INFLUENCE OF TRAIT MINDFULNESS ON COVID-19 ANXIETY IN COLLEGE

STUDENTS

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A Senior Honors Project Presented to the

Honors College

East Carolina University

In Partial Fulfillment of the

Requirements for

Graduation with Honors

by

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Greenville, NC

May, 2021

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Among the battery of physical symptoms and signs that the COVID-19 virus imposes on the public, this pandemic has also sparked an increase in anxiety across the globe. The inevitability of death, more prominent now than ever in light of the disease, has triggered various emotional and behavioral responses, which can be understood through terror management theory (TMT) (Solomon, Greenberg, & Pyszczynski, 1991). This theory postulates that anxiety of death drives much of human behavior. Combined with the additional stressors that college students experience, from studying and maintaining grades, to balancing relationships and investing in future careers, this reminder of mortality has the potential to affect students' mental health considerably. Mindfulness-based therapies have shown significant promise in effectively treating both physical and psychological symptoms (Grossman, Niemann, Schmidt, & Walach, 2004; Chen, Yang, Wang, & Zhang, 2013; Liehr & Diaz, 2010). Studies also consistently suggest that mindfulness, either as trait or practice, may be inversely related to anxiety through emotion regulation (Chambers, Gullone, & Allen, 2009). These studies suggest that trait mindfulness offers a therapeutic benefit towards handling existential anxiety. This investigation explores the influence of trait mindfulness on anxiety caused by COVID-19 among college students.

The novel coronavirus, COVID-19, was first detected in Wuhan, China in December 2019 and was declared a pandemic by the World Health Organization on March 11, 2020 (World Health Organization, 2020). By early August 2020, approximately 19 million cases had been confirmed, resulting in the deaths of more than 700,000 across the globe. This international threat has triggered a surge of panic among communities as people scrambled to stock up on supplies to last them through quarantine or self-isolation. Beyond being a physical disease, this

pandemic is also contagious in its psychological effects and presents a novel existential threat in today's society.

The human action taken to ignore or escape this impending doom can be explained through TMT (Greenberg, Pyszczynski, & Solomon, 1997; Pyszczynski, Solomon, & Greenberg, 2003). This social psychological theory is derived from the work of cultural anthropologist Ernest Becker's book, *The Denial of Death*, which posits that the majority of human action is provoked by the brevity of life and the terror of death. To combat death-related anxiety, people often develop buffers, which largely consist of symbols such as religion, laws, culture, and self-esteem. The latter in particular is a concept widely explored as a means to alleviate death anxiety. One explanation is that self-esteem is gained through fulfilling cultural expectations, which thereby results in feeling valuable and worthy of being remembered beyond death (Greenberg, 2012). Evidence shows that when threatened by death anxiety, individuals also display greater levels of in-group favoritism and out-group hostility (Pyszczynski, Solomon, & Greenberg, 2003). In the present study, self-esteem of the subjects is measured using the Rosenberg Self-Esteem Scale to explore the potential influence of anxiety and mindfulness on subjects' self-esteem.

Researchers have additionally been examining the connection between self-consciousness and death cognitions. Through two studies, Taubman-Ben-Ari and Noy (2010) investigated the relationship between a person's level of self-awareness and self-consciousness and their responses to death anxiety. In Study 1, the researchers found a positive association between accessibility of death-related cognitions and the ruminative dimension of self-consciousness. In Study 2, researchers found that a mortality salience induction resulted in greater validation of cultural worldviews compared to a control group, but only among participants with lower levels

