

ON LIFE AND DEATH:
VITALITY, MORTALITY SALIENCE, AND WORLDVIEW DEFENSE

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DEDICATION

This project is dedicated to my fiancé, Justin, with my gratitude for his support and tolerance throughout the length of this process, and to my mother and my grandmother for cultivating my devotion to science.

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ABSTRACT

Human experience is most notably characterized by feeling or being “alive.” However, according to Terror Management Theory (TMT), humans possess the awareness of their own mortality, and the resulting potential for existential anxiety produced by mortality salience might interact with vitality, or the subjective experience of enthusiasm and aliveness. The construct of vitality includes attributes such as resilience and self-esteem, which is why vitality was predicted to be a more holistic approach to dealing with the potential death anxiety triggered by mortality salience. TMT operates under the notion that anxiety from the realization of one’s mortality is managed in part by embracing cultural worldviews, or psychological systems that provide life with meaning. When one fails to employ such a psychological buffer in the face of mortality concerns, this results in an increased defensiveness toward those who threaten or violate cultural worldviews. As such, Study 1 hypothesized that, under mortality salience, those low in a self-report measure of vitality would react more defensively to a moral transgressor than those high in vitality. To test this prediction, 176 individuals completed a self-report measure of vitality and were randomly assigned to provide a written response to two open-ended questions about their own death or to two parallel questions about watching television. Then, following a necessary delay, all participants provided judgments of moral transgressors; previous work shows that reminders of death lead to harsher judgments on this scale. No evidence for buffering was found in the results of Study 1, and findings failed to replicate past TMT research. To better understand vitality as a construct, Study 2 randomly assigned 90 individuals to view photos of either natural, outdoor scenes, or photos of built, outdoor scenes and were subsequently measured on vitality. Results of Study 2 conceptually replicated findings of previous work illustrating that those exposed to photos of nature reported higher levels of vitality than those exposed to photos of built environments. These findings strengthen evidence of the vitalizing effects of nature and supports contact with nature as a potential factor in future studies on vitality. Alternative explanations and implications are discussed.

INTRODUCTION

Human experience is most notably characterized by feeling or being “alive.” Following certain experiences in everyday life, people report feeling “invigorated” or “lively,” whereas other experiences lead people to feel “dead” or drained of energy (Ryan & Frederick, 1997). One may also refer to this sense of aliveness as *vitality*. Marked by the subjective experience of enthusiasm and aliveness, vitality is an individual difference factor that varies from person to person (Peterson & Seligman, 2004). Vitality is one of 24 widely-valued character strengths identified by the Values in Action (VIA) Classification of Strengths (Park, Peterson & Seligman, 2004). As a strength, research defines vitality as a direct reflection of eudaimonia—or an inherent fulfillment produced by virtue-congruent activity, or actions valued by one’s worldview. The current study aimed to understand vitality through the perspective of a motivational framework that emphasizes the adherence to values that provide meaning, under the uncertainty of death. Previous work suggests vitality as a “protective factor,” one which I predicted may mitigate existential anxiety following reminders of mortality (Peterson, Park, Pole, D’Andrea & Seligman, 2008).

Facing Mortality: Terror Management Theory

Like all creatures, humans possess the will for self-preservation. Indeed, avoiding death is an underlying motivation embedded in human nature (Simon et al., 1997). However, human beings have (perhaps) uniquely evolved the cognitive ability of temporal thought, allowing them to reflect on past events and envision events in the

future (Greenberg et al., 1990). Although temporal thought likely serves an adaptive purpose (Landau, Solomon, Pyszczynski, & Greenberg, 2007), such as proactive planning for upcoming events, it also affords humans the ability to contemplate their own inevitable demise (Becker, 1973). Humans are then faced with an internal conflict between the motivation to live and their awareness of death, creating the potential for debilitating anxiety (Simon et al., 1997). Derived from previous work by Ernest Becker (1973), Terror Management Theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986; Solomon, Greenberg & Pyszczynski, 1991) suggests that humans are motivated to escape the potential anxiety triggered by the awareness of their unavoidable demise. Most often, people do so either through the construction, maintenance, and defense of cultural worldviews, or symbolic constructions that imbue the world with meaning (e.g., Arndt & Vess, 2008; Burke, Martens, & Faucher, 2010; Schimel, Hayes, Williams, & Jahrig, 2007). More specifically, this dual-buffer system is composed of a) sustaining faith in the validity of a cultural worldview, and b) self-esteem, which individuals attain by meeting or exceeding the values set by the cultural worldview (Burke et al., 2010; Vail et al., 2012). In this context, a cultural worldview is described as a collectively generated and accepted standard of beliefs that, when upheld, provides a sense of personal significance and possible promise of something that exists beyond one's physical death. In other words, TMT theorists suggest that cultural worldviews and self-esteem afford individuals with a sense of immortality, or the belief that one's existence is significant and enduring beyond one's individual existence (Juhl & Routledge, 2016; Landau et al., 2007). Such beliefs can take root by way of literal immortality (e.g. believing in a religious afterlife),

or, in the case of worldviews and the self-esteem, by means of symbolic immortality (e.g. being a great athlete, a successful researcher, a good American; Landau et al, 2007).

Particularly when one takes pride in such a role, being a good American for example, one is able to feel as though they are a part of something eternal (Dechesne et al., 2003).

Thus, self-esteem, and the cultural worldviews in which it is derived, provide a sense of symbolic immortality, or a sense that one is valued which persists through time.

It is worth mentioning that although people are generally aware of their inclination to live and avoid death, evidence suggests that terror management defenses are primarily driven by death-related cognitions, rather than the physical experience of overt fear (Pyszczynski, Greenberg, & Solomon, 1999). Thus, humans are able to quell this terror without actually having to experience it. Similar to other creatures, people tend to develop actions for avoiding fear-inducing stimuli, particularly ones that do not involve an affective response. Accordingly, this dual-process theory claims that in order to avoid affective reactions like anxiety and terror, individuals evoke two types of defenses: proximal and distal defenses (Arndt, Cook, & Routledge, 2004; Pyszczynski et al., 1999). First, this dual-defense system conjures proximal defenses, or specific techniques aimed to remove conscious death-related cognitions from focal awareness. Specifically, humans push these existential concerns out of immediate awareness through distraction or by suppressing the threat of death through the denial of risk. Once these cognitions are successfully hidden from focal awareness, or when such cognitions are activated outside awareness, distal defenses work to confront residual death concerns through the maintenance of a sense of meaning (e.g., self-esteem). Distal defenses are

often symbolic in nature, occurring only when death concerns are outside conscious awareness (Pyszczynski et al., 1999). Illustrating such effects, Routledge, Arndt, & Goldenberg (2004) examined women's intent to sun-tan, an activity that, despite evidence regarding its negative consequences, people continue to engage in. Results illustrated that when concerns about death were in focal attention, individuals showed increased intentions to purchase sunscreen, a form of actual protection. Thus, immediate reactions to conscious thoughts of death lead individuals to engage in a behavior that provides a sense of protection from conscious threat (Routledge et al., 2004). However, when death thoughts were outside of focal attention, individuals primed with the association between tan skin and attractiveness showed an increased interest in sun-tanning. In this case, tan skin is a potential source of self-esteem, so instead of protecting it, intentions to sun-tan the skin offer a distal defense against death concerns that lie outside of conscious awareness. In this way, conscious thoughts about death activate proximal defenses that work to deny or counteract mortality, and death cognitions outside consciousness activate distal defenses that work toward standards that affirm self-worth,

Among ideas emphasized in TMT research, the *mortality salience hypothesis* (Rosenblatt, Greenberg, Solomon, Pyszczynski & Lyon, 1989) argues that if the maintenance of faith in cultural worldviews and self-esteem buffer death concerns, then individuals should uphold, defend, and strongly adhere to such worldviews (Landau et al., 2007; Vail et al., 2012). As such, many studies have illustrated that, following a reminder of death (e.g. writing about death, passing a funeral home, exposure to death primes), individuals have reactions seemingly conducive to upholding and boosting their

beliefs and values or increasing self-esteem (Greenberg, Solomon, & Arndt, 2008). For example, research illustrates that MS leads to more negative evaluations of moral transgressors, and more positive evaluations of those who uphold one's moral standards (Florian & Mikulincer, 1997). Other work demonstrates a similar pattern in terms of worldview defense, such that reminders of mortality lead to more positive evaluations of those who support or share one's cultural worldview and harsher evaluations of those who threaten or derogate one's cultural worldview (e.g. Greenberg et al., 1990). For instance, one study exposed a sample of judges to either a mortality salience manipulation involving two open-ended questions about death, or no questionnaire at all (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). Then, following an affect measure, the judges were asked to set a bond amount for defendants that committed a type of moral transgression, prostitution. In support of the mortality salience hypothesis, judges exposed to the mortality salience manipulation issued higher bonds for prostitutes, as compared to those not exposed to the manipulation. Thus, negative reactions were intensified among those reminded of death.

Further TMT research identifies the *anxiety-buffer hypothesis*, which suggests that psychological buffers which protect against death-related cognitions attenuate the use of other psychological mechanisms when individuals are reminded of death. For instance, both trait and experimentally induced self-esteem predict lower levels of death-thought accessibility and anxiety after people are exposed to reminders of mortality (Greenberg et al., 1992; Harmon-Jones et al., 1997). Additionally, work consistently reveals more negative, defensive reactions (in response to worldview-derogating others) among those

with low self-esteem, but not for those with high self-esteem, following MS (e.g., Baldwin & Wesley, 1996; Greenberg et al., 2001, Harmon-Jones et al., 1997). For example, Harmon-Jones and colleagues (1997) manipulated self-esteem through either positive or neutral feedback on a personality profile. Immediately following, participants responded to either two questions about their own death, or two questions about an innocuous activity: watching television. Then, after an affect measure, participants were asked to evaluate the authors of two essays, one reflecting pro-U.S. attitudes, and the other reflecting anti-U.S. attitudes. Findings of this study revealed that individuals with experimentally induced self-esteem did not respond to the mortality salience prime with increased worldview defense, whereas those with only moderate self-esteem reacted in more defensive ways. It would appear that self-esteem acts as an anxiety buffer, leading to a lower tendency to act defensively to worldview derogating others. Relative to those not reminded of death, those reminded of mortality, and higher in self-esteem, respond in much less defensive ways. Those high in self-esteem actively engage self-esteem as a buffer in the face of mortality concerns. Those low in self-esteem do not employ a buffer in the face of mortality concerns, and therefore are not protected, leading to more aggressive responses to worldview derogating others. In other words, those high in trait self-esteem do not react as strongly to worldview opposing others because this trait buffers death-related concerns (Juhl & Routledge, 2016; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004).

Although quite established (Burke et al., 2010), there are situations that can undermine the death-denying function of cultural worldviews. Exposure to a differing

worldview tends to threaten one's beliefs, and, in turn, the defense against death awareness (Greenberg et al., 1997). Many studies illustrate this effect (e.g. Arndt, Greenberg, Pyszczynski, & Solomon, 1997; Schmeichel & Martens, 2005), which is referred to in TMT literature as *worldview defense*; following reminders of mortality, people become more favorable toward those who support one's cultural worldview and less favorable toward those who reject one's cultural worldview (e.g. Florian & Mikulincer, 1995; Rosenblatt, Greenberg, Solomon, Pyszczynski & Lyon, 1989). In turn, people are motivated to reject the threatening worldview and defend their beliefs. Previous Terror Management literature tests this idea by priming thoughts of death (mortality salience; MS) versus some sort of control condition and examining worldview defense and death thought accessibility (e.g. Florian & Mikulincer, 1997). Control conditions are sometimes innocuous topics, such as watching television (e.g., Harmon-Jones et al., 1997); however, the majority of control topics included in TMT research, such as dental pain (e.g., Maxfield et al., 2007), failure (e.g., Hirschberger, Florian, & Mikulincer, 2005), and public speaking (e.g., Cox, Goldenberg, Arndt, & Pyszczynski, 2007), are often aversive in order to establish that the resulting effects are not simply due to the elicitation of negative affect. Results of these studies show that MS increases the motivation to avoid, derogate, and punish worldview threatening others, above and beyond effects of negative primes (Burke et al., 2010). Conversely, Holbrook, Sousa, and Hahn-Holbrook (2011) provides evidence that negative primes (besides death) can also trigger defensive reactions to worldview derogating others; however, because death is the ultimate self-threat, death primes produce larger and more consistent effects on

worldview defense. In summary, death appears to be the ultimate threat to cultural worldviews, leading to defensive reactions among those who lack sufficient protection, such as through the use of self-esteem.

