial compensation (\$0.50) for participating in a brief study on moral dilemmas. Instructions on MTurk informed them the survey would be taken on Qualtrics and they would be prompted to provide a unique 4-digit ID upon completion in MTurk to verify their participation in order to qualify for payment (Appendix K). Participants began with a consent form (Appendix H) followed by a demographics form (Appendix I). They were then randomly sorted into four groups: 1) mortality salience primed with the standard trolley dilemma ($N = 43$), 2) mortality salience primed with the reversed trolley dilemma ($N = 42$), 3) mortality salience not primed with the standard trolley dilemma ($N = 36$), and 4) mortality salience not primed with the reversed trolley dilemma ($N = 45$). Those in the mortality salience primed condition were given the standard prompt followed by a manipulation check regarding their anxiety and stress related to the thought of their own physical death (Appendix B), whereas those in the mortality salience unprimed condition were given the standard threatening control prompt of a painful dental procedure followed by a manipulation check regarding their anxiety and stress related to the thought of undergoing a painful dental procedure (Appendix C). Regardless of condition and group, participants completed the BFI-10 (Appendix D), followed by both trolley dilemma situations with a manipulation check regarding their feelings of responsibility for the death(s) of those on the track (Appendix E & F), and ended with the Regret Elements Scale (Appendix G). After the tasks were completed, participants were debriefed to make sure there are no lingering effects from the mortality salience priming as well as the trolley problem tasks (Appendix J). Upon verified completion, participants were paid \$.50. After collection of data was completed, data was transferred from Qualtrics to SPSS for statistical analysis.

Results

Data Screening

Standard data cleaning procedures were utilized. The data were first screened for missing data using the explore function of SPSS. There were five participants whose numbers did not match up with the random ID they were assigned, thus they were excluded from the study as there was no way to verify if they had completed the study. Examination of boxplots indicated no outliers. Examination of histograms indicated that the distribution shape for the variables of interest may be normally distributed. Skewness and kurtosis scores were examined to further assess these distributions.

For affective decision regret, cognitive decision regret, and total decision regret, the skewness values were within the acceptable range (-1 to 1). For affective decision regret, the kurtosis value was within the acceptable range (-1 to 1). For cognitive decision regret and total regret, the kurtosis values were outside of the acceptable range. To further examine this distribution, the standard error for kurtosis on these variables were multiplied by three and compared to the original kurtosis scores. The standard error score for total decision regret when multiplying by three was larger than the original kurtosis score, thus it was concluded that the scores for total decision regret were also normally distributed. However, the standard error score for cognitive decision regret when multiplying by three was smaller than the original kurtosis score, as well as attempted log and square root transformations of this variable, thus the original score was kept.

Hypothesis 1: Participants primed with mortality salience and in the trolley dilemma reversal condition will experience more post-decision regret. A between subjects 2x2 factorial ANOVA was conducted. Two independent variables (A, mortality salience; B,

trolley dilemma condition) with two levels each (primed and unprimed; reversal and standard) were tested to assess for differences in self-reported post-decision regret.

Results indicated that there was no significant main effect of mortality salience [$F(1, 162) = .04, p = .85, \text{partial } \eta^2 < .001$] (Table 1). Although not significant, participants with mortality salience primed ($M = 31.16, SD = 13.06$) scored slightly lower on post-decision regret than participants with mortality salience unprimed ($M = 31.42, SD = 11.57$). Likewise, results indicated there was no significant main effect of trolley dilemma condition [$F(1, 162) = 2.41, p = .123, \text{partial } \eta^2 = .015$]. Participants with the trolley dilemma condition set to standard (i.e., five people on the tracks) ($M = 32.82, SD = 11.40$) scored slightly higher, but not significantly higher, on post-decision regret than participants with the trolley dilemma condition set to reversal (i.e., one person on the tracks) ($M = 29.89, SD = 13.00$).

Additionally, there was no significant interaction between mortality salience and trolley dilemma condition [$F(1, 162) = .086, p = .769, \text{partial } \eta^2 = .001$] (Figure 1). A non-significant mean pattern showed participants with mortality salience primed and in the standard trolley dilemma condition ($M = 32.40, SD = 12.23$) reported slightly more post-decision regret than participants with mortality salience primed and in the reversal trolley dilemma condition ($M = 29.98, SD = 13.74$). Also, participants with mortality salience unprimed in the standard trolley dilemma condition ($M = 33.33, SD = 10.47$) reported slightly more post-decision regret than participants with mortality salience unprimed in the reversal trolley dilemma condition ($M = 29.79, SD = 12.33$) (Table 1).

Hypothesis 2: Participants primed with mortality salience will experience more post-decision affective regret. An independent samples t -test was performed to assess whether reported post-decision affective regret differed significantly for a group of 88 participants who

had mortality salience primed (Group 1) compared to a group of 78 participants who did not have mortality salience primed (Group 2). It was hypothesized that group 1 would report higher post-decision affective regret compared to group 2. The assumption of homogeneity of variance was assessed by Levene's test which indicated no significant violation of the equal variance assumption; therefore, the equal variances assumed version of the t -test was used. Reported affective regret did not differ significantly between the groups, $t(164) = .33, p = .37$. Mean affective regret scores for the mortality salience primed group ($M = 16.49, SD = 6.44$) were not significantly higher than mean affective regret scores for the mortality salience unprimed group ($M = 16.17, SD = 5.95$). These results fail to support the hypothesis.