of self-consciousness. Thus, Taubman-Ben-Ari and Noy's findings suggest that a high level of self-consciousness may serve as a death reminder, resulting in greater cultural worldview validation. In another study, participants with high levels of self-control produced less death anxiety and demonstrated a lower need for the buffer system of cultural validation (Gailliot, Schmeichel, & Baumeister, 2006). Within the concepts of self-consciousness and self-examination, researchers distinguish two factors: reflection and rumination. The latter has been shown to be connected to neuroticism and arises from poor adjustment and low self-esteem. In contrast, reflection has been found to be related to more positive and adaptive experiences, such as improving one's self (Trapnell & Campbell, 1999). Research has shown that mindfulness-based therapies have the potential to alleviate physical and psychological symptoms through prompting participants to pay conscious attention to the present moment without judgement (Grossman, Niemann, Schmidt, & Walach, 2004). Mindfulness has also been shown to be linked with high self-esteem (Brown & Ryan, 2003). One study used TMT to assess how mindfulness impacts defense reactions towards existential threat. Participants who were high in mindfulness and curiosity produced non-defensive reactions (Kashdan, Afram, Brown, Birnbeck, & Drvoshanov, 2011). This study, among others, suggests that mindfulness offers a therapeutic benefit towards handling existential anxiety.

Exploring whether trait mindfulness can alleviate the novel death anxiety spurred on by COVID-19 in college students will be advantageous in finding potential methods of easing students' anxiety. Beyond worrying for their physical health amid the pandemic, current students may fear for their future careers as government lockdowns, restrictions and dynamic changes in the consumer market put many other things into question. This stress, combined with death anxiety, has the potential to remarkably impact our future as a society. The purpose of this study

is to investigate whether mindfulness can help promote resiliency among college students living through a pandemic.

There is no potential risk to the subjects of being exposed to a mortality salience manipulation. In the more than 300 published studies that have utilized mortality salience (MS) manipulation, significant deleterious effects for subjects have not been found. In one of the first studies to use MS manipulation, researchers determined that MS manipulation does not cause significant physiological arousal. In addition, researchers did not find that "the effects of mortality salience depend on physiological arousal or the conscious experience of anxiety" (Rosenblatt, Greenberg, Solomon, Pyszczynski & Lyon, 1989). In another study, researchers noted that in emerging literature on MS manipulation, none of the experiments in which MS demonstrated an effect on subjects' evaluation of others discussed that MS manipulation results in either self-report or physiological measures of distress (Greenberg, Simon, Harmon-Jones, Solomon, & Pyszczynski, 1995). In addition, current research highlights the fact that the effects of MS manipulation are driven by death-thought accessibility (DTA), which involve non-conscious death-related concerns that are highly accessible at a conscious level. Yet no research has shown that DTA mediates MS manipulation effects (Hayes, & Schimel, 2018).

Method

Participants

Subjects consisted of students enrolled in PSYC 1000 – Introductory Psychology at East Carolina University. Of the 65 subjects, 17 were male and 48 were female students ages 18-26.

Materials and Research Design

This study is a between-subjects factorial design with independent variables being trait mindfulness (high or low) and mortality salience (present or control). Participants were either

exposed to a Mortality salience manipulation, or not (i.e., control) and then completed a trait measure of mindfulness through the Mindful Attention Awareness Scale (MAAS) (Brown & Ryan, 2003). In the Experimental condition, participants were instructed to read a description of COVID-19, then write about (a) what will happen to them as they physically die to the virus, and (b) the emotions the thoughts of their own death that was aroused in them due to the virus. The Control condition participants were asked to write about the same things but "while watching television," instead of "due to the virus." All participants completed the Positive and Negative Affective Schedule expanded form (PANAS-X) as a delay task before completing the dependent measures (Watson & Clark, 1994). The dependent variables were the subjects' measurements of anxiety (i.e., Coronavirus Anxiety Scale), self-esteem (i.e., Rosenberg Self-Esteem Scale), and mood (Brief Mood Introspection Scale) (Lee, 2020; Rosenberg, 1965; Mayer & Gaschke, 1988).

Procedures

Subjects in the mortality salience group were instructed to read a short background of COVID-19 with information and statistics on college student deaths caused by the virus. All subjects then were asked to "Briefly describe the emotions that the thought of [your own death (i.e., mortality salience condition)/watching television (i.e., control condition)] arouses in you" and to "Jot down, as specifically as you can, what you think will happen to you physically as you [die (i.e., mortality salience condition)/watching television (i.e., control condition)] and once you are [physically dead (i.e., mortality salience condition)/watching television (i.e., control condition)]" (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989).

