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Implicit Attitudes and Terror Management: Pilot of Implicit Association Test as a Means of Measuring Death-Thought Accessibility

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Abstract

Terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986) has been extensively tested and applied in a variety of contexts. One of the major criticisms of TMT is that there are methodological issues with assessing some of the proposed processes within the theory, such as activation of death thought accessibility. The present study provides an initial test of a proposed alternative for measuring death thought accessibility using an image-based implicit association test instead of the traditional word fragment completion task used in a majority of TMT research. An experiment was carried out with 200 undergraduate students using a 2 (mortality salience: Yes or no) x 2 (social/fiscal conservatism: Low or high) between-subjects design. Results provided partial empirical support for the use of an IAT-based measure for death thought accessibility relying on color images. The IAT-based measure outperformed the traditional word fragment completion task at discriminating between mortality and non-mortality salient participants in terms of death thought accessibility.

Moreover, this study also tested the mortality salience hypothesis to determine whether mortality salience activates cultural worldview defenses following a brief delay. Specifically, participants with differing political ideologies were asked to evaluate an editorial in support of the Muslim ban. Results found that after being reminded of their death, participants with strong levels of conservatism reported more positive attitudes toward the Muslim ban, relative to those in the control condition (i.e., non-mortality salient). Implications of the findings for this study as well as directions for future research are discussed.

Keywords: terror management theory, death thought accessibility, mortality salience, implicit attitudes

1. Introduction

Terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986) argues that mortality salience (MS) produces existential anxiety, motivating behaviors that work to buffer aversive death thoughts (Solomon, Greenberg, & Pyszczynski, 1991). TMT further holds that death-thought awareness (DTA) motivates differing anxiety-buffering behaviors depending on how consciously one processes death thoughts. When death is in focal awareness, *proximal* psychological defenses are aroused. *Distal* defenses are aroused when death thoughts are salient but persist outside focal awareness. Several hundred studies have verified the structure of the TMT dual defenses system, identifying distinct behaviors associated with each type of defense (Arndt, Cook, Goldenberg, & Cox, 2007; Burke, Martens, & Faucher, 2010; Hayes, Schimel, Arndt, & Faucher, 2010).

In proximal defense, TMT research finds that people respond by attempting to push death thoughts from awareness immediately. In experimental studies, for instance, proximal defenses motivate *vulnerability-denying bias*, where people underestimate their susceptibility to death to suppress uncomfortable death thoughts (Greenberg, Arndt, Simon, Pyszczynski, & Solomon, 2000), such as showing lesser intention to get cancer screenings despite cancer warnings (Arndt et al., 2007). Proximal defenses diminish the threat of MS by removing DTA from immediate attention.

Comparatively, when in distal defense, research shows people tend to promote cultural worldviews (Solomon, Greenberg, Pyszczynski, 2004) by favoring ingroup members (Greenberg et al., 1992) or derogating outgroups (Pyszczynski et al., 2006). Greenberg et al. (1992), for instance, found that when in distal defense, strongly liberal participants were more accepting of a target that did not share their political attitudes. In contrast, strongly conservative

participants evaluated the target more harshly (Experiment 1). This finding was explained as a function of worldview bolstering, with liberals operationalized as valuing tolerance and conservatives valuing patriotism and obedience. According to TMT, when distal defenses are induced, people experience greater motivation to elevate important aspects of their worldview. This affects message-processing effects, as those in distal defense should be more critical of messages that do not support or validate their attitudes and beliefs.

To induce distal defenses, researchers typically manipulate MS (i.e., have participants write essays about death; Rosenblatt et al., 1989; subliminally flash death words; Landau et al., 2004; or fill out survey items with death- related content; Arndt, Greenberg, Simon, Pyszczynski, & Solomon, 1998) before distracting participants with non-death tasks to remove DTA from focal awareness. However, holding DTA outside focal awareness presents a methodological problem—that is, how do researchers measure a manipulated variable (e.g., DTA) that must be held outside conscious awareness? The purpose of this paper is to develop and test a manipulation check to capture DTA without bringing death into focal awareness. To do so, we tested a new version of the implicit association test (IAT; Greenwald, McGhee, & Schwartz, 1998), presenting death images or non-death images to record automatic associations. To bolster our test, we also included a typical dependent variable in TMT research, asking participants to evaluate a pro- or counter-attitudinal target.