Hypothesis 3: Participants in the trolley dilemma reversal condition will experience more cognitive regret. An independent samples t -test was performed to assess whether reported post-decision cognitive regret differed significantly for a group of 87 participants assigned to trolley condition reversal (Group 1) compared to a group of 79 participants assigned to the standard trolley condition (Group 2). It was hypothesized that group 1 would report higher post-decision cognitive regret compared to group 2. The assumption of homogeneity of variance was assessed by Levene's test which indicated no significant violation of the equal variance assumption; therefore, the equal variances assumed version of the t -test was used. Reported cognitive regret did not differ significantly between the groups, $t(164) = 1.47, p = .07$. Mean cognitive regret scores for the trolley condition reversal group ($M = 14.18, SD = 7.22$) were lower, but not significantly, than mean cognitive regret scores for the trolley condition standard group ($M = 15.52, SD = 6.71$). These results fail to support the hypothesis.

Hypothesis 4: Participants primed with mortality salience will make more utilitarian choices in the trolley dilemmas. Fisher's exact test was used to determine if there

was a significant association between mortality salience (e.g., primed vs. unprimed) and trolley decision (e.g., utilitarian vs. nonutilitarian) in both the switch and footbridge dilemmas. There was not a statistically significant association between mortality salience and trolley switch dilemma decision ($\chi^2 (1, N = 166) = 1.36, p = .24$). Likewise, there was not a statistically significant association between mortality salience priming and trolley footbridge dilemma decision ($\chi^2 (1, N = 166) = .78, p = .38$). These results fail to support the hypothesis.

Discussion

A 2x2 factorial ANOVA, two independent *t*-tests, and a Fisher's exact test were conducted to assess the main and interaction effects of, and relationships between, the variables of interest. The factorial ANOVA examined the relationship mortality salience priming and the assigned trolley dilemma default had on total decision regret, as well as their interaction. Results did not align with the hypotheses developed based on the existing literature. There was no significant main effect of either variable nor was there a significant interaction effect. The two one-way ANOVAS, examining the effects mortality salience had on affective decision regret and the effects trolley dilemma default had on cognitive decision regret, failed to find significant results which also diverged from previous findings in the literature. However, some studies have also had difficulty replicating the expected effect of mortality salience. A study by Sætrevik & Sjøstad was unable to find the predicted effects of mortality salience on worldview defense in the form of increased national patriotism and ingroup identification (2019). This study also found decreased pro-sociality which is the opposite effect suggested by the literature. The lack of effective priming and confounding results may have been due to an ineffective priming of mortality salience or trolley reversal, therefore further probing on the measures used was needed.

The Fisher's exact test examining the relationship between mortality salience priming and utilitarian choices across trolley dilemma tasks and conditions failed to find significant results suggested by the literature. However, further probing examined the effects of mortality salience on decision inaction. When conducting a Fisher's exact test on the association between trolley dilemma default (e.g., one person on the tracks vs. five people on the tracks) and trolley decision (e.g., "do nothing" vs. "push") in both dilemmas, findings were significant. There was a statistically significant association between trolley dilemma default and trolley switch dilemma decision ($\chi^2 (1, N = 166) = 44.36, p < .001$) with Fisher's exact test being significant, $p < .001$. There was also a statistically significant association between trolley dilemma default and trolley footbridge decision ($\chi^2 (1, N = 166) = 19.93, p < .001$) and Fisher's exact test was significant, $p < .001$. These findings show that, regardless of mortality salience and trolley dilemma task (e.g., switch and footbridge), the default (i.e., reversal or standard) for the trolley dilemma impacted how participants chose. Those in the standard trolley dilemma default condition tended to "push" more ($N = 59$) than "do nothing" ($N = 20$) in the switch dilemma and chose "push" ($N = 48$) more than "do nothing" ($N = 31$) in the footbridge dilemma. Those in the trolley reversal condition tended to "do nothing" ($N = 68$) more than "push" ($N = 20$) in the switch dilemma, and also chose "do nothing" ($N = 64$) more than "push" ($N = 23$) in the footbridge dilemma. Participants, as expected, engaged more in decision inaction in the experimental trolley reversal. To assess if this was, in part, due to mortality salience as suggested in this study, a Fisher's exact test examining the relationship between mortality salience and trolley decision. However, the results indicated there was no significant relationship between mortality salience condition and trolley switch choice ($\chi^2 (1, N = 166) = .12, p < .001$), and mortality salience and trolley footbridge choice ($\chi^2 (1, N = 166) = .27, p < .001$). These results taken together indicate that,

while the trolley reversal led participants to remain with the status quo more often, it was likely not due to stress induced by mortality salience. Mortality salience in this study did not seem to have the expected effects on regret, failing to replicate previous findings in the literature. Probing of the decision regret scores was needed.

Reliability analyses on the two RES subscales and combined total were conducted. A reliability analysis was carried out on the RES Affective subscale comprised of five items ($M = 16.34$, $SD = 6.20$). Cronbach's alpha showed the questionnaire to reach acceptable reliability, $\alpha = .92$. Most items appeared worthy of retention, resulting in a decrease in the alpha if deleted. The one exception was item 2, which would increase the alpha to $\alpha = .93$. As such, removal of this item should be considered. A reliability analysis was carried out on the RES Cognitive subscale comprised of five items ($M = 14.95$, $SD = 7.04$). Cronbach's alpha showed the questionnaire to reach acceptable reliability, $\alpha = .92$. All items appeared worthy of retention, resulting in a decrease in the alpha if deleted. A reliability analysis was carried out on the total RES scale comprised of ten items ($M = 31.28$, $SD = 12.32$). Cronbach's alpha showed the questionnaire to reach acceptable reliability, $\alpha = .96$. All items appeared worthy of retention, resulting in a decrease in the alpha if deleted. While both subscales and the total scale showed good reliability, what differed from the literature were the low total scores for each measure. Participants in this study showed an overall low level of decision regret, regardless of type of regret and condition in the study. Reliability analysis of both RES subscales and the total have discarded this being due to the RES measure. That being the case, probing of the mortality salience manipulation checks for both conditions (primed and unprimed) was needed.

