The Effects of Mortality Salience and Influence of Conspiracy Beliefs on Reactions to Vaccine Hesitancy

Evan Byrne

20434422

Supervisor: Dr. Robert Fox

B.A. (Hons) in Psychology

National College of Ireland

March 2023

Submission of Thesis and Dissertation

National College of Ireland
Research Students Declaration Form
(Thesis/Author Declaration Form)

Name: Evan Byrne

Student Number: 20434422

Degree for which thesis is submitted: B.A. (HONS) in Psychology

Title of Thesis: The Effects of Mortality Salience and Influence of

Conspiracy Beliefs on reactions to Vaccine Hesitancy

Date: 13/03/2023

Material submitted for award

A. I declare that this work submitted has been composed by myself. X

B. I declare that all verbatim extracts contained in the thesis have been distinguished by quotation marks and the sources of information specifically acknowledged. X

C. I agree to my thesis being deposited in the NCI Library online open access repository NORMA. X

D. ***Either*** *I declare that no material contained in the thesis has been used in any other submission for an academic award.
Or *I declare that the following material contained in the thesis formed part of a submission for the award of

_____
(State the award and the awarding body and list the material below) X

Acknowledgements

Firstly, I would like to thank my family. My father Seán, who is a living reminder that education is, and never will be a burden to carry. My sister Alannah, for reminders that good things are worth pursuing. And finally, my cat Molly whose presence has never failed to make me smile throughout the tough times of this degree. Without their love and support, I am certain I would not be where I am today. I would also like to thank my extended family who never failed to help or support me when I needed it most.

Secondly, I would like to thank Dr Robert Fox for his patience, understanding and encouragement throughout this process. His helpfulness never waned throughout my many, many questions and gave me tremendous guidance towards carrying out the best research I could. I truly cannot thank him enough.

Last but not least, I would like to thank all of the NCI lecturers that I have studied under these past 3 years. Your presentations have preserved more of me than I have of them! A part of my life will always remain in the many lectures I attended and enjoyed. I would also like to thank all the participants who took part in this research, without your willingness to take part, this research would not be possible.

Abstract

The present study examined the potential effects of mortality salience on reactions to COVID-19 vaccine hesitant individuals depending on COVID-19 vaccination status. It also examined the predictive influence of general conspiracy beliefs on reactions to vaccine hesitant individuals in relation to other potential predictors. Research has shown mortality salience to increase punishment for those who threaten their worldview and values. It has also been suggested that conspiracy beliefs are associated with vaccine hesitancy. This study aimed to apply these findings into the context of the COVID-19 pandemic regarding the punishment and restrictions of the vaccine hesitant. A total of 90 participants completed questionnaires on their attitudes towards vaccine hesitant people and their conspiracy beliefs before being randomly allocated to a mortality salient or neutral condition. Then participants were asked to place fines on a vaccine hesitant rule breaker and were measured on their support for restrictions regarding a vaccine hesitant profile. Results found that mortality salience did not have an effect nor was it mediated by vaccination status, however there was a difference between vaccinated and unvaccinated fines and support for restrictions. Conspiracy beliefs did not significantly predict fine amounts or support for restrictions however age and attitudes did. Implications of the present study and suggestions for future research are discussed.

Table of Contents

Contents

Introduction

"*The brutes die even as we; but it is our knowledge that we have to die that makes us human*." - Alexander Smith

In 2020, the world encountered the COVID-19 virus (World Health Organization, 2020). The virus spread globally, ravaging economies and caused over 6 million deaths (Belitski, 2022; World Health Organization, 2023). Due to the nature of our more than ever connected world, it is likely that people all over the globe were made mortality salient (MS). Even if one believed that the danger of the virus for their demographic was over-exaggerated, it was not likely that one could avoid the MS that ensued from daily news cycles, articles, and government restrictions regarding the pandemic (Neureiter et al., 2021). As noted by Pyszczynski et al. (2021), this is of particular interest from a terror management theory perspective (TMT) amongst all other phenomena that occurred throughout the pandemic.

This is because TMT is a psychological theory that seeks to understand the role that death plays in the life of humans (Greenberg et al., 1986; Pyszczynski et al., 2015) TMT continues from the work of cultural anthropologist Becker (1962, 1973, 1975). In summary, Becker proposes that individuals need to control existential terror that ensues from the human awareness of death. This is achieved by gaining a sense of worth within a culture that can offer symbolic immortality. For example, contributing to a culture where you will be remembered as a hero. Considering this, TMT posits that a wide range of human behavior is oriented towards the pursuit of self-esteem and value within a worldview to obtain protection from existential dread. This is necessary because cultures by nature, only offer symbolic immortality to those who uphold the standards of the culture (Rosenblatt et al., 1989).

From this, TMT hypothesizes that people reminded of death should bolster to their worldview and offer more negative reactions to things that threaten it (Pyszczynski et al., 1999). This is because according to TMT, worldviews provide an anxiety buffer from the

existential dread (Pyszczynski et al., 1999). This is known as the MS hypothesis of TMT. Experimental data strongly suggests that when people are reminded of death, they tend to bolster their own worldviews and make greater efforts to defend against threats it compared to those who are not MS (Pyszczynski et al., 2015; Rosenblatt et al., 1989). A worldview in the context of TMT is a belief system that one subscribes to. For example, if someone views that criminals are bad or that people should follow the law. The conditions of MS should cause an increase of that person's punishment of someone committing a crime (Greenberg, 1997).

However, when it comes to the MS hypothesis, two modes of reactions against MS have been discovered. These are noted as distal and proximal defenses. A proximal defense occurs when death is within direct confrontation or contemplation. A distal defense occurs when death is a highly accessible unconscious thought (Pyszczynski et al., 1999). In regards to proximal defenses it has been found that people actively suppress thoughts of death (Arndt et al., 1997; Pyszczynski et al., 1999). Proximal defenses also include the employment of cognitive distortions. It has been discovered that when faced with death, people tend to deny vulnerability to threats or attempt to rationally remove thoughts regarding death (Ditto et al., 1988; Kunda, 1987). For example, people tend to push the reality of dying to the future rather than contemplating it in the present (Pyszczynski et al., 1999). In regards to distal defenses it is hypothesized that the defense bears no rational or logical relationship to the problem of death but rather defends against vulnerability by attempting to defend one's known security against the reality of death. One's worldview (Greenberg et al., 1995; Pyszczynski et al., 1999; Rosenblatt et al., 1989).

Evidence of distal defenses were first found in the experiments conducted by Rosenblatt et al. (1989). The study discovered that judges who were placed in a MS condition assigned a much higher bond (M = $455) compared to the judges who were in the control

condition (*M* = $50; Rosenblatt at al., 1989). However, this sample size was limited. This effect was replicated with a student population with a larger sample (Rosenblatt et al.,1989). Interestingly, this study also found that in contrast to those with negative attitudes to prostitution, no reliable effect was found in the MS condition of the group who had positive attitudes towards prostitution. Illustrating that the MS effect appeared somewhat dependent on worldviews and consistent with the theory of TMT. The experimenters also found that that awareness of death increased reward recommendations for a hypothetical hero (*M* = $438) compared to the non-salient condition (*M* = $134; Rosenblatt at al., 1989).

Consistent with these findings, experiments conducted by Greenberg et al. (1990) found that mortality salience increased positive reactions to those who were supportive of their worldview and also increased negative reactions to those who criticize their worldviews. Another finding of this study was that MS increased in-group bias and decreased evaluations for out-groups. This finding was replicated by Castano et al. (2002). However, it appears to not stop with attitudes as MS has also been found to increase aggression towards those of violate a worldview as well (McGregor et al., 1998). However, the study found that the opportunity to express a negative attitude towards a target eliminated aggression.

When it comes to differences in the research, TMT has found a considerable amount of evidence that individual differences can moderate the effects of MS. For example, Greenberg et al. (1990) found that people that scored low in authoritarianism did not lower their opinion of attitudinally different others in response to MS. However, such findings lead to criticism being levelled at TMT. Martin and Van Den Bos (2014) argued that conflicting results are not integrated into the theory. For example, mortality salience can lead to self-interest but it can also lead to pro-social behaviour (Pyszczynski et al., 2015). But this can be explained through TMT as TMT highlights the importance of a worldview moderating responses (Pyszczynski et al., 2015). In a study examining the effect of morality salience of

liberals and conservatives, it was suspected that because liberals appear to value tolerance it would lead them to be less harsh towards conservatives (Greenberg et al., 1992). This study found that this was the case. Liberals held more tolerant views towards conservatives. Although, this critique does highlight that people can have complex and conflicting attitudes and it may not be obvious which one people will cling to when faced with the contemplation of death (Pyszczynski et al., 2015).