1.1 Problems Measuring Death-Thought Accessibility

Proximal defenses deal with the threat of DTA on a corresponding level (Pyszczynski, Greenberg, & Solomon, 1999). This means that when death is in focal awareness, proximal reactions address the threat directly, either by dismissing it or adopting protective behaviors (e.g., expressing intentions for safe driving; Bessarabova & Massey, 2023). However, proximal defenses can be relaxed, as demonstrated experimentally by giving participants distractor tasks that increase cognitive load. As cognitive load engages focal attention, DTA is not eliminated, but remains accessible outside conscious awareness (Arndt, Greenberg, & Cook, 2002; Greenberg, Ardnt, Simon, Pyszczynski, & Solomon, 2000; Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994).

To demonstrate this process, Greenberg et al. (1994) devised a task where word fragments could be completed as "death words" or "non-death" words (Hayes et al., 2010). Greenberg and company reasoned that priming MS would induce DTA and introducing cognitive load (through distraction) would remove death thoughts from focal awareness. In this case, DTA would still be accessible, but non-consciously. A successful distal induction would be evidenced by treatment completing more word fragments as "death" words versus the controls (e.g., completing Sk_ _ l as "Skull" vs. "Skill"). Higher death-word completion rates in the MS condition (vs. control) would indicate DTA was still accessible and motivating behavior beyond participants' conscious awareness. Greenberg et al. (1994) found that when primed with MS and given a distractor task, participants completed more death words than controls, indicating cognitive load relaxed proximal defenses, allowing DTA to persist outside conscious awareness (Experiment 4). This method of priming MS and distracting participants has been used in hundreds of TMT studies (see Burke et al., 2010) with the word fragment task commonly used to measure non-conscious DTA (see Hayes et al., 2010). More recently, Hayes et al. (2010) reviewed 93 published articles, highlighting a major methodological problem for researchers trying to induce distal defenses. Mainly, the variable of interest in TMT studies—DTA—cannot be assessed through self-report, as such reports could bring death into focal awareness, inducing proximal (and not distal) defenses. Indeed, the use of "death anxiety" scales (e.g., Wong, Reker, & Gesser, 1994) has been shown to prime MS (e.g., Arndt et al., 1998), indicating self-report measures could work to make mortality salient, and thus would not be appropriate for a manipulation check. As Hayes et al. (2010) point out, despite a large number of published TMT studies, there is no agreed-upon, reliable measure to use as a manipulation check.

A common manipulation check in TMT research is the above-mentioned word fragment task developed by Greenberg et al. (1994). This task asks participants to complete 26 word-fragments, of which four- or five-word fragments could be completed with death words (e.g., the fragment SK_ _L). Despite the measure's popularity, Hayes and Schimel (2018) have argued that the task may constitute a death prime and, thus, would not be appropriate as a manipulation check. This argument may help explain inconsistent effects in TMT studies using the word fragment task as manipulation check (i.e., Greenberg et al., 1994; Experiments 2 and 3). If the word fragment completion task primes MS, then using this measure as a manipulation check in non-death controls could threaten the internal validity of studies comparing death treatment conditions against non-death controls.

Hayes and Schimel (2018) hypothesized that the word fragment completion task routinely used as a check in TMT research might bring DTA into focal awareness, triggering proximal defenses within studies designed to test distal effects. Hayes and Schimel (2018) randomly assigned participants to complete 1 of 2 word fragment completion tasks. One task included word fragments that could be completed as death words; the other had fragments that could not be completed as death words. A delay was introduced after tasks to induce distal effects. The dependent measure was

self-enhancement (i.e., rating positive or negative traits). The researchers predicted distal defenses would be evidenced by greater self-enhancement in the group completing the word fragment task in which it was possible to complete death words. Participants in the death word fragment condition, which received a delay, reported higher numbers of death-related words for the word completion task than those in the control condition or those with no delay. Having found that the standard TMT manipulation check of a death word fragment completion task might prime DTA instead of measuring non-conscious DTA, Hayes and Schimel (2018) offered the following warning to researchers: Administering a DTA measure following MS can obscure the effect that MS might otherwise produce. Thus, including a DTA manipulation check to ensure that MS increases DTA will likely only be counterproductive. Given the extensive evidence that MS does in fact increase DTA after a brief delay, we urge researchers to forgo checks on this manipulation in their future research. Based on Hayes and Schimel (2018), there is reason to believe the traditional manipulation check used in TMT studies may be unreliable or work as a death prime that inadvertently manipulates the variable of interest in experimental controls.