Both mortality salience condition (primed and unprimed) manipulation checks were investigated. A reliability analysis was carried out on the mortality salience manipulation check

comprised of two items ($M = 7.5$, $SD = 2.28$). Cronbach's alpha showed the questionnaire to reach acceptable reliability, $\alpha = .70$. All items appeared worthy of retention, resulting in a decrease in the alpha if deleted. A reliability analysis was carried out on the threatening control topic manipulation check comprised of two items ($M = 7.22$, $SD = 2.15$). Cronbach's alpha showed the questionnaire to reach acceptable reliability, $\alpha = .73$. All items appeared worthy of retention, resulting in a decrease in the alpha if deleted. What is notable with these two manipulation checks is that both conditions showed similar mean scores. That suggests that participants, regardless of whether the prompt was mortality salience or the threatening control topic, felt a moderate amount of anxiety and stress related to that thought. Further investigation into these manipulation checks was performed. Bivariate correlations were performed to examine the relationship between the mortality salience manipulation check scores and the affective, cognitive, and total RES scores. Results indicate that the correlations between the mortality salience manipulation check score and affective decision regret ($r(76) = .36$, $p < .001$), and the trolley manipulation check and total decision regret ($r(76) = .28$, $p = .01$), were both statistically significant. However, the relationship between the mortality salience manipulation check and cognitive decision regret ($r(76) = .17$, $p = .14$) was not significant. This suggests that, while mortality salience led to higher affective and total decision regret, this was not enough to result in a significant main effect of mortality salience. Participants in general scored low on regret, which may have been due to other factors. Other measures were examined as well to determine possible reasons.

While the BFI-10 used in this study was as a filler task, a reliability analysis was carried out on each two-item subscale. Cronbach's alpha showed that most subscales showed poor reliability. The two-item subscales for Extraversion ($M = 5.89$, $SD = 1.9$) $\alpha = .33$, Agreeableness

($M = 6.98$, $SD = 1.63$) $\alpha = -.31$, Conscientiousness ($M = 7.43$, $SD = 3.54$) $\alpha = .39$, Neuroticism ($M = 5.22$, $SD = 1.86$) $\alpha = .16$, and Openness ($M = 6.68$, $SD = 1.63$) $\alpha = -.07$. These subscales each had a reverse-scored item within them, and these results suggest the participants may not have been reading carefully during the item.

The manipulation check completed after both trolley dilemma tasks (switch and footbridge), regardless of trolley dilemma condition (standard and reversal), was investigated. A reliability analysis was carried out on the trolley dilemma manipulation check comprised of two items ($M = 6.6$, $SD = 2.63$). Cronbach's alpha showed the questionnaire to reach acceptable reliability, $\alpha = .90$. All items appeared worthy of retention, resulting in a decrease in the alpha if deleted. This manipulation check asked two questions regarding the responsibility of the participant in the death of the person(s) on the track. These results indicate that they felt moderately responsible. Bivariate correlations were performed to examine the relationship between the trolley manipulation check scores and the affective, cognitive, and total RES scores. Results indicate that the correlations between the trolley manipulation check score and affective decision regret ($r(164) = .78$, $p < .001$), the trolley manipulation check and cognitive decision regret ($r(164) = .68$, $p < .001$), and the trolley manipulation check and total decision regret ($r(164) = .78$, $p < .001$), were all statistically significant. This suggests that participants who perceived responsibility for the death(s) of those on the track also reported more affective, cognitive, and total decision regret. However, they still scored low overall on all regret scales.

Taken together, these examinations of the scales and results indicate that the measures, for the most part, worked as intended. However, there was not sufficient priming of stress on regret. Stress and personal responsibility, both measured by the manipulation checks after mortality salience (primed and unprimed) and trolley dilemma (default and reversal), were

shown to be significantly related to decision regret scores. However, this relationship did not result in sufficiently high enough scores to render main effects or interaction effects of significance in previous analyses. This may have been due to other factors outside of the testing environment that have led participants to generally feel less regret for hypothetical deaths even if they feel directly responsible and/or stressed with the reminder of their own mortality. We must look to current events and other outside factors as possible explanations.

Limitations and Future Research

The present COVID-19 pandemic may be a confounding factor. Jonas & Fischer conducted a series of studies on the relationship between religious beliefs and TMT (2006). In one study conducted shortly after a terror attack in Istanbul, German participants were split into those who were surveyed immediately after (November 20, 2003) and surveyed at a delayed time (November 28, 2003). The terror attacks were used as a real-world mortality salience inducement. Those who were surveyed immediately reacted with a lower worldview defense if they scored high on intrinsic religiousness (i.e., those who felt their faith gives life meaning and value). This effect was not seen in the delayed condition, suggesting the immediateness of the attack was a factor. The affirmation of their beliefs during a crisis, according to Jonas & Fischer, serves a terror management function which is not present in those who were surveyed 8 days later. It may be that the ongoing COVID-19 pandemic serves a similar function. Participants in this study with high intrinsic religiousness may have also displayed similar effects if these variables had been taken into account. For example, one respondent's mortality salience prompt response was as follows: "At this point in my life, I really don't care either way. I would like to go as painlessly as possible. I imagine it's a feeling of shortness of breath and so forth. I lived my life, leave it to the next generation." This suggests that the participant is not particularly

stressed at the thought of their own physical death. While this may be due to individual characteristics, the pandemic may also play a part. Another participant responded as follows: “I believe that as I physically die my spirit will leave my body and become one with the energy of the Universe. The emotion aroused in me at the thought of my own death is some trepidation but in general I think it will be okay.” This could be due to an intrinsic religious belief, which may have led to their low decision regret scores. Future studies should consider a religious orientation scale in order to quantify this effect. As the pandemic continues, studies under TMT should consider the extent to which it functions as mortality salience.