One of the areas of where individual differences has had considerable study is self-esteem. A study conducted by Ben-Ari et al. (1999) showed that MS increased reckless driving for subjects who regarded driving skills as relevant to their self-esteem. Interestingly, this suggests MS can cause individuals to even override biological drives of self-preservation and safety if it concerns an individual's self-esteem. Consistent with these findings was study conducted by Peters et al. (2005) which has found behaviour related to self-esteem being bolstered. In this experiment it found that those who prided themselves in strength training had increased performance compared to those who were not interested in strength training. Also, it has been found that people with high self-esteem are not effected by the MS effect compared to those with moderate self-esteem (Harmon-Jones et al., 1997). This is explained by the possibility that those with high self-esteem have full protection of the anxiety-buffer whilst those who have moderate self-esteem do not.

Two other areas where there seems to be individual differences is age and sex (Burke et al. 2010). Some evidence has found that males and females defend differently from mortality salience depending on the situation. In a study examining word accessibility it was found that females increased their word accessibility regarding relationships whereas males increased their word accessibility regarding nationalism (Arndt et al., 2002). A common replicated finding has found males to become ambivalent to sex under MS, however this is not the case for females (Landau et al., 2007; Lee et al 2017; Morris et al., 2015). Also, it has

been found by Hirschberger et al. (2002) that males have increased their attraction to risk whereas women have decreased their attraction to risk. However, it is important that even though gender may moderate reactions to different situations, MS effects have been found to not be significantly different in size between males and females overall (Burke et al., 2010).

In regards to age, it has also been found to not be significantly different when it comes to the size of effects to mortality salience (Burke et al., 2010). However, in some situations, older people appear to react differently compared to younger people. In a study conducted by Maxfield et al. (2007), it was found that older adults did not judge moral transgressions more harshly after MS in contrast to younger adults. And in another study middle-aged adults actually decreased their willingness to engage in healthy behaviors following MS compared to younger adults who increased their willingness to engage in healthy behaviors (Taubman-Ben-Ari & Findler, 2005). This is potentially due to evidence which has been shown in studies such as Greenberg et al. (1994), that sustained contemplation with death which is possible over longer lifetimes, the effects of MS tend to wane. Overall there are many studies that have illustrated the MS effect (Pyszczynski et al., 2015). A meta-analysis conducted by Burke et al. (2010) found that with the examination of 277 experiments the MS effect has a moderate strong effect across a wide variety of dependent variables ($r^2 = 0.35$). It is also important to note that these effects have been replicated cross culturally for example, in North America (Nelson et al., 1997; Baldwin & Wesley, 1996) and Asia (Lee et al., 2017).

More recently, TMT has been applied to study towards attitudes regarding state control and understanding health behaviors during COVID-19 pandemic (Prusova & Gulevich, 2019; Scrima et al 2022). Prusova & Gulevich (2019) found evidence that MS can affect attitudes towards state control. In this study Russian citizens had their opinions towards state control in different areas such as the economy (Prusova & Gulevich, 2019). The

findings reported that when placed in a MS condition individuals increased their support for government in these various areas compared to their peers. The findings also in line with TMT found that those who had pre-existing views geared towards state control became more supportive of state control compared to those who did not have state supportive attitudes. But their views were still moved closer to encouraging state control (Prusova & Gulevich, 2019).

In regards to health decisions, TMT has been developed into a health model known the Terror Management Theory Health Model (TMTHM; Arndt & Goldenberg, 2017). This is applied to understand health behaviors when faced with death. The model hypothesizes the proximal defenses encourage health promoting behaviors whereas distal defenses may aim to reduce health vulnerability by believing the dangers of a health problem are overexaggerated (Pyszczynski et al., 2021). This has been applied within the context of COVID-19 to explain conspiracy beliefs about vaccines and COVID-19. Conspiracy beliefs have been consistently found to be negatively associated with health-promoting behaviors such as getting vaccinated (Enders et al., 2022; Lazarevic et al., 2021). Scrima et al. (2022) also found that conspiracy beliefs within the context of COVID-19 are negatively associated with intention to get vaccinated. Though this is possibly due to a lowering of the perceived threat it could also be due to the findings of Fitri et al. (2020) which has found that in times of death awareness individuals tend to strengthen bonds with specific groups to defend against MS. So, strengthening relationships to conspiracy beliefs would defend against existential anxiety during COVID-19.

During the COVID-19 pandemic, the topic of vaccine hesitancy became a controversial topic among various different countries (Bor et al., 2023). For many reasons, for example some countries like Ireland engaged in restrictions of the unvaccinated such as limiting their ability to dine indoors at hospitality to limit the spread of COVID-19 and failure to comply lead to fine punishment. As well, in Ireland it has been reported by the CSO

that vaccination uptake was around 84% for all people in 2021 (COVID-19 Vaccination Statistics Series 1 - CSO - Central Statistics Office, 2022). Though this rate is high and can be perceived as majority positive, it leaves a majority vaccinated and minority unvaccinated. It could be argued that this juxtaposition of choices creates an in-group out-group dichotomy. Indeed, research conducted by Bor et al. (2023) has found vaccinated people express discriminatory attitudes towards unvaccinated individuals at a level as high as discriminatory attitudes that are commonly aimed at immigrant and minority populations. However unvaccinated people do not reciprocate this towards vaccinated people nor do they hold discriminatory attitudes towards fellow vaccine hesitant people (Bor et al., 2023)

These findings suggest that during COVID-19 pandemic that vaccinated individuals tended to hold discriminatory attitudes towards vaccine hesitant populations and that vaccine hesitant populations during are strongly associated with increased conspiracy beliefs (Castano et al., 2002; Pyszczynski et al., 2021). As mentioned before the nature of our connected world meant that it was practically impossible to avoid reminders of death nearly everyday during the COVID-19 pandemic. Though TMT has been applied to understand potential intentions to get vaccinated against COVID-19 or as a potential explanation for why people engage in conspiracy beliefs (Pyszczynski et al., 2021; Scrima et al., 2022). No studies have examined the potential effects MS may have had on these discriminatory attitudes towards vaccine hesitant individuals during the COVID-19 pandemic nor have any studies have examined the influence of conspiracy beliefs when it comes to actions towards the unvaccinated during the pandemic.

The Present Study

Considering this, the current study aims to examine if psychological equanimity could have been undermined in the recent COVID-19 pandemic to the point where people made harsher decisions regarding punishment of the unvaccinated and supporting restrictions of the

unvaccinated depending on vaccination status. This study also aims to investigate conspiracy beliefs alongside other potential predictors of these actions to understand if conspiracy beliefs significantly predict punishment and restrictions placed on vaccine hesitant individuals. Specifically, the research questions and hypotheses are:

Research question 1: Does mortality salience effect the fine amount on an unvaccinated COVID-19 rule breaker depending on vaccination status? Hypothesis for research question 1: Mortality salience will have a significant effect on the fine amount placed on the rule breaker depending on the vaccination status (vaccinated/non-vaccinated).

Research question 2: Does mortality salience effect the support for restrictions placed on the unvaccinated depending on vaccination status? 2: Mortality salience will have a significant effect for overall support for restrictions placed on vaccine hesitant people depending on vaccination status (vaccinated/non-vaccinated).

Research question 3: Are general conspiracy beliefs, mortality salience, global attitudes towards the unvaccinated and COVID-19 vaccination status able to predict fine amounts after controlling for demographic variables of age and sex? Hypothesis for research questions 3: COVID-19 vaccination status, mortality salience and general conspiracy beliefs, global attitudes towards vaccine hesitant individuals will be significant predictors of fine amounts placed on hypothetical rule breaker after controlling for sex and age.

Research question 4: Are general conspiracy beliefs, mortality salience, global attitudes towards vaccine hesitant individuals and COVID-19 vaccination status predictive of fine amounts after controlling for demographic variables of age and sex? Hypothesis for research question 4: COVID-19 vaccination status, mortality salience and general conspiracy beliefs, global attitudes towards vaccine hesitant individuals will be significant predictors of support for government restrictions of vaccine hesitant individuals after controlling for sex and age.

Methods

Participants

Participants were recruited through a opportunistic snowball sampling technique. A brief description of the study was provided with a link on the social media sites Instagram and Twitter with participants invited to share the link with any others eligible to participate. As two-way between groups ANOVA analyses and hierarchical regression analyses were conducted in this study, G*Power: Statistical Power Analyses were used to determine the sample size required for statistically powerful analysis (Faul et al., 2007). The analyses indicated the minimum sample size to achieve 80% power for detecting a moderate to large effect size at a significance criterion of $\alpha = .05$, was $N = 90$ for two-way between groups ANOVAs and $N = 80$ for the multiple hierarchical regressions. The total sample consisted of 90 participants, 51.1% male ($n = 46$) and 47.8% female ($n = 43$). The mean age of the sample was 26.97 years ($SD = 11.97$). According to the sample 86.7% ($n = 78$) participants were vaccinated against COVID-19 compared to the 13.3% ($n = 12$) participants who were not vaccinated against COVID-19.