1.2 Implicit Association Tests in TMT

The IAT measures automatic associations by asking people to match descriptors (e.g., good, bad, happy, nasty) to target concepts (e.g., ethnic groups, gender/sex groups, religious groups) in timed trials. The test is arranged so that target concepts and descriptors are presented in a specific order (e.g., male + positive words; female + negative words), then reversed in a second set of trials (e.g., female + positive words; male + negative words). The descriptors are randomized, so words from either category (e.g., positive or negative) appear rapidly. The participants' task is to match words to the correct targets. The latency of pairing descriptors to target concepts captures the strength of automatic associations (Greenwald et al., 1998).

There has been research utilizing IAT to capture death awareness. Bassett and Dabbs (2003), for instance, asked participants to complete an explicit measure of death anxiety before a pencil-and-paper version of the IAT. In this case, the IAT used four categories: death, life, calm, and anxious, and participants paired words in 20-second trials. Scores were calculated by subtracting the number of words assigned for death + calm and for death + anxious. Results found that participants showed stronger association between death + anxious (vs. calm). The explicit measure of death anxiety was not related to implicit attitude scores. In a follow-up, the same IAT was administered on an electronic palm pilot, and again found a stronger association between death + anxious (versus calm) and explicit measures were again un-correlated with implicit ones. Bassett (2005) used death anxiety scales alongside IAT to determine any association between death in relation to self or other. In this case, participants were randomly assigned to read an essay about America's failing status as a superpower, an essay about the institution of marriage weakening, or a control condition. After assignment to conditions, participants completed explicit and implicit death measures. Results found that within the marriage-essay condition, participants showed greater implicit preference for the death + other pairing, as compared to controls. There was not a main effect for condition on explicit death anxiety. Basset and Dabbs (2003) and Bassett (2005) present some evidence that the IAT can be used to measure death awareness. However, there are methodological issues to note when considering these findings. First, latency scores were calculated differently from the algorithm recommended by Greenwald, Nosek, and Banaji (2003). Second, in Bassett and Dabbs (2003), one version of the IAT was administered via pencil-and-paper (Experiment 1), which deviates from the typical IAT administration where a computer flashes images and words (Greenwald et al., 1998). Third, both studies asked participants to match death-related words (e.g., death, die, dying) to the category of death. Exposing participants to death words has been demonstrated to prime MS (see Arndt et al., 1998). If exposure to explicit death words brings DTA into focal awareness, then IATs used in both studies would have been measuring explicit DTA, not implicit DTA.

1.3 Review of the Literature

Given the issues surrounding measuring death awareness in TMT studies, scores on dependent outcomes are often used as evidence that the MS manipulation worked. Greenberg et al. (1992), for instance, hypothesized that in distal defense, conservatives would be more likely to derogate a dissimilar other compared to liberals when mortality was salient. The rationale for this hypothesis was the hypothesis that liberals value tolerance more than conservatives. Similarly, the hypothesis that conservatives tend to be more patriotic and less tolerant of dissimilar attitudes. Greenberg et al. (1992) predicted that when mortality was salient, liberals would evaluate the author of an anti-US essay more favorably, while conservatives would be more likely to derogate the author of an anti-US essay.