Self-Esteem: The Unstable Buffer

Much research supports self-esteem as an existential buffer. Particularly, through the lens of the mortality salience hypothesis, if self-esteem protects against existential concern, then exposing an individual to reminders of mortality should increase striving for self-esteem, or a desire to live up to standards valued by a cultural worldview (Dechesne et al., 2003). One study tested this concept by looking at risk taking while driving (Taubman Ben-Ari, Florian, & Mikulincer, 1999). A large sample of Israeli soldiers reported on the relevance to driving to their self-esteem and were subsequently exposed to MS or a control condition. A series of four studies found that MS led to riskier driving than control primes, but only among those who reported driving as being important to their self-esteem. Such findings support the idea that reminders of death may activate protective mechanisms, which may lead individuals to seek out avenues to validate and enhance self-esteem, such as riskier driving. Several empirical studies provide support for this notion (e.g. Dechesne et al., 2003; Goldenberg, McCoy, Pyszczynski, Greenberg, & Solomon, 2000; Goldenberg et al., 2003), illustrating that MS increases self-esteem striving, ultimately supporting that self-esteem serves a terror management function. However, other research demonstrates contrasting findings regarding self-esteem. For instance, Baldwin and Wesley (1996) asked participants to

respond to a paragraph detailing thoughts and feelings associated with death and dying (MS condition), and found that those *high* in trait self-esteem (rather than low) showed more polarized judgments toward foreigners that derogated the university. This study, along with similar work, demonstrates that those high in self-esteem respond to MS in more destructive ways than those low in self-esteem, showing increased risk-taking behaviors, as well as increased derogation of out-groups (e.g. Landau & Greenberg, 2006; McGregor, Gailliot, Vasquez & Nash, 2007). Researchers interpret these results by claiming that high trait self-esteem individuals gain the most protection through cultural worldviews; thus, those high in trait self-esteem are more strongly motivated to defend their worldviews (Burke et al., 2010). This study mirrors findings from other research, which indicates that individuals high in self-esteem tend to react to self-threats in an aggressive manner (e.g. Bushman & Baumeister, 1998). Although puzzling, these findings may reflect the potential fragility of self-esteem to self-threats. Assuming death is the ultimate threat to self-esteem, Kesebir (2014) argues that self-esteem may collapse as a protective factor in the face of mortality concerns. With attention focused on the self and its unique value, this can become costly, leading to an increase in death-thought accessibility (Crocker & Park, 2004). Specifically, threats to the self and one's worth may undermine the utility of self-esteem as an existential buffer, as seen in previous work (e.g. Hayes, Schimel, Faucher, & Williams, 2008; Ogilvie, Cohen, & Solomon, 2008).

With such mixed results, the evidence of self-esteem as an existential buffer appears inconclusive. Considering that death is the supreme threat to human existence, self-esteem may not be entirely stable in the face of mortality (Kesebir, 2014). In keeping

with the idea that self-esteem can potentially collapse as a form of existential protection, some work claims that humans may employ other means of terror management (e.g., Kesebir, 2014). Continuing with the logic of TMT, focusing on the self and one's unique value may be coupled with undesirable outcomes, such as lowered self-esteem in response to threats aimed at the self or increased death-thought accessibility. In turn, more recent research (e.g., Vail et al., 2012) has aimed to find means of buffering mortality concerns beyond the use of self-esteem, examining other individual difference factors that provide more secure means of dealing with mortality concerns. Specifically, such research examines more positive-focused ways to deal with mortality concerns (Vail et al., 2012). Traditionally, TMT tends to focus on how mortality concerns contribute to negative outcomes, such as in-group biases and out-group derogation (e.g., Baldwin & Wesley, 1996), increased greed and materialism (e.g., Cozzolino, Staples, Meyers, & Samboceti, 2004), and increased behaviors that can risk physical health (e.g., Routledge et al., 2004). Instead, other work suggests that it is also important to look at whether there are positive qualities or outcomes associated with terror management (Vail et al., 2012), which has led to research utilizing positive aspects of character (e.g., Kashdan et al., 2011; Kesebir, 2014; Scmeichel & Martens, 2011). Thus, the current literature turns attention to optimal terror management (Sheldon & King, 2001; Vail et al., 2012), particularly through the use of character strengths.

Positive Psychology and Character Strengths

The field of positive psychology is an expansive area of research that focuses on aspects that allow individuals to thrive and lead meaningful lives (Park, Peterson, & Seligman, 2004). Particularly, constructs such as well-being and life satisfaction, as well as the strengths of character, are of central concern within positive psychology (McCullough & Snyder, 2000). Honing in on strength of character, the Virtue in Action (VIA; Peterson & Seligman, 2004) classification of character strengths is a collection of 24 widely-valued positive traits that fall under 6 broad virtue categories. Peterson and Seligman (2004) structured this classification system to operationalize the Character Strengths and Virtues (CSV) Handbook, a supplementary counterpart to the DSM. Associated with the positive psychology aspect of mental health, the CSV is devoted to helping individuals realize and develop positive traits.

By definition, a character strength is a stable and universal aspect of personality that is exhibited in thinking (cognition), feeling (affect), willing (volition), and action (behavior). These particular characteristics are described as the essential cornerstones of human flourishing (Peterson & Seligman, 2004), making it an important aspect of positive psychology. As a descriptive theory, Peterson & Seligman developed the VIA classification to explore and describe strengths that hone virtuous character.

Like other individual difference factors, character strengths described by the VIA Institute are not simply present or absent, character strengths possess structure, depth, and dimensionality (Peterson & Seligman, 2004). People vary in degrees to which they express these traits, based on their personality profile. Situational factors can also shape

and attenuate character strengths, and people express them to various extents due to social contexts. For example, one may express a differing amount of love and kindness toward a partner (e.g. offering to cook dinner) versus a homeless person (e.g. offering them \$5). In everyday existence, different situations may invoke different characteristics, such as teamwork when at work, or self-regulation when eating a large meal. These same situations bring out multiple character strengths, so they are considered interdependent, with the presence of one influencing the other. For instance, it is difficult to show self-regulation without prudence, or love without kindness. As such, character strengths tend to act in unison, elicited by circumstances and events in everyday life.

Considerable research provides evidence in support of the connection between character strengths and bigger-picture variables, such as well-being and life satisfaction (Peterson et al., 2008). Thus, character strengths are often targeted in interventions to enhance health and to pursue growth-oriented goals (Peterson & Seligman, 2004). Using this knowledge, a collection of work began to emerge, using the positive growth aspects of character strengths for the greater good, or dealing with a much darker issue: concerns with death.

Character Strengths and Terror Management Theory

Thinking about death is easily associated with negative outcomes, such as anxiety (Vail et al., 2012). However, according to research in positive psychology, there are also positive aspects implicated in terror management. A body of research indicates that certain personality traits may serve as existential buffers in the face of death, including

those listed in the VIA classification of character strengths. For example, the character strength of perseverance often occurs in response to challenges involving the continuation of goal-directed action (Park, Peterson & Seligman, 2004). This strength is placed under the broad category of courage, which involves overcoming fear.

Consequently, empiricists examined perseverance in light of TMT. A study by Florian, Mikulincer & Hirschberger (2001) illustrated that, under mortality salience versus control conditions, those lower in hardiness (a characteristic strongly related to perseverance) opted for harsher judgments and more severe punishments of social transgressors.

Another character strength, curiosity, is often seen in those motivated to discover new ideas and experiences, pushing their knowledge to new limits (Park et al., 2004). For this reason, Kashdan et al. (2011) hypothesized that curiosity may aid in the interpretation of the ambiguity of death. Supporting this prediction, Kashdan et al.'s (2011) research illustrated that participants high in curiosity showed less negative evaluations of a worldview derogating author. The authors rationalize that curious individuals may better handle existential concerns due to their pronation toward novel and ambiguous aspects of the world. Another aspect of moral character, self-regulation, is also relevant to ridding of death anxiety. Regulatory mechanisms shield individuals from excess and help monitor and control cognitions, motivation, and behavior, the underlying bases of temperance (Park, Peterson & Seligman, 2004). Studies illustrate that following reminders of death (vs. a control), worldview defense is reduced when accompanied by a self-affirmation exercise. Additionally, self-affirmation also reduced death-thought accessibility when executed before MS manipulations. Other research observed similar results, indicating

that those high in trait self-control reported lower death anxiety and less death-thought accessibility following MS, and were less likely to perceive death-related themes in ambiguous scenes (Gailliot, Schmeichel & Baumeister, 2006). In sum, character strengths appear to contribute to TMT literature in a positive manner, essentially turning the focus from traditionally negative views of MS to potentially positive opportunities for growth.

Vitality

The most common denominator between living humans is the feature of “aliveness.” However, this “aliveness” consists of more than physical activeness or caloric energy; instead, this vivacity is also rooted in psychological experience (Ryan & Frederick, 1997). Vitality encompasses both somatic and psychological properties. At the somatic level, vitality is related to good health, or lack of illness and fatigue. On a deeper, psychological level, vitality reflects autonomy, competence, and connection to the self and other people (Peterson & Seligman, 2004). As such, the definition of vitality explicitly includes “mental and physical vigor” (*New Merriam Webster Dictionary*, 1989), reflecting the dual-nature of the concept.

A vital person approaches life with enthusiasm and spirit. Different from happiness, vitality has distinct correlates and determinants that distinguish it as a separate resource (Nix et al., 1999). Specifically, vitality is an active positive state, whereas happiness often involves non-activate states such as contentment and pleasure (Peterson & Seligman, 2004). Those who exhibit vitality or zest pour enthusiasm into everything they undertake, signifying an actuated state of character.

Although the term “vitality” seems interchangeable with the word “energy,” vitality only affords energy that is available to the self. This energy is not the same as caloric energy. In fact, an intake of calories can actually decrease subjective vitality (Thayer, 1987), and a large output of caloric energy such as physical exertion can increase subjective vitality (Myers et al., 1999). For instance, work in this area found that following a sugary snack (or one meant to increase energy), tension levels increase and vitality levels decrease (Thayer, 1987). Vitality also involves more than just hyperactivity, nervous energy, or mania; at times, these types of arousal are actually quite draining. Suitably, nervous states are negatively associated with subjective vitality, and may be considered “negative energies” (Ryan & Frederick, 1997).

Vitality connects to both behavioral and objective health outcomes (Ryan & Deci, 2008). Research using brain imaging techniques revealed an association between subjective vitality and specialized patterns of brain activation and positive response systems (Barrett, Della-Maggiore, Chouinard, & Paus, 2004). Further, vital states predict higher levels of activity and productivity, more effective strategies when dealing with stress and, largely, better mental health outcomes (Penninx et al., 2000; Ryan & Frederick, 1997). In addition, research on stress suggests that the positive aspects linked to vitality lead to more resilience in the face of stressors, especially that of physical and viral influence (Polk, Cohen, Doyle, Skoner, & Kirschbaum, 2005). The current research aims to extend this research to psychological stressors, or more specifically, the anxiety surrounding mortality.