Materials.

Demographics Questions

Participants were asked to indicate their gender (Male, Female, Prefer not to say, Other), provide their age and answer if they were vaccinated against COVID-19 (see Appendix B).

Global Attitudes towards Unvaccinated - Adapted.

The global attitudes towards unvaccinated scale - Adapted (Bor et al., 2023) is a 4 item binary self-report measure that was used to measure participants' attitudes towards an unvaccinated individual. Users read a profile of an unvaccinated person and answered 4 statements regarding the individual on a binary Yes/No scale. Yes, indicating they agreed

with the statement. No, indicating they disagreed with the statement. An example of an item is as follows: *I would be unhappy if this person married one of my close relatives.* The scale was adapted to be scored continuously (Yes = 1, No = 0). Scoring is done by adding up all items. Higher scores indicate higher levels of negative attitudes towards the profile. The Cronbach's alpha coefficient for the current sample was .68. Ideally, the Cronbach's alpha coefficient should be value above 0.7 to be considered of respectable reliability (DeVellis, 2012). However, it is noted by Pallant (2016) that Cronbach alpha's coefficient is sensitive lower item scales and in those cases it is more appropriate to note the inter-item correlation of the items. Briggs and Cheek (1986) specify that the optimal range for the inter-item correlation of .2 to .4. The items in this scale all fell between .2 and .4 (see Appendix C for scale)

Support For Restrictions Scale - Adapted

The support for restrictions scale - Adapted (Bor et al., 2023) is a 5 item binary self-report measure that was used to determine participants' support for restrictions towards an unvaccinated individual. Users read a profile of an unvaccinated person and answered 5 statements regarding the individual on a binary Yes/No scale. Yes, indicating that they agreed with the statement, No, indicating that they disagreed with the statement. An example of an item is as follows: *This person should be allowed to express their political views on social media freely, without fear of censorship.* The scale was adapted to be scored continuously (Yes = 0, No = 1). Scoring is done by adding up all items. Higher scores indicating higher levels of support for restrictions. The Cronbach's alpha coefficient for the current sample was .69. Ideally Cronbach's Alpha should be above 0.7 to be considered of respectable reliability (DeVellis 2012). However, as mentioned before Pallant (2016) notes that Cronbach alpha's coefficient is sensitive to lower item scales and in those cases it is necessary to note the inter-item correlation. Briggs and Cheek (1986) recommend the optimal range correlation of .2 to

.4. The majority of the items in this scale all fell between .2 and .4. With two values falling just below .2 and above .4 (see Appendix G for scale).

General Conspiracy Beliefs Scale

The general conspiracy belief scale (Brotherton et al., 2013), is a 15-item scale that was used to measure an individual's level of conspiracy beliefs. Users read 15 statements and then rated them on a 5-point Likert scale ranging from 0 = *Definitely not true* to 5 = *Probably true*. An example of an item is as follows: *The government permits or perpetrates acts of terrorism on its own soil, disguising its involvement.* Each score can be computed by adding up all scores and averaging the given score. Higher scores indicate more more general conspiracy beliefs. It has been shown that scale that overall internal reliability of the GCB scale is extremely high (α = 0.93; Brotherton et al., 2013). The Cronbach's alpha coefficient for the current sample was (α = 0.93; see Appendix D for scale).

Mortality Salience or Neutral Condition Question

The experimental questions were taken from Rosenblatt et al (1989). Participants were randomly assigned to either the experimental condition where they were made to answer the following question: *Please briefly describe the emotions that the thought of your own death arouses in you.* If they were assigned to the neutral condition they were asked to answer the following question: *Please briefly describe the emotions the thought of watching television arouses in you* (see Appendix E for questions),

Fine Allotment Vignette

Participants were also presented with a scenario regarding someone who is unvaccinated and broke COVID-19 rules in Ireland and was caught. They were then asked to place a fine on that individual (see Appendix F for full details).

Design and Analyses

The research design of the present study was experimental and cross sectional as all data was collected at one point in time however there was a randomization into a MS or neutral condition. The study was also quantitative in nature. For the first hypothesis, a two-way between groups ANOVA was conducted. Here there were 2 independent variables (IVs) which were as follows: experimental condition and vaccination status. There were also 1 dependent variable (DV) which was fine amounts. For the second hypothesis two-way between groups ANOVA was conducted. there were 2 independent variables (IVs) which were as follows: experimental condition and vaccination status. There were also 1 dependent variable (DV) which was support for restrictions scores. For the third hypothesis a hierarchical multiple regression was conducted. There were 6 predictors (PVs) which were as follows: age, sex, conspiracy beliefs, vaccination status, attitudes towards unvaccinated and experimental condition. There was also 1 criterion variable (CV) which was fine amounts. For the fourth hypothesis a hierarchical multiple regression was conducted. There were 6 predictors (PVs) which were as follows: age, sex, conspiracy beliefs, vaccination status, attitudes towards unvaccinated and experimental condition. There was also 1 criterion variable (CV) which was support for restrictions.

Procedure

Data was collected online through a Google Forms survey. This study was first piloted to eleven individuals to determine whether the vignettes were easily understood. No issues were encountered based on feedback. Due to this, that data was included in the total sample and analysis. The feedback questions were removed from the survey and subsequently posted online. The survey was posted on Twitter and Instagram with a brief description of the study and the eligibility criteria for participation. It invited anyone eligible to click the link and to share the study with anyone they knew who was eligible. The first

page contained the participant information sheet. It included the nature and purpose of the study. However, the participants did not know that the study was experimental. Participants were also provided with contact information which they could pose questions to prior to taking part in the research and the criteria for taking part (see Appendix H). Participants were then giving informed consent forms and ask to click yes to consent to taking part in the research (see Appendix I). Participants were then asked to complete the demographic questions, global attitudes scale, followed by the conspiracy beliefs scale before being randomly allocated to an experimental condition. Here they were asked to answer either the TV question or MS question. Afterwards participants read a fine allottment vignette and completed the support for restrictions scale.

All data was collected in accordance with NCI ethical guidelines. Participants were given no incentive to take part in the research and all participants were provided informed consent. The risks and benefits were clearly outlined to each participant and participants were informed of the entire nature of the research with the debriefing form. Though this study did not include any obvious harm, the topic may have been sensitive for some participants and therefore the helplines of Pieta House and Aware helplines were placed on the debriefing form for those who may have felt distressed as a result of taking part in the study.

Results

Descriptive Statistics

The current data is taken from sample of 90 participants ($N = 90$). This consisted of 51.1% males ($n = 46$), 47.8% Females ($n = 43$) and 1.1% Other ($n = 1$). The sample contained a majority vaccinated 86.7% ($n = 78$) and minority unvaccinated 13.3% ($n = 12$). In regard to experimental assignment. 58.9% ($n = 53$) were randomly assigned to the experimental condition whereas 41.1% ($n = 37$) were randomly assigned to the neutral condition. Preliminary analysis was performed on the data set and indicated that all variables except the scores for conspiracy beliefs were non-normally distributed.

The results for the continuous variables age, fine amounts, global attitudes towards unvaccinated, support for restrictions against unvaccinated and general conspiracy beliefs can be found in in table 1 below.

Table 1

Descriptive Statistics for all continuous variables

Variable	*M* [95% CI]	*SD*	Range
Age	26.97[24.46, 29.47]	11.97	19-70
Fine Amounts	630.02[467.54, 792.51]	771.335	0-2000
Global Attitudes Scores	1.19[.93, 1.45]	1.26	0-4
General Conspiracy Beliefs	2.70[2.53, 2.88]	.84	1-4.4
Support For Restrictions	.61[.39, .83]	1.04	0-5

Note. $N = 90$

Inferential Statistics

Mediational Analyses

A two-way between groups ANOVA analysis was conducted to see if vaccination status mediated the relationship between MS and fine amounts. It was hypothesized that MS would have a significant effect on fine amounts depending on vaccination status. Based on the meta analysis from Burke et al. (2010) the effect size for the MS effect was considered to be moderate to large using Cohen's (1988) criteria. As such, a priori power analyses were conducted based on this using G*Power version 3.1.9.7 (Faul et al., 2007) to find the minimum sample size required to test the hypotheses. Results showed the minimum sample size to achieve 80% power for detecting a moderate to large effect size at a significance criterion of $\alpha = .05$, was $N = 90$ for two-way between groups ANOVA. Thus, the obtained sample size of $N = 90$ is adequate to test the study hypotheses.

Residual analysis was performed to test for the assumptions of the two-way ANOVA. Outliers were assessed by inspection of boxplot for all data collectively, normality was assessed using Shapiro-Wilk's normality test and homogeneity of variances was assessed using Levene's test. There were not outliers. However, residuals were non-normally distributed ($p < .001$) and there was a violation in the homogeneity of variances ($p < .001$). Therefore, a more stringent p value of .01 will be used to interpret significant results.