After completing either the mortality salience or control condition, subjects were then instructed to complete the Mindful Attention Awareness Scale to determine whether they had higher or lower trait mindfulness (Brown & Ryan, 2003). This treatment was then followed by a

delay task, which has been shown in research to increase the effectiveness of Death-Thought Accessibility (Steinman & Updegraff, 2015). The delay task required subjects to complete the Positive and Negative Affective Schedule expanded form (PANAS-X). Once completed, COVID-19 anxiety of subjects was measured using the Coronavirus Anxiety Scale (CAS) (Lee, 2020). The Brief Mood Introspection Scale (BMIS) was additionally used to measure subjects' mood and the Rosenberg Self-Esteem Scale (RSE) was used to measure subjects' self-esteem. It was predicted that the subjects with higher trait mindfulness would report lower scores on CAS as a result of mortality salience.

Results

This was a questionnaire study conducted with 65 undergraduate psychology students at East Carolina University. A simple linear regression was calculated to predict participants' mood using the BMIS Pleasant-Unpleasant subscale (BMISpu) based on Trait Mindfulness (MAAS). A significant regression equation was found ($F(1, 63) = 32.51$, $p < .000$), with an R^2 of .340. Participants' predicted mood (BMISpu) is equal to $23.324 + 4.943$ (MAAS) when mood is measured as pleasant mood. BMISpu increased 4.943 for each increase in Trait Mindfulness (MAAS).
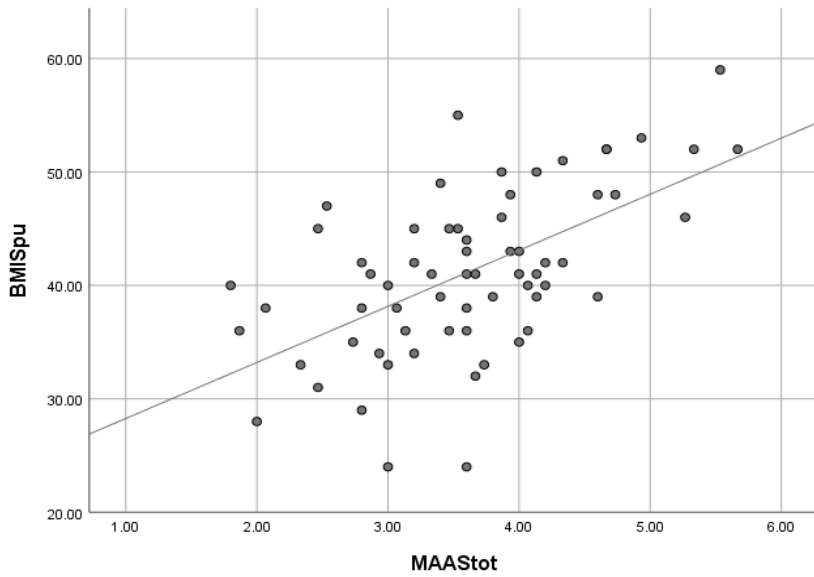
Figure 1. Trait mindfulness (MAAStot) versus Pleasant-Unpleasant mood (BMISpt). R^2 = .340.