History

Vitality is deeply rooted in the feeling of being alive (*New Merriam Webster Dictionary*, 1989), and involves psychological integration, meaning, and purpose, rather than fragmentation and disconnection (Peterson & Seligman, 2004). For this reason, vitality is often a cornerstone in various teachings and healing traditions. Eastern philosophies, such as the Chinese notion of *chi* and the Japanese concept of *Ki*, emphasize the existence of a vital resource that harbors life, creativity, and harmony. These teachings claim that individuals draw upon this source to access energy and power, which ultimately predicts mental, physical, and spiritual health. The concept of vitality is also evident in the teachings of Balinese healers; they endorse the idea of *bayu*, an internal force that provides spiritual growth and resistance to illness (Peterson & Seligman, 2004). Everyday health practices such as yoga, reiki, and acupuncture exemplify such ideologies, purposed to increase vital energy, which stimulates higher mental and physical performance (Cleary, 1991). Collectively, each of these ideologies stresses the existence of an internal source of life.

In Western society, the idea of a vitality resource is prominent in works of early psychological theorists, where each theory discusses a pool of energy that is used in the maintenance of health and adaptation. On a much larger scale, early energy theories all suggest that psychological clarity and integration add energy or vitality to the self, whereas illness, conflict, and stress diminish it. Within the health sciences, Hans Selye (1975) developed a model of energy and health-outcomes. This work suggests that all individuals possess what Selye called “adaptive energy,” which, different from “caloric

energy,” is drained through exposure to psychological, environmental, and physical stressors. When one’s adaptive energy is low or depleted, one cannot cope with stress, or even illnesses.

With the dual nature of vitality in mind, Thayer (1996, 2001) created a biopsychological model to explain the type of energy associated with vitality. In describing this model, he claims that it is impossible to disentangle mental and bodily states, for they are not mutually exclusive. Thayer’s two-dimensional model measures tense (tense versus calm) and energetic (energy versus tiredness) arousal, each on a bipolar scale. This model also combines these two constructs and scales, accounting for more complex states of arousal such as tense-tiredness and calm-energy. Calm-energy, in particular, is the state Thayer claims is most related to subjective vitality, whereas the individual experiences an energy that is controlled, yet active and available to the self (Thayer, 2001). According to Thayer (1996), this is an idyllic state of arousal. Using this measurement, Thayer’s (1996) model of energy and arousal laid the groundwork for similar research, also exploring the relationship with various health behaviors.

Correlates

A large body of literature supports vitality as the central dogma of optimal human functioning (Peterson & Seligman, 2004). Thus, factors that influence any aspect of health generally influence vitality as well. Studies consistently illustrate that exercise, such as taking a walk, can increase subjective vitality and decrease tension (Thayer, 1986). On a larger scale, vitality ranks as one of the five strengths that are most strongly related to overall well-being (Ryan & Frederick, 1997). Further, Peterson and Seligman

(2004) suggest that vitality may contribute to well-being, serving as a “protective factor.” Researchers have found this to be quite useful, because subjective vitality is a consciously accessible feeling-state, it provides a gauge of well-being. Many studies have looked specifically at life-satisfaction, the cognitive aspect of subjective well-being. By definition, life satisfaction represents an individual’s subjective evaluation of his or her life in entirety (Diener, 2000). Individuals that are high in life-satisfaction are often good problem-solvers, have higher work performance, have better health, and, most related to the current study, are more resistant to stress and anxiety (Frisch, 2000). Social and relationship problems and depression are inversely related to life-satisfaction, whereas other variables such as SES or education only account for 15% of the variance in subjective-well being (Campbell, Converse, & Rodgers, 1976).

Vitality is also implicated in Ryan and Deci (2000)’s self-determination theory. This theory operates on the notion that humans have internal energies that are activated or impeded in expression by current psychological needs. As mentioned earlier, vitality acts as a critical indicator of well-being. In other words, an individual that is vital is fully-functional and self-actualized. To be self-actualized and fully-functioning, Ryan and Deci (2000) suggests that the individual meets the three basic psychological needs. Specifically, Ryan and Deci (2008) emphasize the importance of competence (feeling effective), relatedness (feeling socially connected), and autonomy (feeling volitional) in maintaining or enhancing energy, or more related to the current research, energy associated with vitality. A collection of studies has illustrated that, overall, the three basic needs designated by self-determination theory (Ryan, Berstein & Brown, 2010) positively

relate to differences in vitality. Vitality is positively correlated with individual differences in self-actualization, or the discovery, development, and expression of the real self (Jones & Crandall, 1986). Those high in self-actualization exhibit high levels of autonomy. Those with depression, on the other hand, often feel as though they have lost control, and therefore experience lower levels of vitality (Ryan, Deci, & Grolnick, 1995). To understand the relationship between autonomy and vitality, Kasser and Ryan (1999) surveyed nursing home residents. This study found that residents who reported more autonomy in everyday activities also reported higher levels of vitality. Additionally, residents that perceived higher autonomy support in nursing home staff reported higher vitality levels. These results replicate classic work by, Langer and Rodin (1976) who conducted a field experiment looking at the effects of personal choice and responsibility on nursing home residents. In comparison to residents told that their choices were the responsibility of the staff, residents told to be responsible for their own decisions showed significant improvement in alertness, activeness and overall well-being. Thus, autonomy over decisions is indicative of several outcomes related to well-being. Lending more support toward this idea, Gagne, Ryan & Bargmann (2003) recorded the levels of competence, autonomy, and relatedness from elite female gymnasts as experienced during their practice. Vitality ratings were also obtained before and after the gymnasts' practice. Results indicated that fluctuations in vitality from pre- to post-practice were heavily influenced by each of the three basic needs. When the athletes felt more competence, relatedness, and autonomy during practice, they had higher levels of vitality and energy, even though they had just expended much caloric energy. Similar results are

found among weight-loss participants (Ryan and Frederick, 1997) such that those who reported autonomous reasons for continuing the program reported higher levels of vitality. These findings illustrate the positive relationship among competence, autonomy, and relatedness with the maintenance or enhancement of vitality, and also show that vitality is diminished with feelings of disconnection, alienation, or inhibition.

Due to the influx of research in positive psychology, empirical evidence supplements the theoretical construct of vitality. Researchers have pinpointed certain factors that increase and decrease subjective feelings of vitality using well-validated and reliable self-report questionnaires and measures. Specifically, these studies revealed that vitality is something of a conscious experience; that is, individuals are often aware of their current level of subjective vitality, both mentally and physically. Results of these studies also indicate that vitality is, in addition to the three basic needs outlined by SDT, increased by physical exercise (Witard et al., 2016) and contact with nature (Ryan et al., 2010). Conversely, literature argues that unhealthier habits may detract from vitality levels, as vitality diminishes through illness, poor diet, stressful situations, conflict, fatigue and inactivity (Dean, 2017; Peterson & Seligman, 2004; Selye, 1975). With that, researchers argue that vitality is influenced by a multitude of factors, both physical and psychological in nature.

On the whole, each of the character strengths identified in the VIA classification are linked to life-satisfaction (Park et al., 2004). This finding is not surprising, for each of these character strengths is, by definition, psychologically fulfilling. Vitality, however, is one of the strongest predictors of life-satisfaction, along with hope and gratitude (Park et

al., 2004). Health psychologists and researchers alike utilize this research in constructing interventions that target well-being, as it appears to be unrelated to gender and is a useful indicator across the entire life span (Peterson & Seligman, 2004; Proyer, Ruch, & Buschor, 2013). Additionally, in a study on victims of trauma, vitality increased with posttraumatic growth (Peterson, Park, Pole, D'Andrea, & Seligman, 2008). This may suggest that trauma victims utilize character strengths, such as vitality, as a means of recovering from the traumatic incident. Similarly, Ryan & Frederick (1997) showed that in a population suffering from severe pain, pain level did not detract from subjective vitality levels. This goes against the traditional definitions of vitality, claiming that vitality is the absence of illness or pathology (Peterson & Seligman, 2004).

Although previous work has linked self-esteem with vitality, these are distinct concepts (e.g. Routledge et al., 2010). Researchers operationalize self-esteem as an attribute of vitality, or simply one aspect of vitality (Westendorp & Schalkwijk, 2014). Vitality also encapsulates several other attributes that are evidenced to influence MS effects, such as resilience (Florian et al., 2001), meaning in life (Routledge & Juhl, 2010), and positive affect (DeWall & Baumeister, 2007), which sets up vitality as a potential protective factor against the potential for anxiety surrounding mortality concerns.

Vitality and Terror Management Theory

As suggested before, self-esteem is often investigated as an existential buffer (Kesebir, 2014; etc.). Whether it is experimentally induced or dispositionally high, self-esteem relates with lower levels of anxiety, worldview defense, and death-thought accessibility following a reminder of death (Harmon-Jones et al., 1997). When self-

esteem is threatened, individuals often see an increase in death-thought accessibility, which commonly occurs when people are reminded of negative aspects about themselves, or their “undesired self” (Ogilvie, Cohen & Solomon, 2008). However, other research also suggests the opposite. A meta-analysis of TMT (Burke et al., 2010) suggests that high self-esteem participants that react more aggressively and defensively when threatened, showing riskier behaviors and increased out-group derogation (Baldwin & Wesley, 1996; Landau & Greenberg, 2006). This casts doubt on the original explication of self-esteem as a protective factor, as explained in Harmon-Jones et al. (1997). In light of these ambiguous results, researchers suggest that the focus on the self and one’s value can become costly (Crocker & Park, 2004; Kesebir, 2014). Specifically, self-esteem may not protect against death-related concerns when threats are made to the self, undermining self-esteem. In turn, work in positive psychology is currently searching for healthier, more constructive ways of dealing with death-anxiety, ones that divert attention away from the self.

In turn, research has identified many different individual difference traits (e.g., resilience, hardiness, curiosity) that serve as a “protective factor” or a buffer against anxiety, specifically related to death. The possibility of vitality as a protective buffer against death anxiety, however, remains unknown. Given the underlying essence of vitality is being “alive,” and the basis of terror management theory is death, it is hypothesized that vitality may provide a buffer against existential threat and reduce worldview defensiveness. According to empirical studies, those who are more vital possess vigor for life, even when faced with obstacles. Other research operationalizes

vitality as a quality that “plays a pivotal role in ensuring well-being, despite limitations,” which arguably applies to the concept of mortality (Westendorp & Schalkwijk, 2014). Similar to the way in which vitality offsets the negative effects of frailty (e.g. illness, pain, stress) it was predicted that vitality would also shape how individuals respond to mortality salience (MS). In particular, the current research aimed to explore vitality as an anxiety buffer.

Different from self-esteem, vitality does not draw excessive attention to the self and one’s individual value. Because the thought of death is the ultimate threat to one’s existence, self-esteem is said to be undermined in certain situations involving the reflection of mortality. Vitality, on the other hand, is an internal sense of life and enthusiasm that is also tied to physical and psychological existence, which is not necessarily contingent the self and one’s individual value. Although vitality and self-esteem are associated (Routledge et al., 2010), self-esteem is only one aspect of vitality, which is comprised of several other factors such as resilience, positive affect, and sense of purpose and meaning, each an aspect of vital functioning (Westendorp & Schalkwijk, 2014). Further, each of these attributes relates in some way to MS effects. For example, DeWall and Baumeister (2007) found that MS led participants to tune to positive affective information (e.g. filling word stems with positive words), suggesting that individuals use positive affect as a coping mechanism. In terms of purpose, Routledge and Juhl (2010) revealed that MS increased death anxiety, but only for those low in meaning in life. Thus, along with the other characteristics that comprise vitality, studies demonstrate that these particular attributes influence MS effects. Instead of examining

these mechanisms individually, vitality may be a more holistic avenue in which people cope with anxiety about death.