Time spent contemplating one’s mortality is a factor that needs to be controlled for as well. In a series of studies on the effects of mindfulness on the response to mortality salience prompts, those who rated higher in mindfulness displayed less worldview defense across a variety of tasks (Niemec et al., 2010). Mindfulness led to more writing time, regardless of condition, which was related to less defense of worldview. As these studies suggest, deep contemplation of one’s mortality may reduce defense of worldview. This study did not measure nor limit the time which respondents had to enter their mortality salience responses, which may have affected the final results. Future research could measure the time spent writing the response in order to function as an added manipulation check and to determine its effects on the results of mortality salience.

Age may play a role in the impact of mortality salience. In a study comparing age groups, researchers found that older adults responded less harshly to judgments of moral transgressions than younger adults when in a mortality salience condition (Maxfield et al., 2007). Mortality salience manipulations which led to harsher judgments in younger adults did not have an effect on older adults. Older adults, the researchers suggest, may be changing their strategies for coping

with the problem of death due to their increasing temporal proximity to it and more frequent reminders (i.e., the death of loved ones and others in their age group). This study differed from previous literature, which has focused on college-aged students, with its older age range. To examine this possible explanation for the lack of regret, further probing was performed.

. Bivariate correlations were performed to examine the relationship between self-reported age of the participants and the affective, cognitive, and total RES scores. Results indicate that the correlations between age and cognitive decision regret ($r(164) = -.22, p = .005$), and age and total decision regret ($r(164) = -.19, p = .01$) were statistically significant. However, the correlation between age and affective regret ($r(164) = -.14, p = .07$) was not significant. This suggests that older participants tended to score significantly lower on cognitive and total decision regret but not significantly so on affective decision regret. Future research in this area should compare age groups as a between-subjects factor to conform with the previous studies, as well as examine the difference in populations from the norm in this research (i.e., college-aged students).

Conclusion

This study was conducted as an attempt to fill in the gaps in research on the impact of stress on moral decision-making. Following research on TMT, mortality salience was used as a stress induction and the effects of this were examined. This study also created a new trolley dilemma version to examine its effects on moral decision-making. Although this study was unable to find significant results for all hypotheses, there were non-significant differences in the decision regret.

The further probing using Fisher's exact test suggests that adding the trolley dilemma default condition with an experimental trolley dilemma default reversal had an effect on the way participants chose in their given trolley dilemma tasks. To our knowledge, no other studies had

attempted using this version of the trolley dilemma. Although this study did not find other significant results with this novel factor, future research could examine whether having the worst outcome as the default in a hypothetical dilemma impacts decision avoidance in moral dilemmas.

Upon further examination, the manipulation checks seem to have shown that mortality salience and the trolley reversal had the expected effects. Although the manipulation checks for mortality salience primed and unprimed correlated significantly with decision regret, both resulted in participants reporting a similarly moderate amount of stress and anxiety. In this study, mortality salience did have the expected effect on participants' decision regret. There was also a significant relationship between responsibility for the deaths and regret but low decision regret overall. During the pandemic, the constant reminders of the thought of one's own death and how one's actions might directly or indirectly result in the deaths of others may be reducing the effect to which people feel regret after their own decisions, both in the real world and in hypothetical tasks manipulating these factors. Future research during the COVID-19 pandemic should take this into consideration.

References

- Aacharya, R. P., Gastmans, C., & Denier, Y. (2011). Emergency department triage: an ethical analysis. *BMC emergency medicine*, 11, 16. <https://doi.org/10.1186/1471-227X-11-16>
- Anderson, C. J. (2003). The psychology of doing nothing: forms of decision avoidance result from reason and emotion. *Psychological Bulletin*, 129(1), 139-67. <https://doi.org/10.1037/0033-2909.129.1.139>
- Andrade, G. (2019). Medical ethics and the trolley Problem. *Journal of medical ethics and history of medicine*, 12(4), 3, 1-15. <https://doi.org/10.18502/jmehm.v12i3.766>
- Balgiu, B. (2018). The psychometric properties of the Big Five inventory-10 (BFI-10) including correlations with subjective and psychological well-being. *Global Journal of Psychology Research: New Trends and Issues*, 8(2), 61-69. <https://doi.org/10.18844/gjpr.v8i2.3434>
- Buchanan, J., Summerville, A., Lehmann, J., & Reb, J. (2016). The Regret Elements Scale: Distinguishing the affective and cognitive components of regret. *Judgment and Decision Making*, 11(3), 275-286. Retrieved from <http://journal.sjdm.org/15/15901/jdm15901.html>
- Burke, B. L., Martens, A., & Faucher, E. H. (2010). Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality and Social Psychology Review*, 14(2). <https://doi.org/10.1177/1088868309352321>
- Feltz, A., & May, J. (2017). The means/side-effect distinction in moral cognition: A meta-analysis. *Cognition*, 166, 314-327. <https://doi.org/10.1016/j.cognition.2017.05.027>
- Garrigan, B., Adlam, A. L. R., & Langdon, P. E. (2016). The neural correlates of moral decision-making: A systematic review and meta-analysis of moral evaluations and response decision judgements. *Brain and Cognition*, 108, 88-97. <https://doi.org/10.1016/j.bandc.2016.07.007>