In Study 1, Greenberg et al. (1992) recruited highly liberal and highly conservative participants based on pre-test questionnaires. The resulting sample of extremely liberal/conservative participants were randomly assigned to MS or control before being asked to evaluate an attitude questionnaire filled out by another student. The questionnaire was a factor in the evaluation of the target the dependent variable. The target's political attitudes were manipulated to be congruent (i.e., conservative participant to conservative target; liberal participant to liberal target) or non-congruent (i.e.,

conservative participant to liberal target; liberal participant to conservative target). Participants read both profiles, and the order of presentation was counter-balanced so that the congruent profile was seen first by half of the participants, and the non-congruent profile was seen first by the other half. Results showed a main effect for positive evaluations of an ideologically congruent target. A significant two-way interaction found that conservatives showed a significantly greater preference for similar targets than liberals. Finally, a significant three-way interaction was found between condition (mortality salience versus control), political ideology (extremely conservative versus extremely liberal), and evaluation of target (similar target versus dissimilar target). When mortality was salient, conservatives showed greater preference for similar others and less preference for dissimilar others. Comparatively, liberals showed greater tolerance to dissimilar others, but only when mortality was salient. Together, results indicate that political ideology moderates how people react to dissimilar others when mortality is salient. This result was argued by the researchers as evidence that the MS manipulation worked, even though there was no manipulation check.

1.4 Research Question and Hypotheses

Based on lack of clarity in the TMT literature about the efficacy of the death word completion task, as well as alternative measures such as the IAT, the following research question is asked:

RQ1: Does the proposed IAT measure of DTA work more effectively than the traditional measure of DTA (i.e., death words fragment completion task)?

For the present study, we test whether or not a newly designed IAT can be used as a DTA manipulation check. To bolster the validity of our test, we also included a standard TMT dependent measure in the evaluation of a pro- or counter-attitudinal essay written by a (dis)similar target. For this study, we chose the proposed "Muslim Ban" as the topic of our essay and used a real letter-to-the-editor that supported the ban. As Greenberg et al. (1992) found that liberal and conservative participants evaluated targets who shared (or failed to share) political attitudes differently, we also reasoned that the Muslim Ban—a proposal put forward by a conservative president—would be received differently by liberal and conservative receivers. Based on this, we hypothesize an interaction effect between MS and political ideology such that participants who report themselves to be:

H1a: High in social conservatism will report more positive attitudes toward the Muslim ban than those low in social conservatism, under conditions of high mortality salience.

H1b: High in fiscal conservatism will report more positive attitudes toward the Muslim ban than those low in fiscal conservatism, under conditions of high mortality salience.

H2a: High in social conservatism will report higher message quality for the editorial than those low in social conservatism, under conditions of high mortality salience.

H2b: High in fiscal conservatism will report more higher message quality for the editorial than those low in fiscal conservatism, under conditions of high mortality salience.

2. Method

2.1 Participants

Undergraduates from a large, southwestern university were recruited to participate in this study (N = 200). Their age ranged from 18 to 40 years old (M = 19.80 SD = 2.32), with 61% identifying as female. Approximately 67% of sample identified as White, 3% as Black or African American, 9% as Asian, 1% as Native Hawaiian, 4% as Native-American or Alaskan Native, 14% as Latino or Hispanic, and 3% identified as other.

2.2 Sampling Procedures

This experiment used a post-test only control experimental design with random assignment to five conditions within a 2 (mortality: salient vs. control) x 3 (DTA check: color IAT vs. no-color IAT vs. word fragment completion task) between-subjects design. In the lab, participants answered questions about political ideology before being randomly assigned to a MS or control condition. In the MS condition, participants were asked to, "*Please describe, in a paragraph or two, the emotions that the thought of your own death arouse in you. Describe how you would feel as you experience your death*;" and then: "*Write down, as specifically as you can, what you think happens to your body as you die and physically experience death*." The control condition was asked to write about going to the dentist instead of experiencing death.

Participants next completed a series of distractor tasks to induce distal defense (see Greenberg et al., 1994). Having completed the distractors, participants were randomly assigned to a word fragment completion task or an IAT test. The IAT included seven trials. In the first, participants were asked to pair 16 different words (e.g., glorious or hurt) to the categories of "Good Word" or "Bad Word" using the computer keyboard. The second trial asked participants to match pictures to "Full Color" or "Black & White". Pictures consisted of death images (e.g., graveyards) or control images

(e.g., fields) (see APPENDIX A). The third and fourth trials combined "Full Color or Good Word" and "Black & White or Bad Word," and asked participants to pair words *and* images to categories. The fifth flipped "Bad Word" or "Good Word" so that "Bad Word" was on the left of the screen and "Good Word" on the right. The sixth and seventh trails asked participants to pair "Bad Word or Full Color" or "Good Word or Black & White." Pairing words/images to categories was timed. Incorrect answers prompted a red "X" to appear on the screen. Correct answers triggered the next word in the series to appear.