However, to my knowledge, little to no research has investigated the strength of vitality and its potential role as an existential buffer. Previous work often looks at vitality as an outcome variable, rather than a predicting variable. In one of the few studies to look at vitality using TMT, Routledge and colleagues (2010) measured self-esteem, and, following a mortality salience manipulation (two open-ended questions), participants self-reported vitality using the Subjective Vitality Scale (Ryan & Frederick, 1997). Because eudemonic living constitutes an essential aspect of well-being, and vitality is a direct reflection of eudaimonia and living a meaningful life, Routledge et al. hypothesized that vitality may be particularly vulnerable to existential threat. Specifically, this study tested the effects of MS on vitality, moderated by level of self-esteem. The results illustrated that the contemplation of eventual death diminishes perceptions of aliveness and vitality, but only for those low in self-esteem. This study looked at vitality as an outcome variable, rather than a predictor; however, the current research examined vitality as a predictor of mortality salience effects.

Overview and Hypotheses

The purpose of the current research was to investigate vitality as an existential buffer. Vitality is central to human existence, with “aliveness” being the single most essential aspect of life (Peterson & Seligman, 2004). Due to its close relationship with subjective well-being, it was hypothesized that vitality would play a moderating role in

the relationship between MS and defensive reactions. Specifically, I hypothesized that MS effects would manifest more so among participants experiencing low, versus high, subjective vitality. To test this, the current project investigated defense responses to moral transgressors, or those who violate some aspect of the cultural worldview. Previous literature illustrates that MS consistently leads to harsher judgments of moral transgressors (e.g. Florian & Mikulincer, 1997; Rosenblatt et al., 1989). Thus, assuming vitality buffers against death-related existential threat, it was hypothesized that participants experiencing low, versus high, subjective vitality would act more defensively when exposed to information that violates their cultural worldview under mortality salience. Thus, vitality was predicted to serve as a protective factor when exposed to reminders of death.

To test this hypothesis, vitality was measured first as a part of a personality battery. Next, participants were randomly assigned to write either about their own imagined death, or about imagining themselves watching television, closely modeling past TMT research. Finally, participants read information about moral transgressors, or those who violate aspects of their worldview, and reported their evaluations of these moral transgressors.

Given that self-esteem can break down as a buffer in the face of mortality concerns, and because vitality encompasses several other attributes in addition to self-esteem, it was hypothesized that moral transgression response would depend on the interaction between vitality level and mortality salience condition. Specifically, those high in vitality would not respond to moral transgressors as defensively as those low in

vitality, given vitality truly serves as an existential buffer following mortality salience primes. Work illustrates that MS leads to harsher, more defensive reactions to moral transgressors, and buffers attenuate these responses (e.g. Florian & Mikulincer, 1997). Additionally, there should be no significant difference among those in the television conditions, following previous work in TMT. Furthermore, no gender differences were expected such that men and women were expected to respond similarly to the stimuli.

Hypothesis 1: TMT predicts a main effect of mortality salience condition.

Specifically, it was predicted that participants exposed to mortality salience primes would respond more defensively toward moral transgressors than those exposed to control (television) primes.

Hypothesis 2: There was predicted to be a main effect of vitality, such that individuals on the higher end of the vitality scale will respond with overall less defensiveness (compared to those on the lower end of the vitality scale) toward moral transgressors.

Hypothesis 3: An interaction was predicted between vitality and MS such that those low in vitality would respond to mortality salience with harsher, more severe judgments of moral transgressors, whereas those high in vitality would respond to mortality salience with much milder judgments toward moral transgressors. Participants in the control condition were hypothesized to not differ significantly in judgments of moral transgressors.

Hypothesis 4: There was also predicted to be a strong, positive relationship among vitality, self-esteem, and general positive affect, as well as a strong negative relationship between vitality and general negative affect, and self-esteem and general negative affect.

Hypothesis 5: Following previous literature, there were two competing hypotheses regarding the role of self-esteem. One possibility was that self-esteem would attenuate responses to moral transgressors, following MS. Specifically, those high in self-esteem were hypothesized to respond less defensively toward moral transgressors following MS. Additionally, those low in self-esteem were predicted to respond with more severe judgments toward moral transgressors following MS. Such findings would be consistent with the majority of TMT work on self-esteem (Harmon-Jones et al., 1997). Alternatively, following predictions of Baldwin and Wesley (1996), it is also possible that those high in self-esteem may respond to MS with *harsher* judgments of moral transgressors than those low in self-esteem.

STUDY ONE

METHOD

Participants

Adult ($N = 176$; 88 women, 85 men, 3 gender non-conforming) undergraduate students at Montana State University were recruited from an introductory psychology course and were given partial course credit. A power analysis determined that 85 participants were needed to detect a small effect with power = .80. The analysis used an effect size of $r=0.35$, following previous literature in TMT (Burke et al., 2010). Participants' mean age was 19.55 ($SD = 2.625$), and they described themselves as White (85.2%), American Indian (4.5%), Asian (2.8%), Multiracial (2.3%), Native Hawaiian (0.6%), and Other (3.4%). Participants registered for the study online, which presented the series of studies as an investigation of the relationship between personality and imagination.

Procedure

After being greeted by an experimenter, participants entered the laboratory in small groups, working at individual computer stations. Participants were told the purpose of the study was to examine imagination based on personality. Before beginning the surveys, individuals were instructed to first read and sign a consent form, indicating that participants could leave at any point during the study. After consent forms were collected by the experimenter, participants were instructed to follow instructions on the computer

screen. Participants first completed a personality battery, including a measure of subjective vitality (Ryan & Frederick, 1997) and Rosenberg's (1965) Trait Self-Esteem Scale.

Following the personality battery, individuals were told that they would now complete a second, unrelated study. Following a few filler measures, participants were randomly assigned to conditions of a mortality salience induction similar to those used in previous TMT studies (e.g. Arndt, Greenberg, Simon, Pyszczynski, & Solomon, 1998; Vess & Arndt, 2008). Following this manipulation, participants completed the PANAS-X (a measure of affect; Watson & Clark, 1994), which served as the necessary delay between the mortality salience induction and the dependent measures. Removal of this delay eliminates the effects of mortality salience on outcome variables (Burke et al., 2010). Lastly, participants read and rated 10 vignettes as a part of the Moral Transgressions Scale (Florian & Mikulincer, 1997), which served as the main dependent variable.

Independent/Predictor Variables

Vitality

Participants first completed the Subjective Vitality Scale (Ryan & Frederick, 1997). This seven-item measure includes items such as "I feel alive and vital" and "I look forward to each new day." Each item is rated on a 1 (not at all true) to 7 (very true) scale. These items reflect the phenomenological definition of subjective vitality (Ryan & Frederick, 1997), and were assessed among filler items to boost the cover story. Scores

on this measure were summed and averaged to provide a single measure of subjective vitality ($M = 4.57$, $SD = 1.21$, $\alpha = 0.904$).

Mortality Salience Induction

Participants were randomly assigned to either a mortality salience condition or a control condition, in accordance with previous TMT studies. Those in the mortality salience condition responded to the following two open-ended items: 1) “Briefly describe the emotions that thought of your own death arouses in you,” and 2) “Jot down, as specifically as you can, what you think will happen to you physically as you die and once you are physically dead” (Rosenblatt et al., 1989). Participants in the control condition responded to parallel questions involving watching television (i.e. “Briefly jot down the emotions that watching television arouses in you,” and “Jot down, as specifically as you can, what you think will happen as you watch television or once you have watched television).

Affect and Delay Task

Immediately following this induction, participants completed the 60 item PANAS-X (Watson & Clark, 1994), an affective measure often used to allow death primes to move from proximal to distal awareness. Participants are asked to indicate the extent to which they currently feel each emotion (e.g., “inspired”, “distressed”, “excited”) on a 1 (*very slightly or not at all*) to 5 (*extremely*) scale. Positive and negative affect subscales each had 10 items (e.g., “alert,” “enthusiastic,” and “guilty,” “hostile”), from which composites were calculated (General PA: $M = 2.742$, $SD = 0.858$, $\alpha = 0.888$;

General NA: $M = 1.654$, $SD = 0.731$, $\alpha = 0.879$). For exploratory purposes, composites were calculated for joviality ($M = 2.394$, $SD = 1.025$, $\alpha = 0.943$) and fatigue ($M = 2.884$, $SD = 1.105$, $\alpha = 0.874$), which included 8 items (e.g., “happy,” “energetic”) and 4 items (e.g., “sleepy,” “sluggish”), respectively.

Dependent Variable

Worldview Defense

Worldview defense was measured as in previous studies (e.g. Maxfield et al., 2007). We exposed participants to Florian and Mikulincer’s (1997) Moral Transgression scale, which consists of 10 vignettes (e.g. The doctor mixed up the records of two patients with the same last name and amputated the leg of the wrong patient. “I was anesthetized for a simple operation on my knee and woke up without a leg. It’s impossible that my leg is gone,” said the woman, staring in disbelief at the empty space on her bed where her left leg was supposed to be). After reading the description of each offense, participants rated the severity and recommended the extent of the punishment on a scale from 1 (very light) to 7 (very severe). Scores from this measure were totaled and averaged to create a composite ($M = 5.260$, $SD = 0.650$, $\alpha = 0.864$), with higher scores indicating more worldview defense.

Secondary Measures

Self-Esteem

Self-esteem was measured with Rosenberg's (1965) trait self-esteem scale, which consists of 10 items (e.g., "On the whole, I am satisfied with myself" and "I feel that I have a number of good qualities") rated on a 1 (strongly disagree) to 4 (strongly agree). This measure aims to identify individual differences in self-esteem. These items were dispersed among filler items in the personality battery. Responses to these items were totaled and averaged to create a self-esteem composite ($M = 2.907$, $SD = 0.589$, $\alpha = 0.910$).

RESULTS

Descriptive Statistics

Table 1 presents the descriptive statistics for the study variables. Significant zero-order correlations appeared for all variables, with the exception of the Moral Transgression Score, with this variable illustrating weak correlations with all other variables. Additionally, General Positive Affect was only weakly associated with General Negative Affect in the negative direction, ($r = -0.136, p = 0.071$), and General Negative Affect was only weakly related to Joviality in the negative direction, ($r = -0.117, p = 0.123$). The strong positive relationship between self-esteem and vitality supports previous literature that iterates self-esteem as a large contributor to vital being (e.g. Ryan & Frederick, 1997; Westendorp & Schalkwijk, 2014). Overall, the correlations suggest that vitality is associated with positive variables.

Table 1. Zero-order correlations and descriptive statistics for study variables across conditions.