- Gawronski, B., Armstrong, J., Conway, P., Friesdorf, R., & Hütter, M. (2017). Consequences, norms, and generalized inaction in moral dilemmas: The CNI model of moral decision-making. *Journal of Personality and Social Psychology*, 113(3), 343-376.
<http://dx.doi.org/10.1037/pspa0000086>
- Gawronski, B., & Beer, J. S. (2017). What makes moral dilemma judgments “utilitarian” or “deontological”? *Social Neuroscience*, 12(6), 626-632.
<https://doi.org/10.1080/17470919.2016.1248787>
- Goldstein-Greenwood, J., Conway, P., Summerville, A., & Johnson, B. N. (2020). (How) Do You Regret Killing One to Save Five? Affective and Cognitive Regret Differ After Utilitarian and Deontological Decisions. *Personality and Social Psychology Bulletin*, 46(9), 1303–1317. <https://doi.org/10.1177/0146167219897662>
- Goodall, N. J. (2010). Away from trolley problems and toward risk management. *Applied Artificial Intelligence*, 30(8), 810-821. <https://doi.org/10.1080/08839514.2016.1229922>
- Greenberg, J., Pyszczynski, T., Solomon S. (1986) The Causes and Consequences of a Need for Self-Esteem: A Terror Management Theory. In: Baumeister R.F. (eds) *Public Self and Private Self*. Springer Series in Social Psychology. Springer, New York, NY.
https://doi.org/10.1007/978-1-4613-9564-5_10
- Greene, J. D., Somerville, R. B., Nyström, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgement. *Science*, 293(5537), 2105-2108. <https://doi.org/10.1126/science.1062872>
- Horne, Z., & Powell, D. (2018). How large is the role of emotion in judgments of moral dilemmas? *PLoS ONE*, 11(7), 1-19. <https://doi.org/10.1371/journal.pone.0154780>

- Inman, J., & Zeelenberg, M. (2002). Regret in repeat purchase versus switching decisions: The attenuating role of decision justifiability. *Journal of Consumer Research*, 29, 116–128.
- Jonas, E., & Fischer, P. (2006). Terror management and religion: Evidence that intrinsic religiousness mitigates worldview defense following mortality salience. *Journal of Personality and Social Psychology*, 91(3), 553–567. <https://doi.org/10.1037/0022-3514.91.3.553>
- Klackl, J., & Jonas, E. (2019). Effects of Mortality Salience on Physiological Arousal. *Frontiers in Psychology*, 10, 1893. <https://doi.org/10.3389/fpsyg.2019.01893>
- Lanteri, A., Chelini, C., & Rizzello, S. (2008). An experimental investigation of emotions and reasoning in the trolley problem. *Journal of Business Ethics*, 83, 789-804. <https://doi.org/10.1007/s10551-008-9665-8>
- Mandal, J., Ponnambath, D. K., & Parija, S. C. (2016). Utilitarian and deontological ethics in medicine. *Tropical parasitology*, 6(1), 5–7. <https://doi.org/10.4103/2229-5070.175024>
- Maxfield, M., Pyszczynski, T., Kluck, B., Cox, C. R., Greenberg, J., Solomon, S., & Weise, D. (2007). Age-related differences in responses to thoughts of one's own death: mortality salience and judgments of moral transgressions. *Psychology and Aging*, 22(2), 341–353. <https://doi.org/10.1037/0882-7974.22.2.341>
- Navarrete, C. D., McDonald, M. M., Mott, M. L., & Asher, B. (2012). Virtual morality: Emotion and action in the simulated three-dimensional “trolley problem”. *Emotion*, 12(2), 364-370. <https://doi.org/10.1037/a0025561>
- Niemiec, C. P., Brown, K. W., Kashdan, T. B., Cozzolino, P. J., Breen, W. E., Levesque-Bristol, C., & Ryan, R. M. (2010). Being present in the face of existential threat: The role of trait

- mindfulness in reducing defensive responses to mortality salience. *Journal of Personality and Social Psychology*, 99(2), 344–365. <https://doi.org/10.1037/a0019388>
- Nowacki, J., Heekeren, H. R., Deuter, C. E., Joerißen, J. D., Schröder, A., Otte, C., & Wingenfeld, K. (2019). Decision making in response to physiological and combined physiological and psychosocial stress. *Behavioral neuroscience*, 133(1), 59-67. <https://doi.org/10.1037/bne0000288>
- Pletti, C., Lotto, L., Tasso, A., & Sarlo, M. (2016). Will I regret it? Anticipated negative emotions modulate choices in moral dilemmas. *Frontiers in Psychology*, 7(1918), 1-15. <https://doi.org/10.3389/fpsyg.2016.01918>
- Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, 41(1), 203–212. <https://doi.org/10.1016/j.jrp.2006.02.001>
- Rosenblatt, A., Greenberg, J., Solomon, S., Pyszczynski, T., & Lyon, D. (1989). Evidence for terror management theory I: The effects of mortality salience on reactions to those who violate or uphold cultural values. *Journal of Personality and Social Psychology*, 57(4), 681-690. <https://doi.org/10.1037/0022-3514.57.4.681>
- Sauer, H. (2012). Educated intuitions. Automaticity and rationality in moral judgement. *Philosophical Explorations*, 15(3), 255-275. <https://doi.org/10.1080/13869795.2012.706822>
- Savulescu, J., Persson, I., & Wilkinson, D. (2020). Utilitarianism and the pandemic. *Bioethics*, 34(6), 620–632. <https://doi.org/10.1111/bioe.12771>
- Sætrevik, B., & Sjøstad, H. (2019, May 17). Mortality salience effects fail to replicate in traditional and novel measures. <https://doi.org/10.31234/osf.io/dkg53>