Using the BMIS Positive-Tired subscale, a simple linear regression was calculated to predict participants' mood. A significant regression equation was found ($F(1, 63)$ = 15.430, $p <$ .000), with an R^2 of .197. Participants' predicted mood (BMISpt) is equal to 11.539 + 1.825 (MAAS) when mood is measured as positive mood. BMISpt increased 1.825 for each increase in Trait Mindfulness (MAAS).
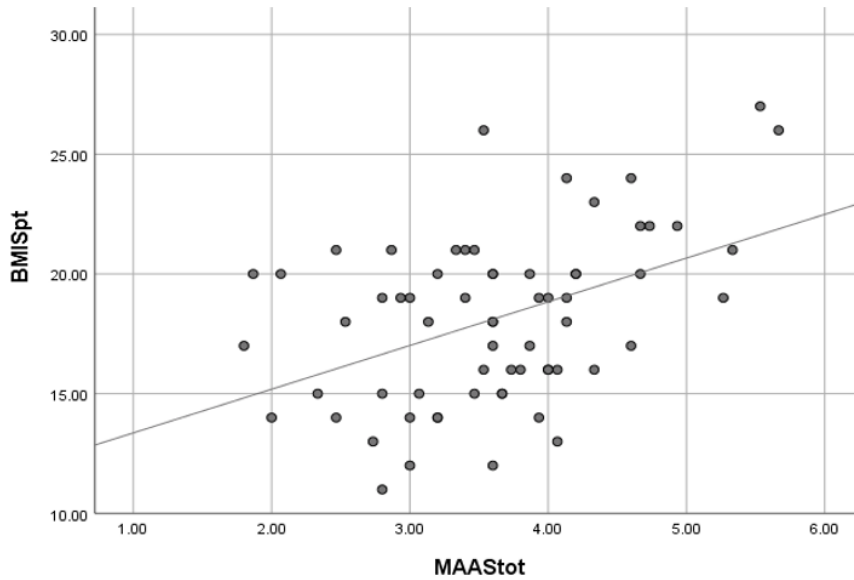
Figure 2. Trait mindfulness (MAAStot) versus Positive-Tired mood (BMISpt). R^2 = .197.

A simple linear regression was calculated to predict participants' mood using the BMIS Arousal-Calm subscale (BMISac) based on Trait Mindfulness (MAAS). A significant regression equation was not found ($F(1, 63) = 2.544$, $p > .05$), with an R^2 of .039. Participants' predicted mood (BMISac) is equal to 32.327 + -1.009 (MAAS) when mood is measured as aroused mood. BMISac did not increase significantly for each increase in Trait Mindfulness (MAAS).

Additionally, the BMIS Negative-Relaxed subscale (BMISnr) was used to calculate a simple linear regression predicting participants' mood based on Trait Mindfulness (MAAS). A significant regression equation was found ($F(1, 63) = 25.066$, $p < .000$), with an R^2 of .285. Participants' predicted mood (BMISnr) is equal to 21.787 + -2.421 (MAAS) when mood is measured as negative mood. BMISnr decreased 2.421 for each increase in Trait Mindfulness (MAAS).
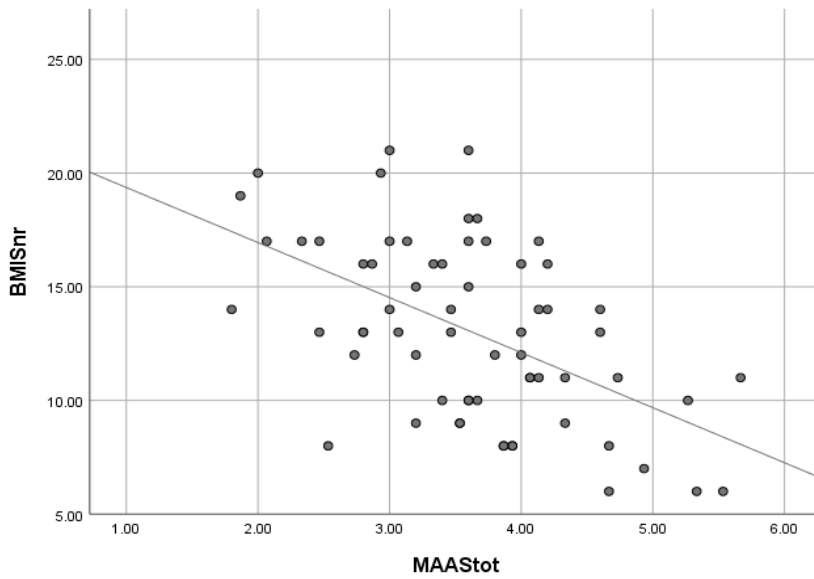
Figure 3. Trait mindfulness (MAAStot) versus Negative-Relaxed mood (BMISnr). R^2 = .285.