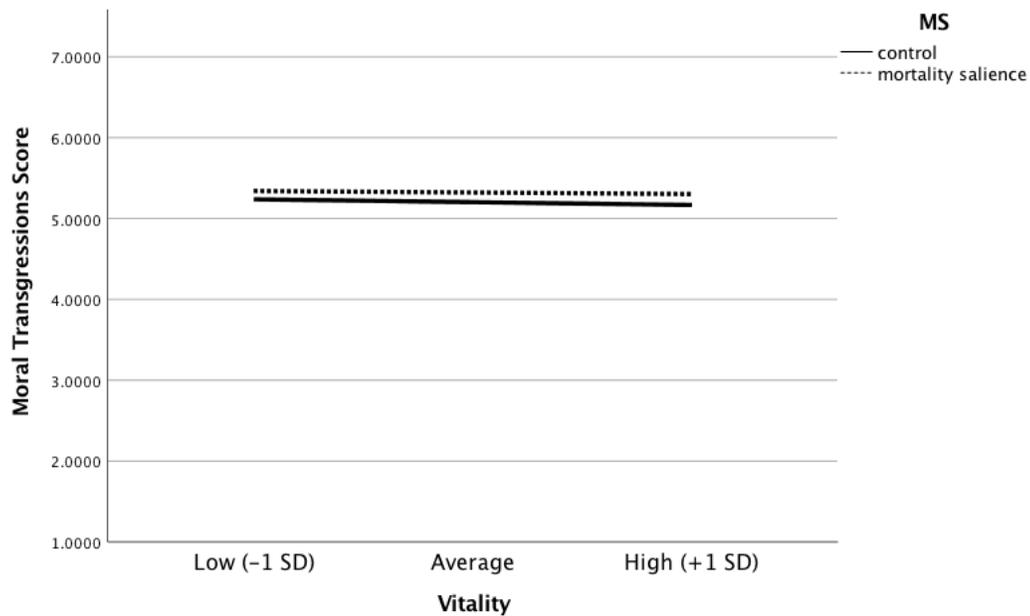
	1	2	3	4	5	6	7
1. Vitality	-						
2. Moral Transgressions Score	-0.040	-					
3. General Positive Affect	0.585**	0.013	-				
4. General Negative Affect	-0.315**	0.073	-0.136	-			
5. Fatigue	-0.323**	0.004	-0.310**	0.358**	-		
6. Joviality	0.637**	-0.023	0.878**	-0.117	-0.285**	-	
7. Self-Esteem	0.649**	-0.089	0.436**	-0.447**	-0.223**	0.448**	-
8. <i>M</i>	4.570	5.260	2.742	1.654	2.884	2.394	2.907
9. SD	1.205	0.653	0.858	0.731	1.105	1.025	0.589

Main Analyses

The main hypothesis was tested by regressing moral transgression evaluation scores on to vitality (mean-centered), mortality salience condition (effect-coded: MS=1, control=-1), and the Vitality x Mortality Salience interaction. The main effects were entered in Step 1, and the interaction term was entered in Step 2. There was no main effect of vitality, $\beta = -0.055$, $t(173) = -0.724$, $p = 0.470$, 95% CI [-0.112, 0.052] and no main effect of mortality salience condition, $\beta = 0.090$, $t(173) = 1.172$, $p = 0.243$, 95% CI [-0.040, 0.156]. In Step 2, it was found that the Vitality x Mortality Salience interaction (Figure 1) was also not significant, $\beta = 0.083$, $t(172) = 0.345$, $p = 0.731$, 95% CI [-0.136, 0.194]. The results of the regression indicate that the two predictors explained only 1.1%

of the variance ($R^2=0.011$, $F(3,172) = 0.644$, $p = 0.588$). Thus, MS and vitality did not appear to interact to influence moral transgressions score.

Figure 1. The effects of mortality salience and vitality on moral transgressions score. Plotted values represent predicted moral transgression evaluation score at one standard deviation below and one standard deviation above the mean.



Self-Esteem

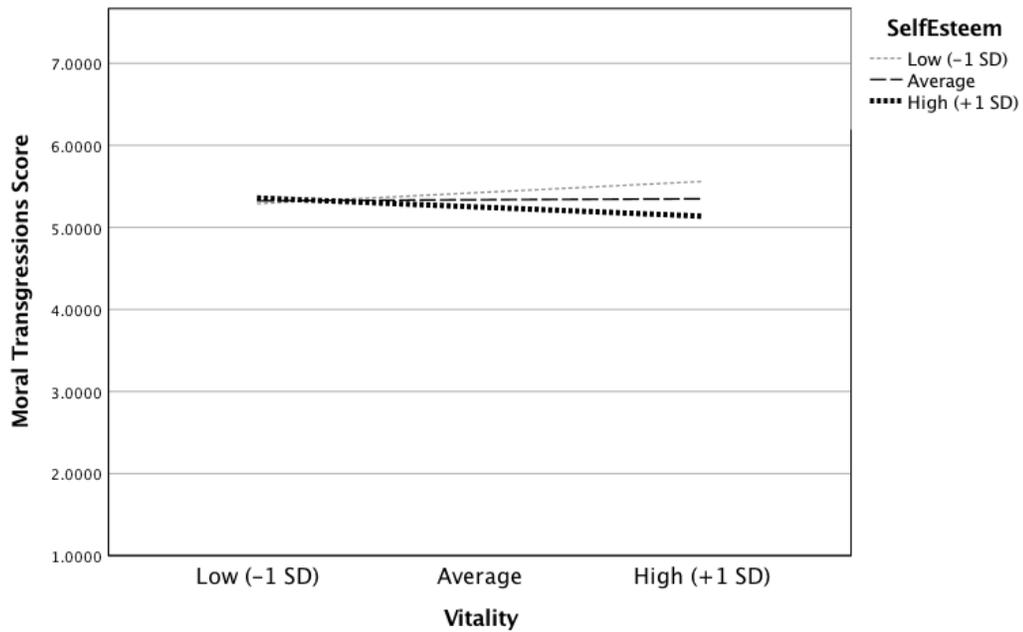
To explore the possible role of self-esteem in the main analysis, self-esteem was entered into the regression equation. Moral transgression evaluation scores were regressed onto self-esteem (mean-centered), vitality (mean-centered), and mortality salience condition (dummy-coded: MS=1, control=-1). Main effects for self-esteem ($\beta = -0.163$, $t(169) = -1.656$, $p = 0.099$, 95% CI [-0.44, 0.06], vitality ($\beta = .034$, $t(169) = 0.343$, $p = 0.732$, 95% CI [-0.10, 0.14], and mortality salience ($\beta = 0.064$, $t(169) = 0.750$,

$p = 0.454$, 95% CI [-0.14, 0.31] were all not significant. The interaction between mortality salience and vitality ($\beta = -0.034$, $t(168) = -0.339$, $p = 0.735$, 95% CI [-0.28, 0.21]) and the interaction between mortality salience and self-esteem ($\beta = 0.138$, $t(168) = 1.404$, $p = 0.162$, 95% CI [-0.18, 0.79]) were also not significant. However, the interaction between vitality and self-esteem was significant, $\beta = -0.210$, $t(168) = -3.205$, $p = 0.002$, 95% CI [-0.33, -0.06], suggesting that vitality and self-esteem interact to influence evaluations of moral transgressions, regardless of MS (see Figure 2). Simple slopes were calculated using the PROCESS dialog (Hayes, 2012) to probe the interaction between vitality and self-esteem, looking at the effects of vitality at high (+1 SD) and low (-1 SD) levels of self-esteem. At high levels of self-esteem, vitality had a negative, non-significant effect on moral transgressions score, $\beta = 0.123$, $t(169) = -0.173$, $p = 0.161$. At low levels of self-esteem, vitality had a positive, non-significant effect on moral transgressions score, $\beta = 0.210$, $t(169) = 1.629$, $p = 0.105$. Lastly, the three-way interaction between mortality salience, self-esteem, and vitality was not significant (see *Figures 3 and 4*), $\beta = 0.066$, $t(167) = 0.718$, $p = 0.47$, 95% CI [-0.17, 0.37].

In addition, self-esteem was examined as a standalone protective factor, as predicted by classic TMT literature. To do so, moral transgression evaluation scores were regressed onto self-esteem (mean-centered) and mortality salience condition (dummy-coded: MS=1, control=-1). The main effect for self-esteem ($\beta = -0.095$, $t(173) = -1.256$, $p = 0.211$, 95% CI [-0.270, 0.060]) and the main effect for mortality salience condition ($\beta = 0.101$, $t(173) = 1.332$, $p = 0.185$, 95% CI [-0.032, 0.163]) were both non-significant. The interaction between self-esteem and MS was also non-significant ($\beta = 0.081$, $t(172)$

= 1.074, $p = 0.285$, 95% CI [-0.075, 0.255]). Thus, self-esteem did not appear to influence MS effects.

Figure 2. Conditional effects of vitality and self-esteem on moral transgressions score.



Gender

To understand possible differences in vitality based on gender, gender was entered into the regression equation. Moral transgression evaluation scores were regressed onto gender, vitality (mean-centered), and mortality salience condition (dummy-coded: MS=1, control=-1). Main effects for gender ($\beta = 0.077$, $t(165) = 1.003$, $p = 0.318$, 95% CI [-0.074, 0.228], vitality ($\beta = -0.051$, $t(165) = -0.572$, $p = 0.566$, 95% CI [-0.228, 0.125], and mortality salience ($\beta = 0.095$, $t(165) = 1.240$, $p = 0.217$, 95% CI [-0.056, 0.246]) were all not significant. The interactions between mortality salience and

vitality ($\beta = -0.023$, $t(166) = 0.262$, $p = 0.794$, 95% CI [-0.153, 0.200], the interaction between mortality salience and gender ($\beta = -0.027$, $t(166) = -0.351$, $p = 0.726$, 95% CI [-0.178, 0.124], and the interaction between vitality and gender ($\beta = 0.141$, $t(166) = 1.574$, $p = 0.117$, 95% CI [-0.036, 0.317] were also not significant. Lastly, the three-way interaction between mortality salience, gender, and vitality was not significant, $\beta = 0.042$, $t(165) = 0.473$, $p = 0.637$, 95% CI [-0.134, 0.217].

Figure 3. Effects of mortality salience and vitality on women's moral transgressions scores

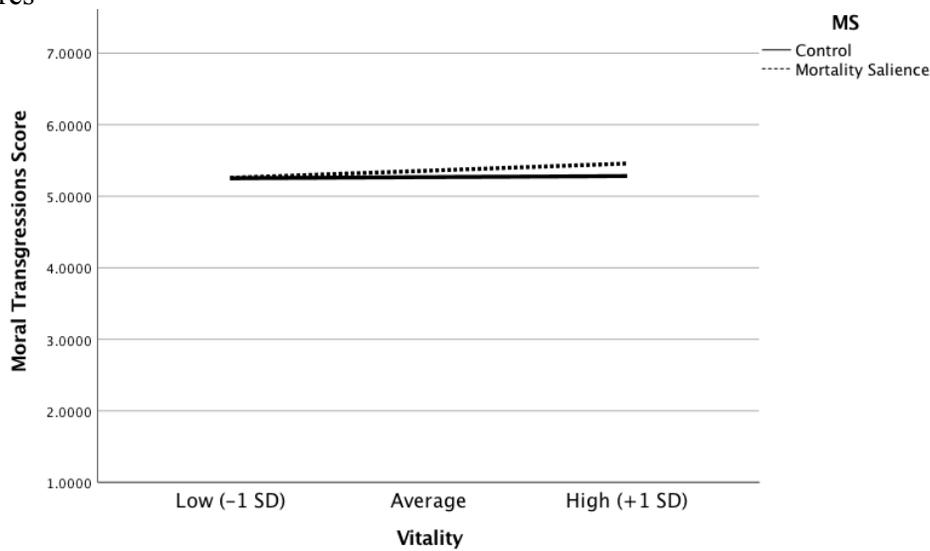
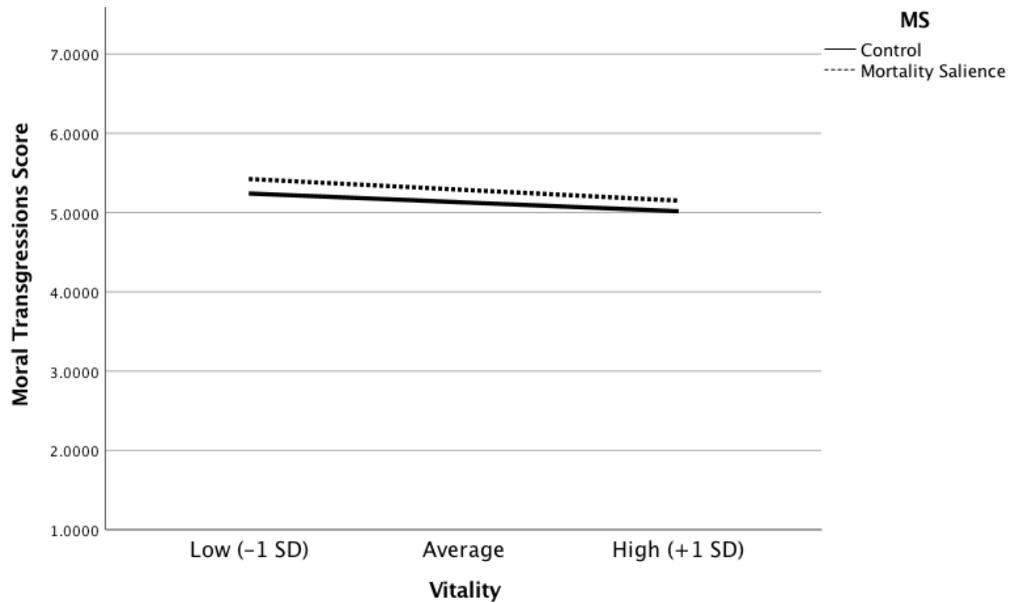