Analysis showed that there was no moderation between the variables as shown in the non-significant interaction effect, $F(1, 85) = .043$, $p = .835$. There was no statistically significant difference in fine amounts between the experimental conditions, $F(1, 85) = .0$, $p = .997$. However, there was a statistically significant main effect for vaccination status, $F(1, 85) = 8.669$, $p = .004$, partial $\eta 2 = .093$. Vaccinated participants placed significantly larger fine amounts on the hypothetical rule breaker (M = €723.40, SD = €789.36) compared to unvaccinated participants (M = €30.83, SD = €44.20).

Another two-way between groups ANOVA analysis was conducted to see if vaccination status mediated the relationship between MS and support for restrictions. It was hypothesized that mortality salience would have a significant effect on support for restrictions depending on vaccination status. Normality was assessed using Shapiro-Wilk's normality test and homogeneity of variances was assessed using Levene's test. Five outliers were found, residuals were non-normally distributed ($p < .001$) and there was a violation in the homogeneity of variances ($p < .001$). In line with the previous procedure a more stringent p value of .01 will be used to interpret significant results.

Analysis showed that there was no moderation between support for restrictions and experimental condition as shown in the non-significant interaction effect, $F(1, 86) = .057$, $p = .81$. There was no statistically significant difference in support for restrictions between the experimental conditions, $F(1, 86) = .057$, $p = .81$. However there was a statistically significant main effect for vaccination status, $F(1, 86) = 5.044$, $p = .027$, partial $\eta 2 = .055$. Vaccinated participants placed significantly larger support for restrictions on a hypothetical vaccinated individual ($M = .71$, $SD = 1.08$) compared to unvaccinated participants ($M = 0$ $SD = 0$).

Hierarchical Multiple Regressions

For the purpose of this study, it was necessary to conduct two different hierarchical multiple regressions to test the third and fourth hypothesis. First a hierarchical multiple regression was run to test if vaccination status, mortality salience, general conspiracy beliefs and global attitudes were significant predictors after controlling for sex and age. Prior to conducting first hierarchical regression, the relevant assumptions of this statistical analysis were tested. Firstly, based on the meta-analysis from Burke et al. (2010) the effect size for the MS effect was considered to be moderate to large using Cohen's (1988) criteria. As such, a priori power analyses were conducted based on this using G*Power version 3.1.9.7 (Faul et

al., 2007) to find the minimum sample size required to test the study hypotheses. Findings showed the minimum required sample size to achieve 80% power for detecting a moderate to large effect size at a significance criterion of α = .05, was *N* = 80 for the hierarchical multiple regression. The obtained sample size of *N* = 90 is adequate to test the study hypothesis. An examination of the correlations revealed that no independent variables were highly correlated. Collinearity statistics were all within accepted limits, satisfying the assumption of multicollinearity. Scatterplots and P-P plots were investigated and indicated that assumptions of normality, linearity and homoscedasticity were all satisfied (Pallant, 2016).

A two-stage hierarchical multiple regression was conducted with fine amounts as the dependent variable. Sex and Age were entered at stage one of the regression to control for sex and age demographics. The variables of vaccination Status, experimental Condition, attitudes and conspiracy scores were entered at stage two. Full details can be found in table 2 below

Table 2

Summary of Hierarchical Regression Analysis for Variables predicting Fine Amounts

Variable	R^2	R^2 Change	*B*	*SE*	*β*	*t*	*p*
Step 1	.13**						
Sex			-230	160.09	-.15	-1.44	.15
Age			24.05	6.72	.37	3.58	<.001
Step 2	.42***	.28***					
Sex			-266	139.39	-.17	-1.91	.06
Age			29.89	5.78	.46	5.17	<.001
Vaccination Status			-399.30	215.93	-.78	-1.85	.07
Experimental Condition			34.80	134.61	.02	.26	.80
Attitudes			263.48	57.14	.43	4.60	<.001
Conspiracy Beliefs			-80.86	79.90	-.09	-1.01	.315

Note:* = p < .05; ** = p < .01; *** = p < .001)

The hierarchical multiple regression revealed that at stage one, age and sex contributed significantly to the regression model, $F(2, 85) = 6.55$, $p = .002$ and accounted for 13.4% of the variation in fine amounts. Introducing the other four variables explained an additional 28.4% of the variance in the model in fine amounts and this change in R^2 was significant, $F(4, 81) = 9.87$, $p = <.001$. When all six predictors were included in stage two of the regression model only age ($\beta = .46$, $p < .001$), and attitudes ($\beta = .43$, $p < .001$) were significant predictors of fine amounts. This indicates that increases in global attitude scores and increases in age predict higher levels of fine amounts. Together the six independent variables accounted for 41.8% of the variance in fine amounts.

A second hierarchical multiple regression was run to test if vaccination status, mortality salience, general conspiracy beliefs and global attitudes were significant predictors of support for restrictions on unvaccinated individuals after controlling for sex and age. Prior to conducting first hierarchical regression, the relevant assumptions of this statistical analysis were tested again. As this analysis had the only a change in criterion variable, the sample size of 90 based on previous G*Power analyses is deemed adequate. Examination of the correlations revealed that no independent variables were highly correlated. Collinearity statistics were all within accepted limits, satisfying the assumption of multicollinearity. Scatterplots and P-P plots were investigated and indicated that assumptions of normality, linearity and homoscedasticity were all satisfied (Pallant, 2016).

A two-stage hierarchical multiple regression was conducted with support for restrictions as the dependent variable. Sex and age were entered at stage one of the regression to control for sex and age demographics. The variables of vaccination Status, experimental condition, attitudes and conspiracy scores were entered at stage two. See table 3 below for full details.

Table 3

Summary of Hierarchical Regression Analysis for Variables predicting Support for Restrictions

Variable	R^2	R^2 Change	*B*	*SE*	*β*	*t*	*p*
Step 1	.01						
Sex			-.19	.23	-.09	-.83	.41
Age			.01	.01	.06	.52	.61
Step 2	.41***	.40***					
Sex			-.27	.19	-.13	-1.43	.16
Age			.02	.01	.20	2.17	.03
Vaccination Status			-.21	.29	-.07	-.71	.48
Experimental Condition			.14	.18	.07	.80	.43
Attitudes			.50	.08	.61	6.52	<.001
Conspiracy Beliefs			.19	.11	.16	1.78	.08

Note:* = p < .05; ** = p < .01; *** = p < .001)

The hierarchical multiple regression revealed that at stage one, age and sex did not contribute significantly to the regression model and accounted only for .9% of the variance for restrictions. Introducing the other four variables explained an additional 39.8% of the variance in the model and this change in R^2 was significant, $F(4, 82) = 13.76$, $p = <.001$. When all six predictors were included in stage two of the regression model, only age ($\beta = .20$, $p = .03$), and attitudes ($\beta = .61$, $p < .001$) were significant predictors of support for restrictions. The strongest predictor of support for restrictions was a participant's attitudes and together the six independent variables accounted for 40.7% of the variance in support for restrictions. This indicated that increases in global attitude scores and age predicted increased support for government restrictions on a hypothetical unvaccinated person.

Discussion

The current study aimed to investigate the whether the effects of MS on fine amounts and support for restrictions were mediated by vaccination status. It also aimed to identify the strength of prediction conspiracy beliefs have on actions towards the unvaccinated. Prior findings have shown that mortality salience has a pretty robust effect however its resulting effects can vary depending on demographics, individual worldviews and values of people (Burke et al., 2010; Castano et al., 2002; Maxfield et al. 2007) It was also found that conspiracy beliefs were linked towards vaccine hesitancy and could be a possible predictor of actions towards the vaccine hesitant (Enders et al., 2022; Scrima et al., 2022). From this research, four hypotheses were formulated to address aims for the study.

It was first hypothesised that mortality salience would have a significant effect on the fine amounts placed on the rule breaker depending on the vaccination status (vaccinated/non-vaccinated). This was explored using a two-way between groups ANOVA analysis. There was no significant interaction effect found between vaccination status and MS. Surprisingly, in regards to the main effects there was no significant difference found between experimental conditions when asked to place fine amounts on the hypothetical unvaccinated rule breaker. However, there was a significant main effect found for vaccination status which found that vaccinated individuals were significantly more likely to place higher fines on the hypothetical rule breaker, this finding is consistent with the research of Bor et al. (2023) that vaccinated people tend to discriminate against vaccine hesitant individuals whereas vaccine hesitant people do not. However, based on these results the first hypothesis is rejected.