To predict participants' RSEtot (self-esteem) based upon Trait Mindfulness (MAAS), a simple linear regression was calculated and a significant regression equation was found ($F(1,63)$ = 46.958, $p < .000$, with an R^2 of .427. Participants' predicted self-esteem (RSEtot) is equal to 14.301 + 4.188 (MAAS) when using Rosenberg's SE scale. RSEtot increased 4.188 for each increase in Trait Mindfulness (MAAS).
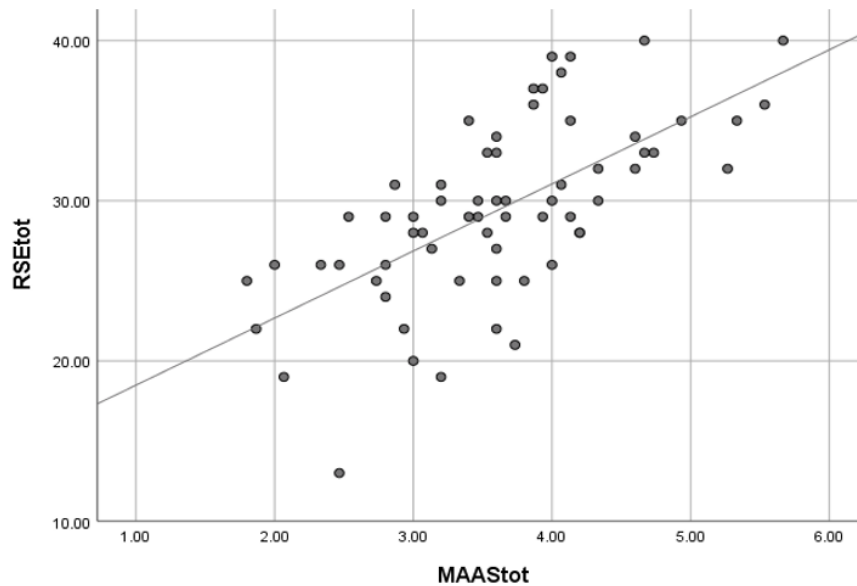
Figure 4. Trait mindfulness (MAAStot) versus self-esteem (RSEtot). R^2 = .427.

A simple linear regression was calculated to predict participants' CAStot (Coronavirus Anxiety Scale) based upon Trait Mindfulness (MAAS). A significant regression equation was not found ($F(1, 63)$ = 3.504, $p > .05$, with an R^2 of .053. Participants predicted coronavirus anxiety (CAStot) is equal to 8.252 + -0.584 (MAAS) when using the CAStot measure. CAStot is equal to 8.252 + .584 (MAAS) and did not increase significantly for each increase in Trait Mindfulness (MAAS).

Additionally, a simple linear regression was calculated to predict participants' CAStot based upon their COND (Mortality salience vs. None) and Sex (Female and Male). A significant regression equation was found ($F(2, 62)$ = 3.278, $p < .05$), with an R^2 of 0.096. Participants' predicted coronavirus anxiety (CAStot) is equal to 7.504 + .585 (COND) + -1.296 (Sex). This indicates that the sex of the participant was responsible for this finding, with Women (M = 6.5,

$SD = 2.45$) reporting significantly greater anxiety than Men ($M = 5.12$, $SD = .332$), $t(2) = -2.149$, $p < .05$.