Figure 4. Effects of mortality salience and vitality on men's moral transgressions scores



Measurement Analyses

Factor Analysis of the Subjective Vitality Scale

An exploratory factor analysis was used to examine the underlying structure of the SVS, based on the current sample. Seven questions regarding vitality levels were factor analyzed using a principal components analysis method with Varimax rotation (see Table 2). The analysis yielded one factor accounting for 58.62% of the variance among all included variables. The scree plot (see Figure 5) appears to level off after an inflection point at the second component, which complements Kaiser's criterion of factor extraction, which also revealed one factor (Field, 2013). The communalities of the variables within the analysis are all high enough to indicate that variables are adequately

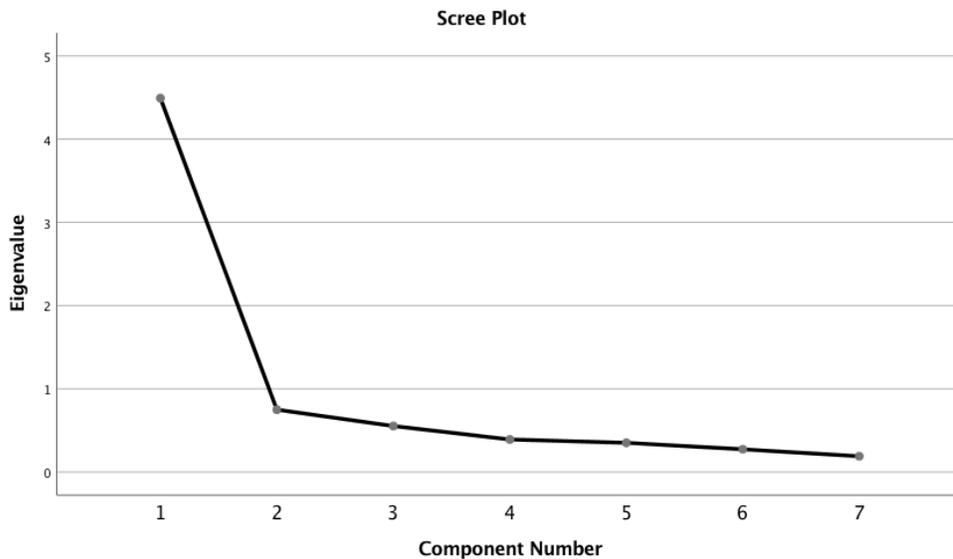
related to one another. Together, results of the factor analysis indicates that there is one clear pattern of response to items in the Subjective Vitality Scale.

Table 2
Summary of Exploratory Factor Analysis for the Subjective Vitality Scale Using Principal Component Analysis (N=176)

<i>Component Loadings</i>	
	<i>Loading</i>
Component 1:	
I feel energized.	0.889
I have energy and spirit.	0.842
I feel alive and vital.	0.833
* I don't feel very energetic.	0.805
I look forward to each new day.	0.779
Sometimes I feel so alive I just want to burst.	0.750
I nearly always feel alert and awake.	0.693

*reverse coded

Figure 5. Scree plot examining items in the Subjective Vitality Scale



Factor Analysis of the Moral Transgressions Scale

An exploratory factor analysis was used to examine the ten vignettes included in the Moral Transgressions Scale, based on the current sample. Each vignette includes 2 questions; however, each pair of items were highly correlated ($r > 0.7$), so pairs were averaged to create one score per vignette. Factors were analyzed using principal component analysis with Varimax (orthogonal) rotation, which resulted in three factors explaining 60.51% of the total variance amongst the set of vignettes. Five criteria were used in determining the number of components to include: eigenvalue, parallel analysis, variance, scree plot, and residuals. Criteria indicated that three components of the underlying structure should be investigated; principal component analysis was conducted to retain three components. The accompanying scree plot (see Figure 6) reveals an inflection point at the third component; however, scree plots are most useful in sample sizes over 200 (Field, 2013). In turn, components with eigenvalues over 1 (Kaiser's

criterion) were retained, resulting in three factors. Following rotation, the first factor explained 36.13% of the variance, and was understood as being more relevant to the participant group, including moral transgressions that involved young individuals. The second factor explained 12.4% of the variance, was seen as being more removed from the participant demographic, involving older, professional individuals. Lastly, the third factor explained 11.98% of the variance, and was seen as involving more miscellaneous transgressions (See Table 3). Factor 3 included only items one and three, which were seemingly unrelated to the other vignettes. Thus, it appears that items in the Moral Transgressions Scale load onto three distinct components, with only the first factor being the most relevant to the sample under study.¹

¹In light of factor analysis results, the main analysis was conducted using only items of one (the first) component. Testing one component of the Moral Transgressions Scale did not change the influence of vitality and MS on moral transgressions score.

Table 3. Summary of Exploratory Factor Analysis for the Moral Transgressions Scale Using Principal Component Analysis (N=176).

Table 3. Summary of Exploratory Factor Analysis for the Moral Transgressions Scale Using Principal Components Analysis

<i>Component Loadings</i>			
	<i>Loading</i>	<i>Reliability Coefficient</i>	<i>Reliability if Item Deleted</i>
Component 1:		0.818	
The head of the needy students' scholarship fund escaped overseas with the grant money. The students' representative: "He ran away with our future; none of us can continue our studies—we have no other resources. The academic degree was supposed to enable us to get out of this situation, and now the door is closed; reality has pushed the dream far away, who knows, maybe forever."	0.830		0.725
The burglar stole a revolutionary computer program developed by the young scientist. A similar program was marketed soon after by a major corporation. "This program was the key to my professional future," said the young scientist. "This market is quick, wild, and full of talent. The opportunity to invent something unique is rare. I doubt if I'll ever have another chance to advance to the front of the line."	0.803		0.808
The owner of a cement factory was sued for the youth's loss of sight. His promise made 15 years ago to install new filters on his smokestacks wasn't fulfilled because of economic reasons. The youth, who lived his whole life neighboring the factory, said: "Their greed cost me my health; any financial compensation, no matter how large—I will never recover from this loss."	0.774		0.772

Table 3 Continued

<p>A faulty medicine caused the amputation of the youth's leg. Economic reasons caused the pharmaceutical company to market a series of faulty medicines instead of destroying it. This was revealed by the doctor of the boy, who suffered from diabetes and as a result of this had to have his foot amputated. "We thought of everything but this; for two weeks his situation deteriorated . . . who would imagine that the major medicine produced by such an established company is the cause? It is hard enough when one is forced to amputate an adult's foot, and he is so young. . . ."</p>	0.673	0.770
Component 2:	0.622	
<p>"The senior doctor's decision to cut the young woman's womb unnecessarily was based on his arrogance and use of only partial information." Such was the judge's conclusion at the end of the doctor's trial. Leaving the courtroom, the young woman said, "I'll never be a complete person again. I have three children and did not intend to have more, but still a major part of my identity is lost forever. Is there anything that can compensate for this?"</p>	0.686	0.545

Table 3 Continued

<p>A negligent operation of removing a blister from the vocal chords of the promising opera singer caused her perpetual hoarseness. The woman sued the surgeon for the loss of her musical future. "I can talk, sing in the shower, maybe even for friends," she told the judge, "but since my childhood I wanted to be an opera singer. I have the talent and I had the appropriate voice, and now it's gone forever."</p>	0.671	0.568
<p>"A dreadful emptiness surrounds me, childhood memories, memories of my dead parents, the songs, the loves . . . all my past erased as if it never was." This emotional description was heard from a young man who was hurt in a car accident when a commercial vehicle tailgated and crashed forcefully into the young man's car. His head injury caused the erasure of his life's memories.</p>	0.634	0.520
<p>The talented pianist's fingers betrayed him; his typically light-handed playing, his unique touch on the keys, the familiar virtuosity were not seen or heard. . . . The young genius's first concert following his recovery from the accident conclusively proved that the young girl who drove through a red light damaged his body lightly, but destroyed the pianist's career.</p>	0.603	0.577
Component 3:	0.586	

Table 3 Continued

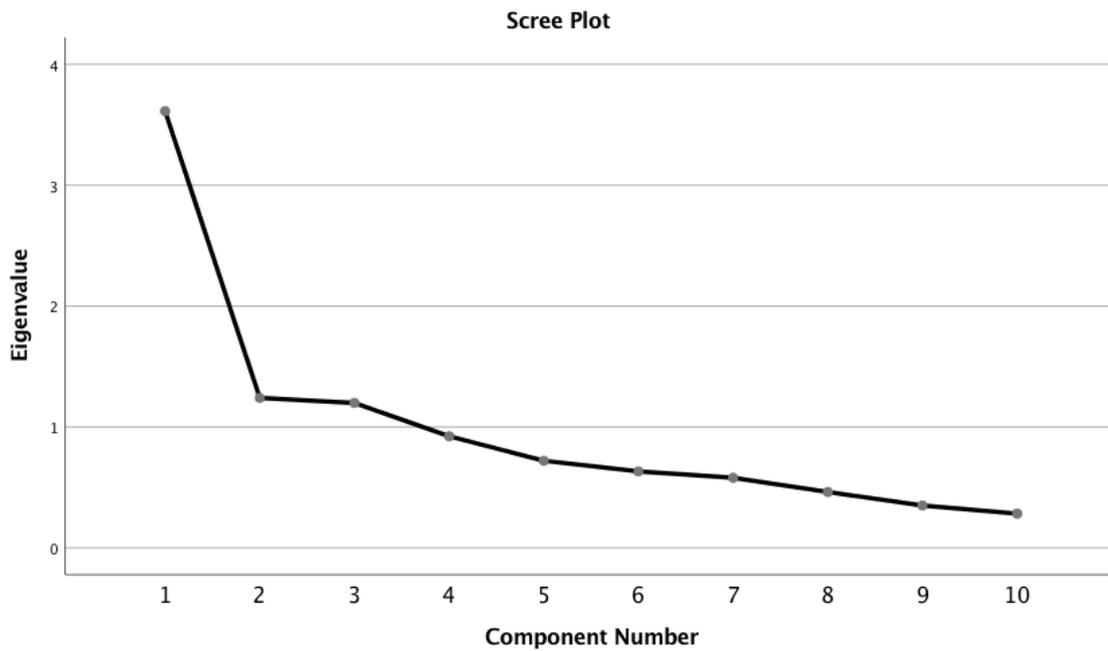
A frustrated burglar destroyed the life masterpiece of the renowned sculptor, one week before its completion and display to the public. The burglar, disappointed from the small booty, tied up the sculptor and in front of his eyes hit the ceramic sculpture with a heavy hammer until it shattered. The stunned sculptor: “Nineteen years of work—the best of my talent, turned into a pile of rubble.”

0.850

The doctor mixed up the records of two patients with the same last name and amputated the leg of the wrong patient. “I was anesthetized for a simple operation on my knee and woke up without a leg. It's impossible that my leg is gone,” said the woman, staring in disbelief at the empty space on her bed where her left leg was supposed to be.