- Shatil, S. R., (2012). Terror management theory: Interplay between mortality salience, death-thoughts, and overall worldview defense. *Dissertations (2009 -)*. Paper 215. Retrieved from http://epublications.marquette.edu/dissertations_mu/215
- Singer, N., Sommer, M., Döhl, K., Zänker, S., Wüst, S., & Kudielka, B. M. (2017). Acute psychosocial stress and everyday moral decision-making in young healthy men: The impact of cortisol. *Hormones and Behavior*, 93, 72-81.
<https://doi.org/10.1016/j.yhbeh.2017.05.002>
- Starkce, K., Ludwig, A., & Brand, M. (2012). Anticipatory stress interferes with utilitarian moral judgement. *Judgement and Decision Making*, 7(1), 61-68. Retrieved February 26, 2020 from: <http://journal.sjdm.org/11/11729/jdm11729.pdf>
- Starcke, K., Polzer, C., Wolf, O. T., & Brand, M. (2011). Does stress alter everyday moral decision-making? *Psychoneuroendocrinology*, 36, 210-219.
<https://doi.org/10.1016/j.psyneuen.2010.07.010>
- Tassy, S., Oullier, O., Duclos, Y., Coulon, O., Mancini, J., Deruelle, C., ... Wicker, B. (2012). Disrupting the right prefrontal cortex alters moral judgement. *Social Cognitive and Affective Neuroscience*, 7(3), 282-288. <https://doi.org/10.1093/scan/nsr008>
- Trémolière, B., De Neys, W., & Bonnefon, J. (2012). Mortality salience and morality: Thinking about death makes people less utilitarian. *Cognition*, 124(3), 379-384.
<https://doi.org/10.1016/j.cognition.2012.05.011>
- Ugazio, G., Lamm, C., & Singer, T. (2012). The role of emotions for moral judgements depends on the type of emotion and moral scenario. *Emotion*, 12(3), 579-590.
<https://doi.org/10.1037/a0024611>

Watson, D., Clark, L. A., Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063-1070. <https://doi.org/10.1037/0022-3514.54.6.1063>

Table 1

Means and standard deviations for the effect of mortality salience and trolley dilemma default on decision regret

Mortality Salience	Trolley Dilemma		
	Standard	Reversal	Total
Primed	32.32 (12.10)	28.96 (13.89)	30.57 (13.11)
Unprimed	32.83 (10.16)	30.02 (12.28)	31.37 (11.33)
Total	32.56 (11.15)	29.46 (13.09)	

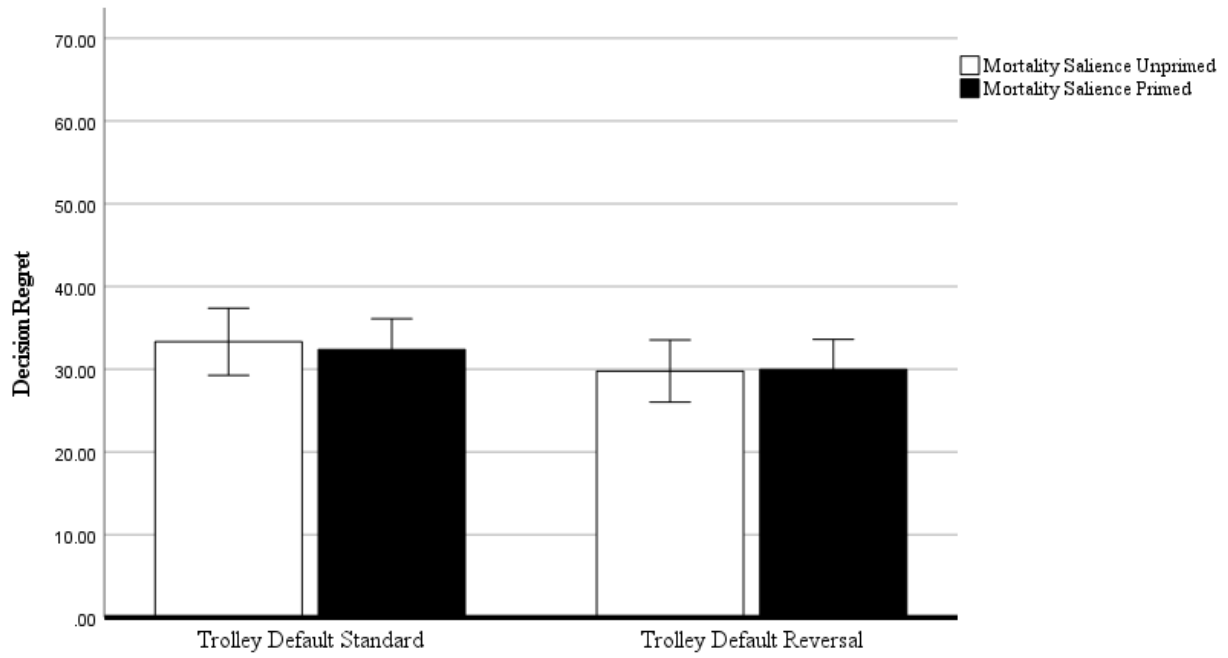


Figure 1. Mean decision regret scores for participants with mortality salience unprimed and primed. Error bars represent a 95% confidence interval. $p = .88$.

Appendix A



FORT HAYS STATE
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OFFICE OF SCHOLARSHIP AND SPONSORED PROJECTS

DATE: November 1, 2021

TO: Nicolas Perdomo

FROM: Fort Hays State University IRB

STUDY TITLE: [1822868-1] THE IMPACT OF STRESS ON REGRET IN TROLLEY
DILEMMA DECISION-MAKING

IRB REFERENCE #: 22_0025

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: November 1, 2021

REVIEW CATEGORY: Exemption category # 2

Thank you for your submission of New Project materials for this research study. The departmental human subjects research committee and/or the Fort Hays State University IRB/IRB Administrator has determined that this project is EXEMPT FROM IRB REVIEW according to federal regulations.