The second hypothesis stated that mortality salience would have a significant effect for support for government restrictions depending on vaccination status (vaccinated/non-vaccinated). This was also explored using a two-way ANOVA analysis. Again there was no significant interaction effect found between vaccination status and mortality salience. Again,

in regards to the main effects there was no significant difference found between experimental conditions when asked about support for government restrictions on the hypothetical unvaccinated person. However, there was a significant main effect found for vaccination status which found that vaccinated individuals were significantly more likely to have greater support for restrictions compared to unvaccinated participants. But again, based on these results the first hypothesis is rejected.

The third hypothesis stated COVID-19 vaccination status, mortality salience and general conspiracy beliefs, global attitudes towards vaccine hesitant individuals would be significant predictors of fine amounts placed on hypothetical rule breaker after controlling for sex and age. This was examined using a hierarchical multiple regression. The final model accounted for 42% of the variance in fine amounts placed, however vaccination status, mortality salience and general conspiracy beliefs were not significantly associated with changes in fine amounts. Only the variables of age and global attitudes towards the unvaccinated were significantly associated with changes in fine amounts therefore this hypothesis is rejected as well.

The fourth hypothesis stated that COVID-19 vaccination status, mortality salience and general conspiracy beliefs, global attitudes towards vaccine hesitant individuals will be significant predictors of support for government restrictions of vaccine hesitant individuals after controlling for sex and age. This was also examined using hierarchical multiple regression. The final model accounted for 41% of the variance, however, COVID-19 vaccination status, mortality salience and general conspiracy beliefs were not significantly associated with changes in support for government restrictions. Only global attitudes towards unvaccinated were significantly associated with changes in support for restricting the vaccinated individual. As such the fourth hypothesis was also not supported.

The first two analyses found that there was a difference in fine amounts and support for restrictions between the vaccinated and unvaccinated. However, it found no mediation of the mortality salience effect depending on vaccination status, or differences in fine amounts between the experimental conditions. Interestingly, this study failed to replicate the expected effects of the mortality salience hypothesis (Pyszczynski et al., 2015). Based on the research of Castano et al. (2002) and consistent replicated findings of increased punishment for out-group when participants are made mortality salient it was expected that MS would increase fine amounts and support for government restrictions (Pyszczynski et al., 2015). However, the reasons for this inconsistency could be many. For example, this study took place after the COVID-19 pandemic, the importance of vaccination to each vaccinated person could have decreased since then. Also, it could be the case that medical procedures such as vaccination are not generally apart of their value system. However there is also the opposite explanation, that the issue of vaccination is so polarizing that mortality salience has a negligible effect on people's decision making when it comes to placing fine amounts and supporting restrictions as it has already been shown by Bor et al. (2023). This could possibly explain that even though there was no interaction between the variables and that mortality salience appeared to have no effect. However, it also could be that due to the high amounts of MS experienced by the world over the last two years, the effect of MS has lessened as it has been found that more someone contemplates death the less MS seems to affect that person (Greenberg et al., 1994).

The third analysis created a model which found only age and global attitudes towards unvaccinated were the only significant predictors. Interestingly, it has been found that age differs in cognitive empathy with older people being less empathetic, although it has also been found that older people judge moral transgressors less harshly as well (Maxfield et al., 2007). However according to the analysis increases in age are associated with increases in fine amounts. But these results may be skewed by the generally younger age of participants.

Global attitudes predicting increases in fine amounts is consistent with the research published by Bor et al. (2023) which found vaccinated participants generally hold discriminatory attitudes towards the unvaccinated.

The variables of vaccination status, experimental condition and conspiracy beliefs were not significant predictors in the final model. This is interesting in contrast to the previous analysis which found a significant difference between vaccination status and fine amounts. Conspiracy beliefs were also not significant predictors which is somewhat inconsistent with previous research that has associated with vaccine hesitancy (Enders et al., 2022). Howerver it is important to note that this study was looking at conspiracy beliefs as a predictor of potential associated actions, such as support for restrictions and placing fine amounts on the unvaccinated. Sex was also not a significant predictor of fine amounts suggesting that there are no differences between males and females when it comes to placing fines.

The fourth analysis created a model which found age and global attitudes towards unvaccinated as a significant predictor again. Interestingly, attitudes were found as a significant predictor in the last regression analysis for fine amounts however the strength of the correlation was stronger in this model. It found that increases in global attitude scores and increases in age were associated with increased support for restrictions on the unvaccinated. This finding is again consistent with research published by Bor et al. (2023). However in the final model, age, sex, vaccination status, experimental condition, and conspiracy beliefs were not significant predictors.

Findings based on TMT have strongly suggested that when people are made aware of their death that they bolster their worldview, based on this the author hypothesised that vaccination status would mediate the relationship between fine amounts and support for restrictions. Based on prior research and the TMT framework it was hypothesised that

COVID-19 vaccination status, mortality salience and general conspiracy beliefs, global attitudes towards vaccine hesitant individuals would be significant predictors of fine amounts and support for restricting an unvaccinated after controlling for sex and age. None of these hypotheses were supported however these findings are somewhat novel as it was shown that vaccinated and unvaccinated participants differed in fine amounts and support for restrictions but these results were seemingly not effected by mortality salience nor was there an interaction effect with mortality salience and vaccination status. It also found that even if conspiracy beliefs were associated with vaccine hesitancy, they did not seem to predict differences in punishment or restrictions for unvaccinated people.

This research contributes further insights into the gulf between vaccinated and unvaccinated citizens along with findings that possibly suggest that even though conspiracy beliefs may be associated with vaccine hesitancy this study did not find evidence that they are predictive of punishment of restrictions regarding vaccine hesitant individuals.

Practical Implications

This present study does not support the hypothesis that mortality salience effects attitudes or decisions towards unvaccinated people nor is it mediated by vaccination status. However, it did find that vaccinated individuals placed significantly higher fine amounts and had significantly more support for restrictions. Perhaps, there should be awareness instilled amongst decision makers in the legal setting that there may be a potential bias against unvaccinated people when it comes to court punishment if rules are broke and also that society as a whole should be more cautious when it comes to making decisions regarding the treatment of unvaccinated citizens. As even if the goal is to increase vaccinated individuals it is unlikely to be bettered by harsher punishment which in turn may create more negative emotions and considering conpiracy beliefs are associated with vaccine hesitancy it may reinforce those beliefs if they are marginalized.

However considering this is most likely an unconscious bias. Forscher et al., (2017) has illustrated making people aware and training them against their unconscious biases appears not to work in the long term. It found that whilst training might raise awareness in a couple of weeks following, it did not lead to long-lasting behavioural change. Perhaps it is the case that when considering such practical implications constant reminders must be considered as a means of creating awareness.

Strengths and Limitations

One of the strengths of this study was its attempt to expand upon previous research by using findings an applying them to a real world context. To the researcher's knowledge, no previous studies have examined whether mortaltiy salience could have effected decisions towards unvaccinated people during the COVID-19 pandemic. Another strength of the study was the fact that it was an online questionnaire so people could take it in their privacy, lowering the possibility of social desirability bias (McCrae & Costa, 1983).

However there are some limitations, firstly though this design was experimental it was cross-sectional and not longitudinal. Therefore, concrete causality cannot be inferred. Also, a limitation was the nature of study in general. Firstly participants could been made indirectly made aware of death by the fact the study detailed on the information sheet that the topic will contain death. This was done for ethical reasons but also the potential that indirect mortality salience ensued from the mention of COVID-19 pandemic. Another limitation is that the attitude and support for restrictions scales were adapted exclusively for this study due to their specific nature of questions designed regarding unvaccinated people. Their validity were not reported due to this reason and they showed less than ideal reliability according to Cronbach's alpha coefficient in the current population however the inter-correlations between the questions were in optimal range.

Future Research

An area for future research could possibly create experiments to see if COVID-19 alone can cause mortality salience and if so, recreate these experiments using COVID-19 to illicit mortality salience and see if reactions between vaccinated and unvaccinated people are different when considering punishment and restrictions for unvaccianted people. Also, an area that could be researched is computing how strongly someone needs to value something for the mortality salience effect to take place. This has somewhat been done with studies examining self-esteem however it is yet to be known to found out how strong exactly someone must value something to be susceptible to increasing their defense of it when made mortality salient.

Conclusion

The present study found no significant effect of mortality salience on fine amounts or support for restrictions depending on vaccination status. Nor did the study find COVID-19 vaccination status, mortality salience and general conspiracy beliefs, global attitudes towards vaccine hesitant individuals significant predictors of fine amounts and restrictions placed after controlling for sex and age. Only age and attitude were found to be significant predictors of fine amounts and only attitudes were significant predictors of placing restrictions on the unvaccinated. Though research has indicated that mortality salience usually does cause people to bolster their world views and increase punishment for others this study found no such evidence. However this comes with the big stipulations that mentioning of death in the information sheet and of the possibility that the discussion of COVID-19 may have indirectly caused mortality salience for all participants. As there was a difference found between fine amounts and support for restrictions regarding vaccination status and the possibility that the discussion of COVID-19 caused mortality salience future research would be well served examining this possibility but also examining the strength of which a value most be held for

the mortality salience effect to occur as it is possible that if a topic is already very polarizing it may have negligible effects.