0.742

Figure 6. A scree plot examining items in the Moral Transgressions Scale



Study One Discussion

Contrary to the hypotheses, those low in vitality did not show increased defensiveness toward moral transgressors following MS. Instead, MS did not lead individuals low in vitality to differ from those high in vitality on moral transgressions scores. Rather, there was almost no observable difference in response among those in the MS condition, regardless of vitality level. Additionally, there was no effect of mortality salience condition, running contrary to classic literature in Terror Management Theory that illustrates that MS leads to more negative evaluations of moral transgressors (e.g. Florian & Mikulincer, 1997). Those asked to write about death did not differ from those asked to write about watching television, and vitality level did not influence MS effects, due to the lack of MS effects, nor did vitality correlate at all with the transgression responses. In other words, there were no MS effects for vitality to potential influence.

Secondary analyses also failed to replicate the finding of self-esteem as a protective factor: MS did not lead those high in self-esteem to differ in defensiveness from those low in self-esteem. Classic work in TMT consistently illustrates more defensive reactions toward worldview derogating others among those low in self-esteem, but not those high in self-esteem, following MS (e.g., Harmon-Jones et al., 1997). Theorists argue that those low in self-esteem do not employ the protective function of self-esteem, revealing more aggressive responses to moral transgressors. These findings do not support self-esteem as a protective factor in the face of mortality concerns.

Additional analyses involving MS effects of self-esteem and vitality also failed to predict moral transgression score. However, the relationship between self-esteem and

vitality appears to influence moral transgression score, regardless of mortality salience condition; the influence of self-esteem on moral transgression score differed only slightly among those high in vitality. In this way, it appears that vitality and self-esteem may work in tandem to influence moral transgression scores, whether or not mortality salience is present.

Men and women did not differ in vitality, which addresses one unanswered question in vitality research. Gender did not influence the relationship between MS and vitality, nor the relationship between MS and self-esteem, on moral transgressions score. Thus, it appears that men and women in this sample similarly endorsed vitality.

Overall, the findings from the current experiment ran conceptually inconsistent with the findings that mortality salience should increase defensiveness in response to moral transgressors, or those who violate standards set by cultural worldviews (e.g., Florian & Mikulincer, 1995). Individuals did not respond to moral transgressors in a more aggressive way following MS. Self-esteem, and vitality (which encompasses self-esteem), did not correlate with or impact transgression responses. This may have to do with a number of potential issues, which are discussed in depth in the general discussion. However, one potential issue is the small effect size associated with TMT (Burke et al., 2010). With no evidence of the classic MS effect, it would be difficult to see the role of vitality on MS effects; thus, the current study is just one data point in a larger collection of studies. One other explanation is the issue of measuring vitality as a predictor; the indirect nature of measuring vitality as a predictor may not provide powerful enough effects. Although this is seen as an appropriate first step, a more direct approach to

looking at differences in vitality on MS effects would be to find a reliable manipulation evidenced to move individuals on vitality. Thus, Study 2 investigates one such approach, serving as a pilot study to further research on the topic.

STUDY TWO

The purpose of the second study was to explore vitality as a construct. Although previous work has examined vitality (e.g., Peterson et al., 2008; Peterson & Seligman, 2004; Ryan et al., 2010), much more is unknown than understood. As a desirable human state (Peterson & Seligman, 2004), people seek out avenues that restore feelings of vitality. Thus, deliberate interventions aimed to increase subjective vitality often involve elements of such avenues, such as contact with nature and exercise (Peterson & Seligman, 2004). Following suit, Study 2 sought to explore avenues of manipulating vitality levels, specifically through exposure to nature. Writers and poets often allude to the connection between nature and vitality, where presence in nature and the wilderness is an uplifting experience (e.g., Muir, 1901). These writings characterize nature as having vitalizing effects, imbuing people with a sense of aliveness and enthusiasm. In turn, researchers investigated this relationship, leading to a small collection of studies that explore aspects of subjective vitality and presence in nature (e.g., Ryan et al., 2010; Stilgoe, 2001; Tarrant, 1996; Van den Berg et al., 2003). For example, Tarrant (1996) illustrated that positive affect and health increases through recollection of experiences in nature. Additional findings from Stilgoe (2001) demonstrate the importance of nature and the outdoors in everyday life, in terms of the avoidance of exhaustion and de-vitalization. Research also suggests that presence in nature increases feelings of “aliveness” and energy (Greenway, 1995), as well as engagement with the world (Kaplan & Talbot, 1983). A similar set of results occurs in virtual environments, where exercise in a virtual experience of nature had an energizing effect on participants, and exercise in virtual

indoor environments had more of a relaxing effect (Plante, Cage, Clements, & Stover, 2006).

Researchers rationalize the seemingly direct relationship between nature and vitality through attention restoration theory (Kaplan, 1995), which suggests that depleted attention and energy is restored or replenished through interaction with novel objects that are often found in natural environments. Research in this realm indicates that outdoor settings that involve natural elements (such as mountains, trees, and rivers) reduce stress and fatigue, and enhance mood. Van den Berg, Koole, and van der Wulp (2003) tested this theory by instructing participants to view videos of either man-made, built environments, or natural, outdoor environments and subsequently measured participants' affect and stress levels. Results of this study show that, as predicted by attention restoration theory, exposure to natural environments decreases stress and enhances mood and overall happiness.

Nature appears to be a vitalizing experience, rather than simply a restorative effect. To test this, Ryan et al. (2010) employed a similar procedure to that of Van den Berg et al. (2003), exposing participants to photos of scenes in nature, as well as scenes involving non-natural structures such as buildings. Specifically, participants viewed each photo for 2 minutes as they were projected on a screen. While viewing the slides, participants listened to a recorded script designed to direct their attention to different aspects of the experience. Participants were asked to imagine themselves in the settings depicted by the photographs to increase realism. As predicted, those exposed to the nature photographs experienced an increase in subjective vitality, whereas those exposed

to photos of buildings experienced a drop in subjective vitality (Ryan et al., 2010). Moving beyond the “restorative effects” of nature, this provides more evidence toward nature as a vitalizing element.

In examining the vitalizing effects of nature, it is important to note that these settings often involve both physical exercise and social interaction. Individually, these factors correlate with a variety of positive outcomes in previous research (e.g. Cohen, Gottlieb & Underwood, 2000). Physical exercise, more specifically, is also linked to increased vitality and wellbeing (Frederick & Ryan, 1995). These factors could possibly overinflate positive outcomes associated with presence in nature, potentially creating confounds in the vitality research. Ryan et al. (2010) investigated the relationship between nature and vitality, all while controlling for both physical exercise and social interaction. Results of this study illustrated that presence of nature predicted vitalization, even when controlling for confounding exercise and social aspects. Physical presence in nature also presents similar results. Ryan et al. (2010) led participants on a 15-minute walk either along the tree-line following a river, or around the halls of the basement floor of the research building, thus controlling for exercise and social interaction. Supporting the connection between vitality and nature, participants who were led outside experienced significantly higher vitality scores than those led inside the building. Taken together, nature appears to reliably increase vitality levels, whether physically present, or simply imagined.

Overview and Hypotheses

The current study aimed to strengthen evidence supporting the seemingly straightforward connection between contact with nature and vitality. A limited collection of research suggests that contact with nature increases vitality, whether it be virtually or physically present (e.g. Ryan et al., 2010; Van den Berg, Koole, and van der Wulp, 2003). Though previous work has illustrated such connection, the purpose of Study 2 was to assess the generalizability of the findings of Ryan et al. (2010) to novel materials.

It was predicted that there would be an effect of photo type, where participants that viewed photographs of natural scenes would report higher levels of vitality than those exposed to photographs of built scenes. The effect of gender was explored as well to determine if there were any differences between men and women regarding vitalization effects of nature.

METHOD

Participants

A total of 92 participants (42=women; 48=men; 2=non-gender conforming; $M_{\text{age}} = 19.55$, $SD_{\text{age}} = 3.01$) took part in a pilot study testing materials for future research. Participants described themselves as white (85.9%), multiple (4.3%), American Indian (3.3%), Asian (2.2%), and other (3.3%). Power analysis determined that 72 participants were needed to detect an effect size of 0.6 They were given the same cover story as in Study 1 and received class credit for their participation.

Procedure

Participants experienced the same protocol as Study 1, except they did not complete the mortality salience manipulation and instead wrote about television.

At this point, participants were told they would complete an “imagination exercise” and were randomly assigned to photo type conditions, following procedures of Ryan et al. (2010). After viewing each of the four assigned photos, vitality was again measured. Participants ended the session by completing a demographics questionnaire, and were fully debriefed before dismissal from the experiment.

Independent/Predictor Variable

Photo Manipulation

Participants were shown either four photos of buildings or structures or four photos of natural, outdoor scenes (e.g. Kaplan, 1995, Ryan et al., 2010). Images were taken from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2008) and were matched with photos of the opposite condition based on aesthetics and affect. Photos included only inanimate objects and avoided any scene that displayed any affectively-charged content (i.e. eateries, identifiable locations, etc.). While viewing one of the two sets of photos, participants in both conditions listened to a pre-recorded script that directs attention to different parts of the scene, asking participants to attend to colors and textures and imagine sounds and smells (see Appendix for full script). This manipulation is shown to induce vitality in several studies (e.g. Ryan et al., 2010; Schwartz, Weinberger, & Singer, 1981; Weinstein, Przybylski, & Ryan, 2009) and was included in order to replicate previous findings.

Dependent Variable

Vitality

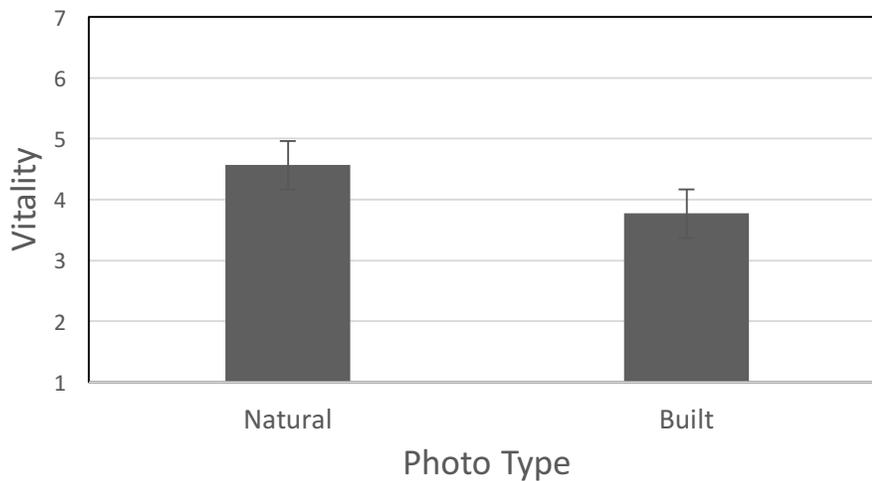
Immediately following the photo manipulation, participants again completed the same Subjective Vitality Scale (Ryan & Frederick, 1997) used in Study 1 ($\alpha = 0.894$).

RESULTS

Main Analyses

An independent t-test was utilized to examine effects of photo type (natural vs. built) on vitality. A significant difference was found ($t(90) = 3.083, p = 0.003, 95\% \text{ CI} [0.283, 1.311], d = 0.638$). Vitality scores were significantly higher (see Figure 7) among participants who viewed photos of natural, outdoor environments ($M = 4.569, SD = 1.085$) compared to participants who viewed photos of built, outdoor environments ($M = 3.771, SD = 1.396$).