After completing either the death word stem or the IAT, participants read a "letter-to-the-editor" taken from an actual newspaper (*News Sentinel,* Fort Wayne). The letter expressed support for the highly controversial Executive Order (EO) 13769, which sought to limit the admittance of refugees in the United States from seven majority Muslim countries. Colloquially referred to as the "Muslim "Ban," EO 13769 was a topic of heated debate at the time of the study. The letter-to-the-editor argued in support of EO 13769 and as follows:

Tuesday, February 07, 2017 05:01 am
Our president said during last year's campaign, "We need to ban Muslims." I believe he misspoke and meant to say, "We need to ban radical Muslim fundamentalists." As one Muslim leader said in a recent interview, "the Wahhabis" or radical fundamentalist Muslims "are a problem wherever they go," and we should give them no quarter .So why don't we all shut up and quit saying "Muslim ban"? Instead, why don't we say "radical fundamentalist ban."

I am in favor of banning all flavors of radical fundamentalists. Polls show that more than half of us are in favor of making sure we don't let in radicals, yet most don't realize that extreme vetting has been in place for several years.

I am fairly certain that very soon everyone will be satisfied with the processes already in place, and immigration will return to normal. But, the rancor over this executive order regarding immigration is the fodder the fundamentalists will use for recruitment.

So I'll say it again, let's all shut up if we can't choose our words more carefully. Also on immigration "the wall" is nothing new; the Secure Fence Act of 2006 authorized the "wall" in the first place. The portions already built are probably the only ones we need, and about all we can afford.

If something really bad is going to come from south of the border it will undoubtedly come under the border, through a tunnel. The net influx of illegals from Mexico is already near or below zero. Instead of trying to get Mexico to pay for the "wall," why don't we get them to imprison their citizens that commit crimes here? Or if we could accomplish it, imprison them here.
Phillip B.

After reading the letter, participants completed measures of attitude towards the proposed Muslim Ban and perceived message quality of the letter-to-the-editor. The survey concluded with demographics and a short debrief thanking participants for their participation.

2.3 Measures

All scales were averaged to form indexes. Means, standard deviations, reliabilities, and correlations coefficients can be found in Table 1.

2.3.1 Pretest Measures

***Political ideology*.** Ideology was measured using a four-item scale (Everett, 2013) asking participants how socially (conservative and liberal) and fiscally (conservative and liberal) they were using, ranging from 0 (*not at all*) to 100 (*completely that way*). Scores were calculated separately for social conservatism and fiscal conservatism. A median split was performed to create high and low groups for social and fiscal conservatism respectively. Social conservatives (M=73.82, SD=19.79) in the high social conservatism condition scored significantly higher on social conservatism scale than those in the low social conservatism group (M=24.10, SD=17.34). Similarly, participants in the high fiscal conservatism group (M=86.60, SD=8.41) reported significantly higher scores on fiscal conservatism than those in the low fiscal conservatism group (M=42.89, SD=21.41). Neither the social nor fiscal liberalism scales were used as part of the analyses in this study because it was not expected that mortality salience would have an effect on how they responded to the stimulus message, an editorial that reinforces the cultural worldview of many conservatives (i.e., all Muslims should be banned; building the wall is an effective way to keep illegal immigrants out). Liberals, on the other hand, are expected to be less motivated to defend this cultural worldview, as it is incongruent to their way of thinking, regardless of if their mortality is made salient or not.

2.3.2 Manipulation Check Measures

***Word fragment completion task*.** The word fragment completion task included a list of 26 word fragments that can be completed with a variety of alternative solutions, some death related and some non-death related. For example: C-O-F-F-__-__ could be resolved as "COFFIN," or "COFFEE". Of the 26 word fragments, seven possible death words

were included (buried; dead; grave; killed; skull; coffin; and corpse). Successful completion of a death word fragment was scored as 1, and all scores were summed ranging from 0 to 6, with higher scores indicating greater death thought awareness.