References

Arndt, J., & Goldenberg, J. L. (2017). Where Health and Death Intersect: Insights from a Terror Management Health Model. *Current directions in psychological science*, *26*(2), 126–131. https://doi.org/10.1177/0963721416689563

Arndt, J., Greenberg, J., & Cook, A. (2002). Mortality salience and the spreading activation of worldview-relevant constructs: Exploring the cognitive architecture of terror management. *Journal of Experimental Psychology: General, 131*(3), 307–324. https://doi.org/10.1037/0096-3445.131.3.307

Arndt, J., Greenberg, J., Solomon, S., Pyszczynski, T., & Simon, L. (1997). Suppression, accessibility of death-related thoughts, and cultural worldview defense: exploring the psychodynamics of terror management. *Journal of personality and social psychology*, *73*(1), 5–18. https://doi.org/10.1037//0022-3514.73.1.5

Baldwin, M. W., & Wesley, R. (1996). Effects of existential anxiety and self-esteem on the perception of others. *Basic and Applied Social Psychology, 18*(1), 75–95. https://doi.org/10.1207/s15324834basp1801_7

Becker, E. (1962). *The birth and death of meaning*. New York: Free Press

Becker, E. (1973). *The denial of death*. New York: Free Pres

Becker, E. (1975). *Escape from evil.* New York: Free Press.

Belitski, M., Guenther, C., Kritikos, A. S., & Thurik, R. (2022). Economic effects of the COVID-19 pandemic on entrepreneurship and small businesses. *Small Business Economics*, *58*(2), 593–609. https://doi.org/10.1007/s11187-021-00544-y

Ben-Ari, O. T., Florian, V., & Mikulincer, M. (1999). The impact of mortality salience on reckless driving: A test of terror management mechanisms. *Journal of Personality and Social Psychology, 76*(1), 35–45. https://doi.org/10.1037/0022-3514.76.1.35

Bor, A., Jørgensen, F. & Petersen, M.B. Discriminatory attitudes against unvaccinated people during the pandemic. *Nature 613*, 704–711 (2023). https://doi.org/10.1038/s41586-022-05607-y

Briggs, S. R., & Cheek, J. M. (1986). The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality, 54*(1), 106–148. https://doi.org/10.1111/j.1467-6494.1986.tb00391.x

Brotherton, R., French, C. C., & Pickering, A. D. (2013). Measuring Belief in Conspiracy Theories: The Generic Conspiracist Beliefs Scale. *Frontiers in Psychology*, *4*. https://doi.org/10.3389/fpsyg.2013.00279

Burke, B. L., Martens, A., & Faucher, E. H. (2010). Two Decades of Terror Management Theory: A Meta-Analysis of Mortality Salience Research. *Personality and Social Psychology Review*, *14*(2), 155–195. https://doi.org/10.1177/1088868309352321

Castano, E., Yzerbyt, V., Paladino, M.-P., & Sacchi, S. (2002). I Belong, therefore, I Exist: Ingroup Identification, Ingroup Entitativity, and Ingroup Bias. *Personality and Social Psychology Bulletin*, *28*(2), 135–143. https://doi.org/10.1177/0146167202282001

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers

COVID-19 Vaccination Statistics Series 1 - CSO - Central Statistics Office. (2022). Retrieved 7 October 2022, from https://www.cso.ie/en/releasesandpublications/br/b-cvac/covid-19vaccinationstatisticsseries1

Devellis, R. (2012) *Scale Development Theory and Applications*. Sage Publications, New York.

Ditto, P. H., Jemmott, J. B., 3rd, & Darley, J. M. (1988). Appraising the threat of illness: a mental representational approach. *Health psychology : official journal of the Division*

of Health Psychology, American Psychological Association, *7*(2), 183–201. https://doi.org/10.1037//0278-6133.7.2.183

Enders, A. M., Uscinski, J., Klofstad, C., & Stoler, J. (2022). On the relationship between conspiracy theory beliefs, misinformation, and vaccine hesitancy. *PLOS ONE*, *17*(10), e0276082. https://doi.org/10.1371/journal.pone.0276082

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175–191. https://doi.org/10.3758/BF03193146

Fitri, R. A., Asih, S. R., & Takwin, B. (2020). Social curiosity as a way to overcome death anxiety: perspective of terror management theory. *Heliyon*, *6*(3), e03556. https://doi.org/10.1016/j.heliyon.2020.e03556

Forscher, P. S., Mitamura, C., Dix, E. L., Cox, W. T. L., & Devine, P. G. (2017). Breaking the prejudice habit: Mechanisms, timecourse, and longevity. *Journal of Experimental Social Psychology, 72,* 133–146. https://doi.org/10.1016/j.jesp.2017.04.009

Greenberg, J., Porteus, J., Simon, L., Pyszczynski, T., Solomon, S. (1995). Evidence of a Terror Management Function of Cultural Icons: The Effects of Mortality Salience on the Inappropriate Use of Cherished Cultural Symbols. *Personality and Social Psychology Bulletin, 21(11),* 1221–1228. doi:10.1177/01461672952111010

Greenberg, J., Pyszczynski, T., & Solomon, S. (1986). The Causes and Consequences of a Need for Self-Esteem: A Terror Management Theory. In R. F. Baumeister (Ed.), *Public Self and Private Self* (pp. 189–212). Springer New York. https://doi.org/10.1007/978-1-4613-9564-5_10

Greenberg, J., Pyszczynski, T., Solomon, S., Rosenblatt, A., Veeder, M., Kirkland, S., & Lyon, D. (1990). Evidence for terror management theory II: The effects of mortality salience on reactions to those who threaten or bolster the cultural worldview. *Journal*

of Personality and Social Psychology, 58(2), 308–318. https://doi.org/10.1037/0022-3514.58.2.308

Greenberg, J., Pyszczynski, T., Solomon, S., Simon, L., & Breus, M. (1994). Role of consciousness and accessibility of death-related thoughts in mortality salience effects. *Journal of Personality and Social Psychology*, *67*, 627–637

Greenberg, J., Simon, L., Pyszczynski, T., Solomon, S., & Chatel, D. (1992). Terror management and tolerance: Does mortality salience always intensify negative reactions to others who threaten one's worldview? *Journal of Personality and Social Psychology, 63*(2), 212–220. https://doi.org/10.1037/0022-3514.63.2.212

Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). Terror Management Theory of Self-Esteem and Cultural Worldviews: Empirical Assessments and Conceptual Refinements. In *Advances in Experimental Social Psychology* (Vol. 29, pp. 61–139). Elsevier. https://doi.org/10.1016/S0065-2601(08)60016-7

Harmon-Jones, E., Simon, L., Greenberg, J., Pyszczynski, T., Solomon, S., & McGregor, H. (1997). Terror management theory and self-esteem: Evidence that increased self-esteem reduced mortality salience effects. *Journal of Personality and Social Psychology, 72*(1), 24–36. https://doi.org/10.1037/0022-3514.72.1.24

Hirschberger, G., Florian, V., Mikulincer, M., Goldenberg, J. L., & Pyszczynski, T. (2002). Gender differences in the willingness to engage in risky behavior: A terror management perspective. *Death Studies, 26*(2), 117–141. https://doi.org/10.1080/074811802753455244

Kunda, Z. (1987). Motivated inference: Self-serving generation and evaluation of causal theories. *Journal of Personality and Social Psychology, 53*(4), 636–647. https://doi.org/10.1037/0022-3514.53.4.636

Landau, M. J., Goldenberg, J. L., Greenberg, J., Gillath, O., Solomon, S., Cox, C., et al. (2006). The siren's call: Terror management and the threat of men's sexual attraction to women. *Journal of Personality and Social Psychology*, *90*(1), 129–146.

Lazarević, L. B., Purić, D., Teovanović, P., Lukić, P., Zupan, Z., & Knežević, G. (2021). What drives us to be (ir)responsible for our health during the COVID-19 pandemic? The role of personality, thinking styles, and conspiracy mentality. *Personality and individual differences*, *176*, 110771. https://doi.org/10.1016/j.paid.2021.110771

Lee, S. M., Heflick, N. A., Park, J. W., Kim, H., Koo, J., & Chun, S. (2017). When sex doesn't sell to men: mortality salience, disgust and the appeal of products and advertisements featuring sexualized women. *Motivation and emotion*, *41*(4), 478–491. https://doi.org/10.1007/s11031-017-9615-9

Martin, L., & van den Bos, K. (2014). Beyond terror: Toward a paradigm shift in the study of threat and culture. *European Journal of Social Psychology*, 25, 32–70.