For any research that will be conducted face-to-face, the FHSU IRB strongly recommends that the PI and research team adhere to CDC guidelines regarding COVID-19. Please note that neither FHSU nor the FHSU IRB are responsible in the event that a participant and/or member of the research team is exposed to risks related to COVID-19.

Please note that any changes to this study may result in a change in exempt status. Any changes must be submitted to the IRB for review prior to implementation. In the event of a change, please follow the Instructions for Revisions at <http://www.fhsu.edu/academic/gradschl/irb/>.

The IRB administrator should be notified of adverse events or circumstances that meet the definition of unanticipated problems involving risks to subjects. See <http://www.hhs.gov/ohrp/policy/AdvEvtGuid.htm>.

We will put a copy of this correspondence on file in our office. Exempt studies are not subject to continuing review.

If you have any questions, please contact Whitney Whitaker at IRB@fhsu.edu. Please include your project title and reference number in all correspondence with this committee.

Appendix B

Mortality Salience Priming

Mortality Salience (TCT)

Write about (a) what will happen to you as you physically die, and (b) the emotions that the thought of their own death arouses in you:

Manipulation Check

For each of the questions below, choose the response that best characterizes how you feel about the statement.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Thinking about my own death made me anxious.	1	2	3	4	5
Thinking about how my death would impact my loved ones caused me stress.	1	2	3	4	5

Appendix C
Mortality Salience Control

Threatening Control Topic (TCT)

Write about (a) what will happen to you as you undergo a painful dental procedure, and (b) the emotions that the thought of this painful dental procedure arouses in you:

Manipulation Check

For each of the questions below, choose the response that best characterizes how you feel about the statement.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Thinking about my painful dental procedure made me anxious.	1	2	3	4	5
Thinking about how my painful dental procedure would impact my loved ones caused me stress.	1	2	3	4	5

Appendix D
BFI-10 Filler Task

Instructions: How well do the following statements describe your personality?

I see myself as someone who ...	Disagree strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly
1. ... is reserved	(1)	(2)	(3)	(4)	(5)
2. ... is generally trusting	(1)	(2)	(3)	(4)	(5)
3. ... tends to be lazy	(1)	(2)	(3)	(4)	(5)
4. ... is relaxed, handles stress well	(1)	(2)	(3)	(4)	(5)
5. ... has few artistic interests	(1)	(2)	(3)	(4)	(5)
6. ... is outgoing, sociable	(1)	(2)	(3)	(4)	(5)
7. ... tends to find fault with others	(1)	(2)	(3)	(4)	(5)
8. ... does a thorough job	(1)	(2)	(3)	(4)	(5)
9. ... gets nervous easily	(1)	(2)	(3)	(4)	(5)
10. ... has an active imagination	(1)	(2)	(3)	(4)	(5)

Appendix E

Trolley Problem Standard

Trolley Problem (Version A)

Switch

There is a runaway trolley barreling down the railway tracks. Ahead, on the tracks, there are five people tied to the tracks. The trolley is headed straight for them. You are standing some distance off in the train yard, next to a lever. If you pull this lever, the trolley will switch to a different set of tracks. Unfortunately, you notice that there is one person tied to the side track.

You have two options:

- (1) Do nothing, and the trolley kills the five people on the main track.
- (2) Pull the lever, diverting the trolley onto the side track where it will kill one person.

Footbridge

There is a runaway trolley headed toward five people tied to the tracks again. Only, this time, you are not in the train yard next to a lever. You are on a bridge, watching the events from above the tracks. There is a very large man next to you. You realize that, if you push him off the bridge and down onto the tracks below, the trolley will hit and kill him, but his body is so large that it will stop the trolley before it reaches the five endangered people.

You have two options:

- (1) Do nothing, and the trolley kills the five people.
- (2) Push the large man off the bridge, so that he dies, but the five others are saved.

Manipulation Check

For each of the questions below, choose the response that best characterizes how you feel about the statement.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel responsible for the death of the person(s) on the track.	1	2	3	4	5
I caused the death of the person(s) on the track.	1	2	3	4	5

Appendix F

Trolley Problem Altered

Trolley Problem (Version B)

Switch

There is a runaway trolley barreling down the railway tracks. Ahead, on the tracks, there is one person tied to the tracks. The trolley is headed straight for them. You are standing some distance off in the train yard, next to a lever. If you pull this lever, the trolley will switch to a different set of tracks. Unfortunately, you notice that there are five people on the side track. You have two options:

- (1) Do nothing, and the trolley kills the one person.
- (2) Pull the lever, diverting the trolley onto the side track where it will kill five people.

Footbridge

There is a runaway trolley headed toward one person tied to the tracks again. Only, this time, you are not in the train yard next to a lever. You are on a bridge, watching the events from above the tracks. There is a group of five people standing close together next to you. You realize that, if you push all of them off the bridge and down onto the tracks below, the trolley will hit and kill them, but their bodies will stop the trolley before it reaches the endangered person.

You have two options:

- (1) Do nothing, and the trolley kills one person.
- (2) Push the group of five people off the bridge, so that they die, but the one person is saved.