Figure 7. Differences in vitality based on photo type condition

Photo Type and Gender

A 2 (gender) x 2 (photo type) ANOVA was conducted to examine the potential role of gender on the relationship between photo type and vitality. A significant main

effect of photo type emerged ($F(1,86) = 5.716, p = 0.019, \eta^2 = 0.062$). The main effect for gender was not significant ($F(1,86) = 0.640, p = 0.426, \eta^2 = 0.064$). The interaction between photo type and gender was also not significant ($F(1,86) = 0.131, p = 0.426, \eta^2 = 0.002$). Vitality does not appear to differ among men and women overall or as a function of photo exposure.

Study 2 Discussion

Study 2 provides support for the connection between contact with nature and increases in vitality, conceptually replicating findings of Ryan et al. (2010).² Participants that studied photographs of natural, outdoor scenes showed higher levels of vitality than those who studied photographs of built, outdoor scenes, evidence that virtual experiences of nature can increase vitality levels. Thus, the current study demonstrates the usefulness of the photo manipulation as a possible direct approach to inducing vitality during a momentary experience.

GENERAL DISCUSSION

The current project examined the role of vitality within the theoretical framework of Terror Management Theory. Specifically, the purpose was to investigate vitality as a protective factor against mortality concerns. Classic literature in TMT gives much attention to self-esteem as the principal protective factor to effectively mitigate MS effects; however, because death is the ultimate threat to the self, there can be a breakdown in self-esteem's stability in the face of mortality (Kesebir, 2014). On the other hand, vitality is an overarching experience that includes attributes such as resilience, meaning, and, self-esteem (Westendorp & Schalkwijk, 2014), which lead to the prediction of vitality as a more holistic approach to dealing with the potential for existential anxiety.

Study 1 tested this prediction using methods parallel to that of previous TMT literature. First, participants completed a measure of vitality, which was buried among filler measures. Next, participants were assigned to conditions of a mortality salience induction often used in MS research (e.g., Rosenblatt et al., 1989). Then, following the manipulation and delay, participants responded to actions of moral transgressors. Following the anxiety-buffer hypothesis, it was predicted that MS would lead those low in vitality to react more defensively to moral transgressors, as compared to those high in vitality.

Contrary to the hypothesis, the results of Study 1 (see Figure 1) revealed no difference among conditions. Those high in vitality did not differ from those low in vitality on moral transgressions score, following MS. Interestingly, the classic mortality

salience effect also failed to replicate. Mortality salience primes did not increase derogation of moral transgressors. However, this may be due in part to the small effect size associated with TMT research (Burke et al., 2010). Overall, mortality salience failed to interact with vitality to predict moral transgression score; thus, the findings of Study 1 did not accord with the prediction of vitality as a protective factor.

One possibility is that vitality simply does not protect against the potential for existential anxiety. However, it could also be that self-reported vitality may not be a powerful enough predictor in such a context. Instead, a more direct approach would be to directly manipulate vitality, which was the object of Study 2.

Study 2 investigated one particular avenue associated with increases in vitality: contact with nature. Alluded to in both creative and scientific writing, nature consistently appears to decrease fatigue and increase mood (e.g., Greenway, 1995; Van den Berg, Koole, & Van der Wulp, 2003). To strengthen evidence of contact with nature as a consistent predictor of vitality, and to replicate findings of Ryan et al. (2010), participants in Study 2 were subjected to a photo manipulation involving photos of nature or photos of built environments and immediately measured on vitality. Results of Study 2 conceptually replicated findings of Ryan et al. (2010); participants that viewed photos of natural, outdoor environments reported higher levels of vitality than those exposed to photos of built, outdoor environments. Thus, results of Study 2 support the prediction that contact with nature would lead to higher vitality levels than those of man-made environments.

Aside from establishing evidence for a vitality manipulation, findings from Study 2 add to the collection of literature emphasizing the value of nature and the outdoors to vitality (e.g., Greenway, 1995; Ryan et al., 2010; Stilgoe, 2001; Tarrant, 1996). This may also shed light on human proclivity for natural settings, seen in choices of outdoor recreation and preferences for homes with views of natural landscapes (Galindio & Rodriguez, 2000; Van den Berg, Hartig, & Staats, 2007). Literature in this realm tends to theorize such desire for contact with nature as providing a psychologically adaptive function, which, in the context of the current project, could be extended to vitality, and ultimately, well-being. This work offers only a glimpse into the importance of nature in boosting vitality, and, given the critical importance of vitality to well-being, potential health benefits of spending time in and around nature. Such results could be useful for informing future studies testing health interventions, or even looking at effects of vitality across age groups.

Alternative Explanations

At face value, the results of Study 1 call into question the utility of vitality as a protective factor in the face of death concerns. One possibility is, of course, that vitality does not serve a buffering function. That said, the lack of a main effect of MS on transgression responses and the lack of evidence for the influence of self-esteem on MS effects suggest a possible methodological explanation, given the decades of research that suggest otherwise. Therefore, this section explores other possible explanations for the results of Study 1.

First and foremost, work in Terror Management Theory carries a relatively small effect size. A meta-analysis of 277 experiments in TMT revealed only a moderate effect size ($r = 0.35$); however, the effect size for studies using the Moral Transgressions Scale is even smaller (Burke et al., 2010). Thus, Study One may have been underpowered to successfully reveal the effect. Feeding into this theory, Study One failed to replicate the classic MS effect. Thus, without the effect, it would be difficult to see any potential effects of vitality. To actually test the influence of vitality on MS effects, the classic worldview defense effect would have to necessarily be present.

Additionally, due to an error in programming, there was no manipulation check associated with the mortality salience induction. As is, there is no evidence to show that participants followed instructions of the assigned prompt. A manipulation check would be inherently useful in determining whether directions were followed. It is possible that participants failed to engage the manipulation, leading to no difference among mortality salience conditions. Future work should include such data to ensure directions were followed.

Upon analysis, it was also found that the Moral Transgressions Scale loaded onto three components. Participants' item responses to the severity of specific moral transgressions depended on component membership. As a possible measure with too much error and noise, this may have contributed to the lack of effects. Future work should explore other dependent measures in order to more reliably examine MS effects and worldview defense.

It is possible that the items in the Subjective Vitality Scale may actually be priming vitality. With items such as, “I feel alive and vital,” and “I feel energized,” participants may experience a boost in vitality upon completion of the measure, which could be problematic in terms of the mortality salience induction. If vitality does buffer against the potential for death anxiety, a boost in vitality prior to reminders of death may remove MS effects. Thus, participants in both MS and control conditions would respond similarly to moral transgressors. This would suggest that future research would do well to measure trait vitality at a different point in time, or to simply manipulate vitality beforehand. However, it appears that both conditions responded quite defensively to moral transgressors, potentially pointing to a ceiling type effect, so this may not necessarily be the case. Together, future work would benefit from looking at vitality from different angles.

LIMITATIONS

Upon completion and analysis of the current set of experiments, it became quite evident that there were several limitations that future research should ideally address. First, although previous work illustrates the relationship between subjective vitality and behavioral outcomes (e.g., Ryan & Frederick, 1997; Ryan et al., 2010), relying solely on self-report measures of vitality could be problematic. In order to fully grasp the concept of vitality, along with its capabilities as a character strength, work must be done to examine also behavioral measures of vitality. To investigate mappings of self-report measures of vitality onto behavioral reflections of vitality, future studies should look to implement methods that expand findings to behavioral outcomes.

Next, Study 1 failed to implement a manipulation check. Without such an element, it is impossible to establish evidence that results are produced by the manipulation. Future research could address this issue by analyzing open-ended responses to mortality salience and control prompts, coding for responses are relevant to the assigned condition.

Further, Study 1 served only as a first step in understanding vitality as a potential protective factor against death concerns. By measuring vitality as a predictor, the results provide an exploratory glimpse into the under-researched area of vital functioning. Thus, findings are to be interpreted as such. Study 1 provides a foundation for further research, and future work should expand upon this work by manipulating vitality and again analyzing its potential role in TMT after correcting for the noted methodological issues.

Such work would provide a more straightforward approach to understanding the psychological functionality of vitality.

As for Study 2, one limitation was that images from the IAPS (Lang, Bradley, & Cuthbert, 2008) are quite dated. Thus, images are often grainy and blurred when displayed on a computer screen. In turn, future work should look to test new materials that are of higher quality. Another limitation of Study 2 was that only the Subjective Vitality Scale was used to measure vitality. Instead, future studies could experiment with other measures. Lastly, as mentioned earlier, future studies would also benefit from other means of measuring vitality, rather than relying solely on self-report. Thus, the collection of literature would greatly benefit from a behavioral measure of vitality.

IMPLICATIONS AND FUTURE STUDIES

The current project only offers a small insight into the construct of vitality. As suggested by Peterson and Seligman (2004), there is more unknown about the experience of vitality than there is known. Building on what is known, future studies could implement actual contact with nature, using aspects from previous TMT literature (e.g., Gailliot et al., 2008; Pyszczynski et al., 2006). Specifically, participants could be led outdoors, either along a tree-line (nature), past a cemetery or funeral home (nature + TMT), or led indoors (control). Such study would circumvent issues with simply measuring subjective vitality, or quality of nature photos. Future work could also potentially utilize virtual reality in nature exposure; such methods would help control for social and exercise aspects often associated with experiences in nature.

Building on other methods of increasing vitality, exercise is also a prime target for future studies. As seen in previous work, physical exertion is often associated with higher levels of vitality (e.g., Myers et al., 1999); however, too much exertion can also detract from vitality (Nix et al., 1999). Thus, future work could aim to find the tipping point of physical exercise, or what range of activity adds to vitality, and at what level exercise begins to detract from it. This could also be useful in looking at MS effects. Particularly, participants could be asked to exercise or provide some level of physical exertion before exposure to MS, looking at high and low levels of vitality. This way, behavioral ways of looking at vitality may be used, adding to the self-report literature of vitality.

It has also been suggested that vitality may be increased through exciting events (Peterson & Seligman, 2004). However, this realm lacks empirical evidence. Future work

could look at certain instances, from sporting events to musical performances, that may increase subjective vitality.

Given the inverse relationship between scores on the Subjective Vitality Scale and depression, more work should be done to investigate the such relationship. Specifically, future studies could work to understand vitality, potentially as a lack of depressive symptoms, or depression as a lack of vitality. With depression being so intricately linked to well-being, studies in this realm would add to depression research.

However, because of its close relationship with well-being, vitality remains an important topic of research. Future studies that identify certain interventions that harness vitality could be useful in terms of health and immunological status, and even pain management (Peterson & Seligman, 2004; Penninx et al., 1999). Thus, more work looking at vitalizing effects of nature could help design an intervention related to health outcomes, potentially supporting vitality as a protective factor.

CONCLUSIONS

Taken together, two experiments attempted to lay the foundation for empirical research on vitality, a keynote of optimal human functioning and indicator of well-being. Despite the large sample of participants, Study 1 was unable to replicate classic TMT findings and did not produce results in line with the prediction that vitality would mitigate MS effects on transgression responses. Previous research supports individual difference factors as playing a role in terror management (e.g., Florian et al., 2001; Kashdan et al., 2011), and due to its overarching relationship to constructs such as self-esteem, vitality was predicted to be an ideal buffer against MS effects. Instead, results were inconclusive.

Results of Study 2 provided useful insight into the relationship between contact with nature and an increase in vitality. Such findings provide meaningful evidence, not only for follow-up studies, but also for the growing body of research involving the health benefits of spending time in nature (e.g., Galindo & Rodriguez, 2000; Plante et al., 2006). Given the critical importance of vitality to health and well-being, research examining avenues for manifesting and increasing vitality should be considered indispensable.

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APPENDIX

IMAGERY SCRIPT

Imagery script: “Imagine yourself in this place [pause]. Look around, noticing all aspects of your environment [pause]. Pay attention to the colors [pause]. Notice the textures. Imagine yourself breathing in the air; notice any smells that may be present [pause]. Imagine any sounds you may hear [pause]. Let yourself take in all the aspects of the environment in front of you. “