Maxfield, M., Pyszczynski, T., Kluck, B., Cox, C. R., Greenberg, J., Solomon, S., & Weise, D. (2007). Age-related differences in responses to thoughts of one's own death: mortality salience and judgments of moral transgressions. *Psychology and aging*, *22*(2), 341–353. https://doi.org/10.1037/0882-7974.22.2.341

McCrae, R. R., & Costa, P. T., Jr.(1983). Social desirability scales: More substance than style. *Journal of Consulting and Clinical Psychology*, *51*, 882–888

McGregor, H. A., Lieberman, J. D., Greenberg, J., Solomon, S., Arndt, J., Simon, L., & Pyszczynski, T. (1998). Terror management and aggression: evidence that mortality salience motivates aggression against worldview-threatening others. *Journal of personality and social psychology*, *74*(3), 590–605. https://doi.org/10.1037//0022-3514.74.3.590

Morris, K. L., & Goldenberg, J. (2015). Objects become her: The role of mortality salience on men's attraction to literally objectified women. *Journal of Experimental Social Psychology, 56,* 69–72. https://doi.org/10.1016/j.jesp.2014.09.005

Nelson, L. J., Moore, D. L., Olivetti, J., & Scott, T. (1997). General and personal mortality salience and nationalistic bias. *Personality and Social Psychology Bulletin, 23*(8), 884–892. https://doi.org/10.1177/0146167297238008

Neureiter, A., Stubenvoll, M., Kaskeleviciute, R., & Matthes, J. (2021). Trust in Science, Perceived Media Exaggeration About COVID-19, and Social Distancing Behavior. *Frontiers in Public Health*, *9*, 670485. https://doi.org/10.3389/fpubh.2021.670485

Pallant, J. (2016). *SPSS Survival Manual: A Step By Step Guide to Data Analysis Using SPSS Program (6th ed.).* London, UK: McGraw-Hill Education.

Peters, H. J., Greenberg, J., Williams, J. M., & Schneider, N. R. (2005). Applying Terror Management Theory to Performance: Can Reminding Individuals of Their Mortality Increase Strength Output? *Journal of Sport and Exercise Psychology*, *27*(1), 111–116. https://doi.org/10.1123/jsep.27.1.111

Prusova, I. S., & Gulevich, O. A. (2020). The effect of mortality salience on the attitudes toward state control: The case of Russia. *International Journal of Psychology*, *55*(2), 305–314. https://doi.org/10.1002/ijop.12571

Pyszczynski, T., Lockett, M., Greenberg, J., & Solomon, S. (2021). Terror Management Theory and the COVID-19 Pandemic. *Journal of Humanistic Psychology*, *61*(2), 173–189. https://doi.org/10.1177/0022167820959488

Pyszczynski, T., Greenberg, J., & Solomon, S. (1999). A dual-process model of defense against conscious and unconscious death-related thoughts: An extension of terror management theory. *Psychological Review, 106*(4), 835–845. https://doi.org/10.1037/0033-295X.106.4.835

Pyszczynski, T., Solomon, S., & Greenberg, J. (2015). Thirty Years of Terror Management Theory. In *Advances in Experimental Social Psychology* (Vol. 52, pp. 1–70). Elsevier. https://doi.org/10.1016/bs.aesp.2015.03.001

Rosenblatt, A., Greenberg, J., Solomon, S., Pyszczynski, T., & Lyon, D. (1989). Evidence for terror management theory: I. The effects of mortality salience on reactions to those who violate or uphold cultural values. *Journal of Personality and Social Psychology, 57*(4), 681–690. https://doi.org/10.1037/0022-3514.57.4.681

Scrima, F., Miceli, S., Caci, B., & Cardaci, M. (2022). The relationship between fear of COVID-19 and intention to get vaccinated. The serial mediation roles of existential anxiety and conspiracy beliefs. *Personality and Individual Differences*, *184*, 111188. https://doi.org/10.1016/j.paid.2021.111188

Taubman-Ben-Ari, O., & Findler, L. (2005). Proximal and distal effects of mortality salience on willingness to engage in health promoting behavior along the life span. *Psychology & Health, 20*(3), 303–318. https://doi.org/10.1080/08870440512331317661

World Health Organization. (2020). *Who director-general's remarks at the media briefing on 2019-ncov on 11 February 2020*. World Health Organization. Retrieved February 13, 2023, from https://www.who.int/director-general/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020

World Health Organization. (2023). *Who coronavirus (COVID-19) dashboard*. World Health Organization. Retrieved March 1, 2023, from https://covid19.who.int/

Appendices

Appendix A

Evidence of data and SPSS output (data available upon request)

	Name	Type	Width	Decimals	Label	Values
1	Age	Numeric	3	0	Age	None
2	Sex	Numeric	17	0	Sex	{1, Male}...
3	Vaccination...	Numeric	3	0	Vaccination Sta...	{1, Vaccinat...
4	AQ1	Numeric	3	0	Attitude Questi...	{0, No}...
5	AQ2	Numeric	3	0	Attitude Questi...	{0, No}...
6	AQ3	Numeric	3	0	Attitude Questi...	{0, No}...
7	AQ4	Numeric	3	0	Attitude Questi...	{0, No}...
8	CSB1	Numeric	22	0	Conspiracy Bel...	{1, definitely...
9	CSB2	Numeric	22	0	Conspiracy Bel...	{1, definitely...
10	CSB3	Numeric	22	0	Conspiracy Bel...	{1, definitely...
11	CSB4	Numeric	22	0	Conspiracy Bel...	{1, definitely...
12	CSB5	Numeric	22	0	Conspiracy Bel...	{1, definitely...
13	CSB6	Numeric	22	0	Conspiracy Bel...	{1, definitely...
14	CSB7	Numeric	22	0	Conspiracy Bel...	{1, definitely...
15	CSB8	Numeric	22	0	Conspiracy Bel...	{1, definitely...
16	CSB9	Numeric	22	0	Conpiracy Beli...	{1, definitely...
17	CSB10	Numeric	22	0	Conspiracy Bel...	{1, definitely...
18	CSB11	Numeric	22	0	Conspiracy Bel...	{1, definitely...
19	CSB12	Numeric	22	0	Conspiracy Bel...	{1, definitely...
20	CSB13	Numeric	22	0	Conspiracy Bel...	{1, definitely...
21	CSB14	Numeric	22	0	Conspiracy Bel...	{1, definitely...
22	CSB15	Numeric	22	0	Conspiracy Bel...	{1, definitely...
23	Condition	Numeric	10	0	Experimental C...	{1, Death C...
24	FineAmounts	Numeric	1	0	Fine amounts	{0, Yes}...
25	SFG1	Numeric	3	0	Support for Gov...	{0, Yes}...
26	SFG2	Numeric	3	0	Support for Gov...	{0, Yes}...
27	SFG3	Numeric	3	0	Support for Gov...	{0, Yes}...
28	SFG4	Numeric	3	0	Support for Gov...	{0, Yes}...
29	SFG5	Numeric	3	0	Support for Gov...	{0, Yes}...
30	TotalAttitud...	Numeric	8	2		None
31	TotalConsp...	Numeric	8	2		None
32	TotalSFGSc...	Numeric	8	2		None

Dependent Variable: Fine amounts

Vaccination Status	Experimental Condition	Mean	Std. Deviation	N
Vaccinated	Death Condition	705.25	810.022	48
	TV Condition	753.45	767.060	29
	Total	723.40	789.362	77
Not Vaccinated	Death Condition	60.00	54.772	5
	TV Condition	10.00	19.149	7
	Total	30.83	44.202	12
Total	Death Condition	644.38	793.431	53
	TV Condition	608.89	748.208	36
	Total	630.02	771.335	89

Levene's Test of Equality of Error Variances[a,b]

		Levene Statistic	df1	df2	Sig.
Fine amounts	Based on Mean	10.813	3	85	<.001
	Based on Median	3.307	3	85	.024
	Based on Median and with adjusted df	3.307	3	73.135	.025
	Based on trimmed mean	9.572	3	85	<.001

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Dependent variable: Fine amounts

b. Design: Intercept + VaccinationStatus + Condition + VaccinationStatus * Condition

Tests of Between-Subjects Effects

Dependent Variable: Fine amounts

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5029047.783[a]	3	1676349.261	3.011	.035	.096
Intercept	5869099.714	1	5869099.714	10.541	.002	.110
VaccinationStatus	4843326.303	1	4843326.303	8.699	.004	.093
Condition	8.153	1	8.153	.000	.997	.000
VaccinationStatus * Condition	24217.854	1	24217.854	.043	.835	.001
Error	47327236.172	85	556791.014			
Total	87682904.000	89				
Corrected Total	52356283.955	88				

a. R Squared = .096 (Adjusted R Squared = .064)

Appendix B

Demographic Quesitionaire

What is your age?

What is your gender?