Though PANAS-X was utilized as a delay task, shown in research to increase the effectiveness of Death-Thought Accessibility (Steinman & Updegraff, 2015), the resulting data was also analyzed in this study. A significant regression equation for General Negative Affect (PANASneg) based on Trait Mindfulness (MAAS) was found ($F(1, 63) = 15.022$, $p < .000$), with an R^2 of .193. Participants' predicted negative affect (PANASneg) is equal to $33.819 + -3.379$ (MAAS). PANASneg decreased 3.379 for each increase in Trait Mindfulness (MAAS). In regard to General Positive Affect (PANASpos) based on Trait Mindfulness (MAAS), a significant regression equation was found ($F(1, 63) = 8.904$, $p < .05$), with an R^2 of .124. Participants' predicted positive affect (PANASpos) is equal to $19.890 + 3.315$ (MAAS). PANASpos increased 3.315 for each increase in Trait Mindfulness (MAAS).
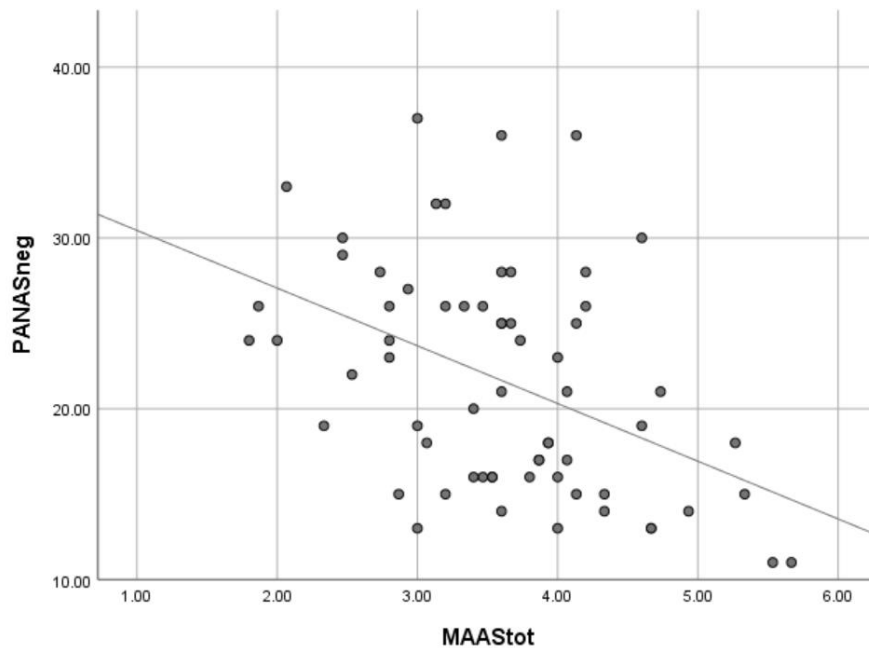

Figure 5. Trait mindfulness (MAAStot) versus General Negative Affect (PANASneg). $R^2 = .193$.
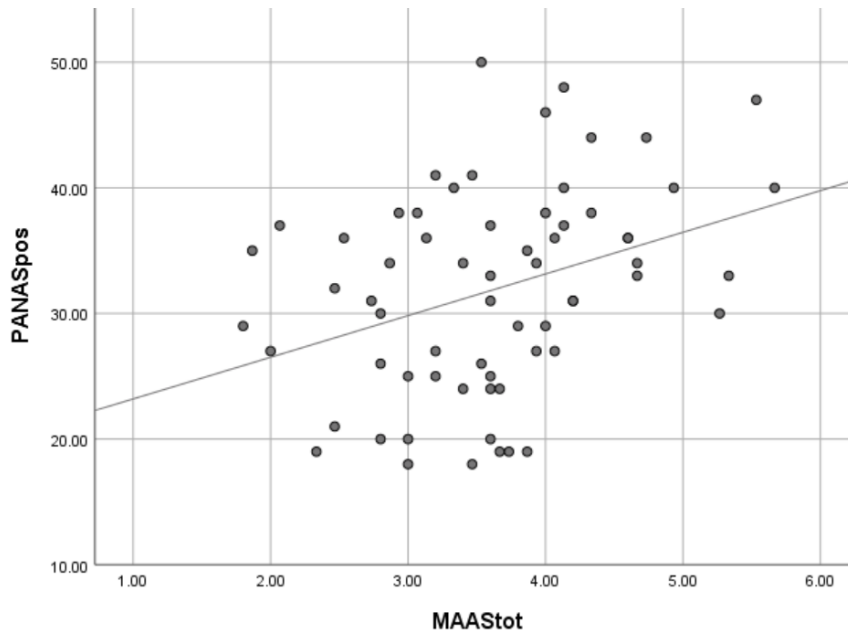
Figure 6. Trait mindfulness (MAAStot) versus General Positive Affect (PANASpos). $R^2 = .124$.