Manipulation Check

For each of the questions below, choose the response that best characterizes how you feel about the statement.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel responsible for the death of the person(s) on the track.	1	2	3	4	5
I caused the death of the person(s) on the track.	1	2	3	4	5

Appendix G

Regret Elements Scale

Please fill in one option for each of the following questions:

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
I am experiencing self-blame about the way I made my decision.							
I feel sorry.							
I am experiencing self-blame.							
I feel guilty.							
I feel like kicking myself.							
Things would have gone better if I had chosen another option.							
I wish I had made a different decision.							
I should have decided differently.							
I would have been better off had I decided differently.							
Before I should have chosen differently.							

Appendix H

Consent Form

Purpose: You are being asked to participate in a research study being conducted by Nicolas Perdomo at Fort Hays State University (FHSU). Participation is voluntary. The purpose of this research study is to examine the effects of psychological stress on decision-making in hypothetical moral dilemmas.

Procedures: If you choose to be in the study, you will complete a series of online surveys. The surveys will take about 15 minutes to complete.

Confidentiality: Your Mechanical Turk Worker ID will be used to distribute the payment to you, but we will not store your worker ID with your survey responses. Please be aware that your MTurk Workers ID can potentially be linked to information about you on your Amazon Public Profile page, however we will not access any personally identifying information from your Amazon Public Profile.

Your name will not be associated in any publication or presentation with the information collected about you or with the research findings from this study. Instead, the researcher(s) will use a study number or a pseudonym rather than your name. Your identifiable information will not be shared unless (a) it is required by law or university policy, or (b) you give written permission. Permission granted on this date to use and disclose your information remains in effect indefinitely.

By signing this form you give permission for the use and disclosure of your information for purposes of this study at any time in the future.

Compensation: You will be paid \$0.50 for completing the study.

Withdrawal from the study: You may choose to stop your participation in this study at any time. Your decision to stop your participation will have no effect on your relationship with Fort Hays State University.

Refusal to sign Consent and Authorization: You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your right to any services you are receiving or may receive from Fort Hays State University or to participate in any programs or events of Fort Hays State University. However, if you refuse to sign, you cannot participate in this study

Ccanceling this Consent and Authorization: You may withdraw your consent to participate in this study at any time. You also have the right to cancel your permission to use and disclose further information collected about you, in writing, at any time, by sending your written request to: Dr. Janett Naylor-Tincknell, Department of Psychology, 600 Park St., Fort Hays State University, Hays, KS 67601.

Contact Information: If you have questions about the research, you can contact me at n_perdomo@mail.fhsu.edu.

[Click here to download this Consent Form](#)

Do you agree to the above and wish to participate in this study?

- ☐ Yes
- ☐ No

RESEARCHER CONTACT INFORMATION:

Nicolas Perdomo
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Fort Hays State University
Hays, KS 67601
(785) 628-4405

Janett Naylor-Tincknell, Ph.D.
Faculty Supervisor
Department of Psychology
600 Park St.
Fort Hays State University
Hays, KS 67601
(785) 628-4405

Appendix I
Demographics Form

How do you identify?

- ☐ Woman
- ☐ Man
- ☐ Non-binary
- ☐ Prefer to self-describe:

- ☐ Prefer not to say

Please enter your age, in years, below:

Are you of Hispanic or Latinx origin?

- ☐ No
- ☐ Yes
- ☐ Prefer not to say

How would you best describe yourself?

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African-American
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ Other, please specify:

- ☐ Prefer not to say

What is the highest degree or level of education you have completed?

- ☐ Some High School
- ☐ High School
- ☐ Some College, Associate Degree, or Trade School
- ☐ Bachelor's Degree
- ☐ Master's Degree
- ☐ Ph.D. or higher
- ☐ Prefer not to say

Appendix J

Debriefing Form

You have just completed a study titled "The impact of stress on regret in trolley problem decision-making." The purpose of this study was to examine how the impact of psychological stress in the form of mortality salience impacted an individual's decision-making in a trolley dilemma and their post-decision regret.

You were asked to fill out a series of surveys asking questions about moral decision-making. The information provided will help researchers understand the impact of different kinds of stress on people's decision-making during a moral dilemma and the effects this has on their perceived regret afterwards. This research might help us better understand why people make certain choices when faced with moral dilemmas and how much stress and regret play a role in these decisions.

If you feel distressed about your participation in this project, you can contact your local mental health provider or agency. If you have general questions about the research process you can contact the Office for Scholarship and Sponsored Projects at Fort Hays State University at 785-628-4338. For more information about this research project, you can contact the principal researcher, Nicolas Perdomo. You may also contact the faculty advisor on this project, Dr. Naylor-Tincknell.

Sincerely,

Nicolas Perdomo
n_perdomo@mail.fhsu.edu

Dr. Naylor-Tincknell
jmnaylor@fhsu.edu
(Faculty Supervisor)

Please make a note of the following 4-digit code. You will input it through Mechanical Turk to indicate your completion of the study. Then click the button on the bottom of the page to submit your answers. You will not receive credit unless you click this button.

ID: [\[Random ID generates here\]](#)

Appendix K

MTurk Instructions

We are researchers at Fort Hays State University (FHSU) conducting an academic study about moral decision-making. We would like you to participate in our study. Participation should take approximately 15 minutes. Select the link below to complete the study. At the end of the study, you will receive a code to paste into the box below to receive credit for your participation.

Make sure to leave this window open as you complete the study. When you are finished, you will return to this page to paste the code into the box.

Survey link: [[Insert Qualtrics link here](#)]

Provide your unique 4-digit ID here:

e.g. 123456

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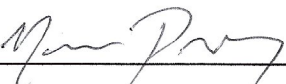
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I understand that once deposited in the Repository, the Thesis may not be removed.

Thesis: Mortality salience and moral dilemmas: The impact of stress on regret in

major problem
decision-making

Author: Nicolas Perdomo

Signature: 

Date: 12/20/21