☐Male

☐Female

☐Other

☐Prefer not to say

During the COVID-19 pandemic in Ireland did you opt into the vaccination program?

☐Yes

☐No

Appendix C

Attitudes towards an unvaccinated person adapted from (Bor et al., 2023)

John is a person who opted to NOT get vaccinated during the COVID-19 pandemic. Please answer the questions below in reference to this information.

I would be unhappy if this person married one of my close relatives

☐Yes

☐No

I would be afraid that this person would infect me or my family with COVID-19

☐Yes

☐No

I think this person is unintelligent

☐Yes

☐No

I think this person is untrustworthy.

☐Yes

☐No

Scores are calculated by adding up scores to total number. Yes = 1 No = 0

Higher scores indicate more negative attitudes towards unvaccinated people.

Appendix D

Measure of general conspiracy beliefs (Brotherton et al., 2013)

Rated items on a 5-point Likert-type scale, with a qualitative label associated with each point (1: definitely not true; 2: probably not true; 3: not sure/cannot decide; 4: probably true; 5: definitely true).

Circle your answer

The government is involved in the murder of innocent citizens and/or well-known public figures, and keeps this a secret

1 2 3 4 5

The government permits or perpetrates acts of terrorism on its own soil, disguising its involvement

1 2 3 4 5

The government uses people as patsies to hide its involvement in criminal activity

1 2 3 4 5

The power held by heads of state is second to that of small unknown groups who really control world politics

1 2 3 4 5

A small, secret group of people is responsible for making all major world decisions, such as going to war

1 2 3 4 5

Certain significant events have been the result of the activity of a small group who secretly manipulate world events

1 2 3 4 5

Secret organizations communicate with extraterrestrials, but keep this fact from the public

1 2 3 4 5

Evidence of alien contact is being concealed from the public

1 2 3 4 5

Some UFO sightings and rumors are planned or staged in order to distract the public from real alien contact

1 2 3 4 5

The spread of certain viruses and/or diseases is the result of the deliberate, concealed efforts of some organization

1 2 3 4 5

Technology with mind-control capacities is used on people without their knowledge

1 2 3 4 5

Experiments involving new drugs or technologies are routinely carried out on the public without their knowledge or consent

1 2 3 4 5

Groups of scientists manipulate, fabricate, or suppress evidence in order to deceive the public

1 2 3 4 5

New and advanced technology which would harm current industry is being suppressed

1 2 3 4 5

A lot of important information is deliberately concealed from the public out of self-interest

1 2 3 4 5

Scores are calculated by adding up each score and averaging. Higher scores indicate higher amounts of conspiracy beliefs.

Appendix E

Morality Salient & Neutral Question (Rosenblatt at al. 1989).

Mortality Salience

Please briefly describe the emotions that the thought of your own death arouses in you

_____

Neutral Question

Please briefly describe the emotions the thought of watching television arouses in you.

_____

Appendix F

Placing Fines Scenario

During COVID-19 in Ireland restrictions were placed on unvaccinated individuals. One of the restrictions removed the ability of the unvaccinated to dine indoors but they were still allowed to dine outdoors. In this case a man named Tom Sweeney was caught with a fake vaccine certificate feigning his vaccination status indoors during the time of these restrictions during 2021. The fine for breaking this law ranged from €0 - €2000. Please write below what fine amount you think Tom should be given for breaking this law.

_____

Appendix G

Support For Restrictions Questionnaire Adapted from (Bor et al., 2023)

Mary is also another person who opted NOT to get vaccinated in Ireland during COVID-19 pandemic.

This person should be allowed to sit next to me in public transportation

☐Yes

☐No

This person should be allowed to move into my neighbourhood

☐Yes

☐No

This person should be allowed to express their political views on social media freely, without fear of censorship

☐Yes

☐No

This person should receive Irish citizenship if they are eligible and apply for it

☐Yes

☐No

This person should receive unemployment benefits if they are eligible and apply for it

☐Yes

☐No

Appendix H

Information Sheet

Investigating the Relationship of Attitudes Towards COVID-19 Restriction Transgressors and Government Control with Public Health Measures.

My name is Evan Byrne, and I am a final year student in the BA psychology programme at National College Ireland. As part of our degree, we must carry out an independent research project.

For my project I aim to investigate the relationship between attitudes towards vaccine hesitant people and government control regarding restricting vaccine hesitant individuals.

This project will be supervised by Dr Robert Fox.

This study will involve answering an online questionnaire for the next 10-15 minutes and you will be asked about your attitudes towards vaccine hesitant people and government control regarding restricting vaccine hesitant individuals.

o The questionnaire will take approximately fifteen minutes to answer.

o If you are over the age of eighteen you can take part in this study.

o You cannot take part in this study if you have intellectual or learning disabilities.

o If you are not fluent in English, you cannot take part in this study.

Participation in this research is voluntary and you do not have to take part. The decision to not take part will result in no consequences for you. If you choose to withdraw from the study, you can do so at any time during the questionnaire process but because of the nature of data collection being anonymised you will not be able to withdraw your data after completion and handing in of the questionnaire.

The questionnaire includes the topic of death, vaccination, and government control. There is a small risk that these questions may cause some individuals distress. If you feel these questions may cause you an undue level of stress, you should not take part in this study.

There are no direct benefits for you taking part in this research. However, it will help us better understand the relationship between attitudes towards COVID-19 vaccination and government control in restricting non-vaccinated people.

The questionnaire is anonymous, it is not possible to identify a participant based on their responses to the questionnaire.

Data will be online. These will be stored securely on the Microsoft cloud. It is NCIs policy to hold this data for at least five years.

The results of this study will be presented in my final dissertation, which will be submitted to National College of Ireland. The results of the project may be presented at conferences and/or submitted to an academic journal for publication.

For further details contact Evan Byrne, the researcher with the email of x20434422@student.ncirl.ie or Dr Robert Fox the supervisor of this project with the email of Robert.fox@ncirl.ie

Appendix I

Consent Sheet

Investigating the Correlation of Attitudes Towards COVID-19 Vaccine hesitancy and Government Control in Restricting the Non-vaccinated.

Consent to take part in research

- I understand that even if I agree to participate now, I can withdraw at any time during the questionnaire without any consequences but not after data has been collected due to anonymisation
- I have been informed as to the general nature of the study and agree voluntarily to participate.
- I understand that I will not benefit directly from participating in this research.
- If I have any concerns about participation, I understand that I may refuse to participate or withdraw at any stage by exiting my browser.
- I understand that once my participation has ended, that I cannot withdraw my data as it will be fully anonymised.
- I understand that if I inform that myself or someone else is at risk of harm the researcher may have to report it to the relevant authorities, this may be required without permission, though will be discussed firstly if possible.
- I understand all data from the study will be treated confidentially. The data from all participants will be compiled, analysed, and submitted in a report to the Psychology Department in the School of Business.

- I understand that under freedom of information legalisation I am entitled to access the information I have provided at any time while it is in storage as specified above.
- I understand I am free to contact any of the people involved in the research to seek for clarity and information about the study.
- I understand the method proposed for this research project has been approved in principle by the Departmental Ethics Committee, which means that the Committee does not have concerns about the procedure itself as detailed by the student. It is, however, the above-named student's responsibility to adhere to ethical guidelines in their dealings with participants and the collection and handling of data.
- I understand that my data will be retained and managed in accordance with the NCI data retention policy, and that my anonymised data may be archived on an online data repository and may be used for secondary data analysis. No participants data will be identifiable at any point

Evan Byrne, 3rd Year Psychology Student. Email: x20434422@student.ncirl.ie

Please tick this box if you have read and agree with all the above information ☐

Please tick this box to indicate that you are providing informed consent to participate in this study ☐

Appendix J

Debriefing Sheet

The Effects of Mortality Salience on Reactions to Covid-19 Vaccine Hesitancy

Thank you for participating in this research. This experiment was designed to examine the effect of mortality salience (awareness of death) on reactions to vaccine hesitant individuals and support for government restrictions on vaccine hesitant individuals whilst measuring potential predictors such as general conspiracy beliefs and attitudes towards someone who is vaccine hesitant. Previous work has shown mortality salience to have

numerous effects towards individuals acting differently compared to peers who were not made salient such as judges setting higher bonds for alleged prostitutes (Rosenblatt et al., 1989). Here the researchers were interested to see if mortality salience caused a difference in reactions to unvaccinated people. We ask you to please not discuss this study with anyone until the conclusion of experimentation as prior knowledge will invalidate results. For more information about the effects of mortality salience you can visit ernestbecker.org. If you have any questions regarding this study, please feel free to contact the researcher Evan Byrne at x20434422@student.ncirl.ie. If you feel psychologically distressed by participation in this study, we encourage you to contact Aware at 1800 80 48 48 or Pieta House at 1800 247 247. Thank you again for your participation in this study