IAT. The IAT included a list of 16 words that were paired with the categories "Good Word" or "Bad Word"; "Black & White" or "Full Color". Categories were combined so that participants matched a combination of good words (e.g., happy, beautiful, laughter, pleasure, joy, wonderful, smile, and glorious) and bad words (e.g., horrible, nasty, awful, terrible, agony, hurt, evil, and failure) to the same side of the screen as the non-color and color photographs. Images were either death related (e.g., graveyards) or non-death (e.g., fields). To ensure that images were not idiosyncratically affecting scores, two IAT tests were developed—one with color death photos (and black and white, non-death images) and one with black and white death photos (and color non-death images). In total, there were 28 images used in the IAT.

2.3.3 Posttest Measures

Participants were asked to, "Please consider the 'Letter to the Editor' message you read when answering the questions below. There are no right or wrong answers: We are just interested in your views." Responses were scored from 1 (*not very*) to 7 (*very*).

Attitudes. To measure participants' attitudes towards the Muslim Ban, Dillard and Shen's (2005) seven-item scale (good, wise, favorable, positive, desirable, necessary, and beneficial) was used. Example items include, "*How good is the Muslim Ban*?" "*How wise is the Muslim Ban*?" and "*How necessary is the proposed Muslim Ban*?"

Message quality. Updegraff, Sherman, Luyster, and Mann (2007) seven-item scale was used to capture message quality. Participants were asked to consider the quality of the message in the letter-to-the-editor. Example items include, "*How persuasive was the message*?" "*How clear was the message*?" and "*How accurate was the message*?"

3. Results

A series of ANCOVAs were conducted to answer the research question posed, and to test the posited hypotheses in the study. Sex, age, and ethnicity were controlled for in all analyses. Estimated marginal means and standard errors are reported in the results.

3.1 Research Question

We examined whether the proposed IAT measure of DTA would outperform the traditional DTA measure used in a majority of TMT studies. To test the effectiveness of the word fragment completion task in assessing DTA, total number of death-related words reported by participants in the word fragment completion task served as the dependent measure, with MS condition as the grouping factor. Results indicated no significant effect for MS condition, $F(1, 198)=0.10$, $p=.76$. Both mortality ($M=.75$, $SE=0.11$) and non-mortality ($M=.69$, $SE=0.12$) salient participants completed the word fragment completion task with very few death-related words. Thus, the traditional DTA measure was not successful at measuring DTA.

Conversely, using the IAT measure of DTA, we examined the response latency data comparing across MS conditions. Each respondent's response latency data was transformed into *D*-scores using the *D*-algorithm developed by Greenwald et al. (2003). Mean *D*-scores were computed using the procedure described in Barnes-Holmes, Murtaugh, Barnes-Holmes, and Stewart (2010). For our study, we randomly assigned participants to 1 of 2 IATs, one where death-related images were presented in color (i.e., color IAT), the other presented in black and white (i.e., non-color IAT). Separate analyses were conducted for the two IATs as measures of DTA. It was expected that for the non-color IAT (i.e., death-related images were in black & white), participants in the MS condition, compared to the non-MS condition, would report a stronger preference for "Black & White or Bad Word" pairing (blocks 3 &4) than "Good Word or Black and White" pairing (blocks 6 & 7), reflected as a higher positive *D*-score. Mean *D*-score was the dependent measure, and MS condition was the grouping factor. Results indicate no main effect for MS condition, $F(1, 50)=0.72$, $p=.40$. Thus, there were no significant differences in preferences within the non-color IAT.

For the color IAT (i.e., death-related images were in color), participants in the MS condition were anticipated to report a stronger preference for "Bad Word or Full Color" pairing (blocks 6 &7) than "Full Color or Good Word" pairing (blocks 3 &4) than those in the non-MS condition, as reflected in a higher negative *D*-score. Results indicate a significant main effect for MS condition, $F(1. 63)=5.33$, $p=.024$, $\eta^2=.08$. Examining the marginal means, respondents in the MS condition reported a much higher negative *D*-score ($M=-.64$, $SE=.05$) than those in the non-MS condition ($M=-.48$, $SE=.05$). Thus, mortality salient individuals reported a stronger association between color images and negative words than non-mortality salient participants.