Lastly, this study analyzed the sex differences based on self-esteem. A significant regression equation for self-esteem (RSEtot) based on Sex (Female and Male) was not found $(F(1, 63) = 1.443, p > .05)$, with an R^2 of .022.

Discussion

This study, designed to investigate whether mindfulness can help promote resiliency among college students living through a pandemic, hypothesized that students with greater levels of trait mindfulness would demonstrate lower COVID-19 related anxiety, higher self-esteem, and more positive mood. Participants with higher levels of trait mindfulness reported greater positive mood on the Positive-Tired subscale of the BMIS (BMISpt), greater pleasant mood on the Pleasant-Unpleasant subscale of the BMIS (BMISpu), and less negative mood on the Negative-Relaxed subscale of the BMIS (BMISnr). This suggests that trait mindfulness may be useful in

increasing more positive, pleasant, and relaxed moods among college students. Further, this data

suggests that trait mindfulness may help students decrease tired, unpleasant, and negative moods.

Thus, trait mindfulness may help students cope with COVID-19-related stress by influencing

their moods and overall outlook on their life during a pandemic.

In addition, participants with higher levels of trait mindfulness reported greater levels of

self-esteem. Self-esteem serves as one of the major buffers against death anxiety as individuals

with higher levels of self-esteem experience greater feelings of reassurance that they are worthy

of being remembered beyond death (Greenberg, 2012). The data from this study indicates that

trait mindfulness may be useful in coping with death anxiety by increasing self-esteem. Future

studies may explore the influence of trait mindfulness versus state mindfulness on death anxiety.

It may be of additional interest to study the longitudinal effects of practicing mindfulness on

individuals' death anxiety or overall wellness during the pandemic, which may induce mortality

salience.

Early studies examining the fear of death have found that women express greater fear of

death than men (Koob & Davis, 1977; Lester, Templer, & Ruff, 1974). Similarly, the data from

regression analysis of CAStot based on condition and sex indicates that the sex of the participant

was responsible for this finding, with females ($M = 6.5$, $SD = 2.45$) reporting significantly

greater anxiety than males ($M = 5.12$, $SD = .332$), $t(2) = -2.149$, $p < .05$. Additionally, Davis,

Bremer, Anderson, & Tramill (1983), and Davis, Martin, Wilee, & Voorhees (1978) found that

men had significantly higher self-esteem scores than women. Interestingly, a study consisting of

157 undergraduate students in Kansas did not find any significant sex differences in levels of

self-esteem, but did find that women had higher death anxiety scores than men (Buzzanga,

Miller, Perne, Sander, & Davis, 1989). Likewise, this study did not find any significant sex

differences based on self-esteem. These results may reflect the social changes in our society that have occurred since these earlier studies. For example, the rate of female college attendance has increased 34.7% since 1960 (EducationData, 2020). Today, approximately 56% of undergraduate and graduate students are women (NCES). Further examples are ubiquitous today in areas such as politics, sports, and the media. The greater amount of positive female role-models may have resulted in an increase of self-esteem for women, thus explaining the lack of sex differences based on self-esteem in this study. However, this study is limited as of the 65 participants, 48 were female and 17 were male. Future studies with equal or more balanced N of females and males may shed more light on CAS based on condition and sex as well as self-esteem based on sex.

Additionally, it may have been difficult to achieve effective state manipulation in this study as the ongoing pandemic is already present in participants' lives and may induced mortality salience regardless of condition assignment. Future studies may find interest in developing methods for making mortality more or less salient during a pandemic.

Lastly, data from participants' scores on PANAS-X reported that participants with higher levels of trait mindfulness exhibited greater general positive affect and less general negative affect. Though used in the study design as a delay task, future studies may utilize PANAS-X to gain further insight on participants' affective emotional states. More specific subscales of the PANAS-X (e.g. Self-Assurance, Serenity, Fear, Hostility, etc.) may also be helpful in studying participants' emotional states in relation to death anxiety or the pandemic.

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