3.2 Hypothesis 1

We predicted an interaction effect between social conservatism on attitudes toward the Muslim ban. Controlling for sex, age, and ethnicity, results indicated a significant interaction effect, $F(1, 193)= 5.63$, $p=.02$, $\eta^2=.027$ (see Figure 1). High social conservative participants in the MS condition ($M= 4.20$, $SE=0.17$) reported significantly more positive attitudes toward a Muslim ban than low social conservative respondents in the MS condition ($M=2.63$, $SE=0.21$). No significant differences were found in attitudes toward the Muslim ban among participants in the non-MS condition as a function of social conservatism.

We also predicted an interaction effect between fiscal conservatism on attitudes toward the Muslim ban. Controlling for sex, age, and ethnicity, a significant interaction was found, $F(1, 193)= 5.94$, $p=.016$, $\eta^2=.023$ (see Figure 2). High fiscal conservative participants in the MS condition ($M= 4.35$, $SE=0.19$) reported significantly more positive attitudes toward a Muslim ban than low fiscal conservative respondents in the MS condition ($M=2.88$, $SE=0.18$). No significant differences were found in attitudes toward the Muslim ban among participants in the non-MS condition as a function of fiscal conservatism. Taken together, H1 was supported.

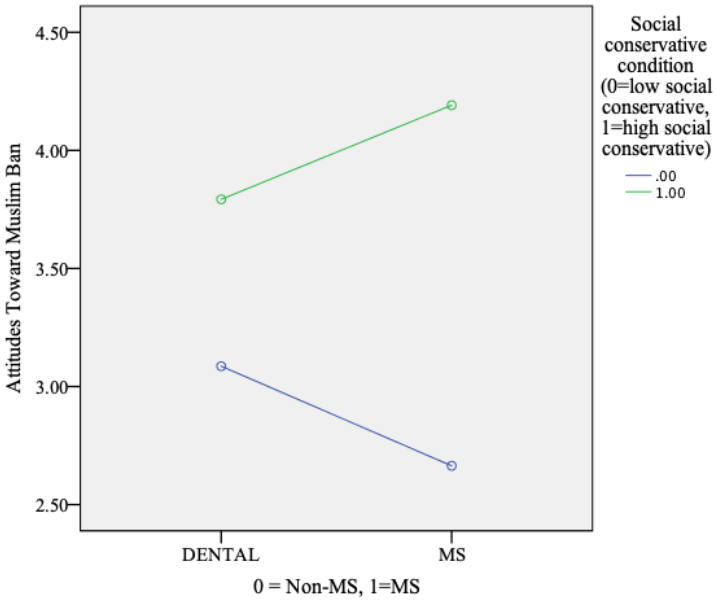

Figure 1. Interaction Effect of Mortality Salience Condition and Level of Social Conservatism on Attitudes Toward Muslim Ban.

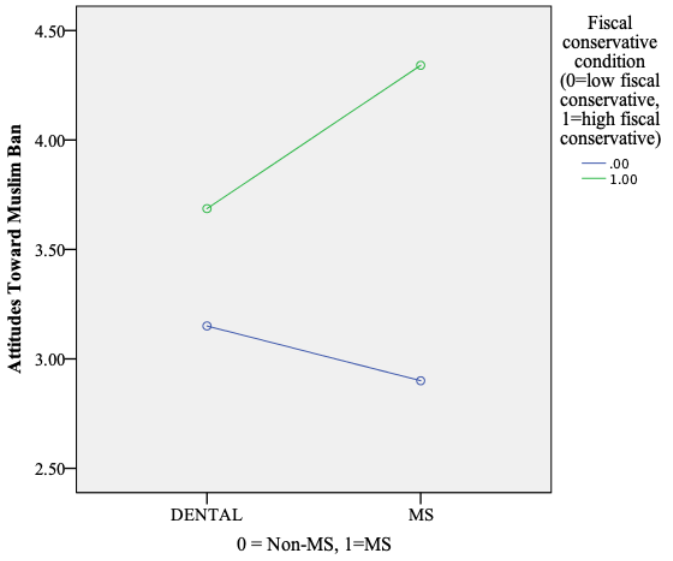

Figure 2. Interaction Effect of Mortality Salience Condition and Level of Fiscal Conservatism on Attitudes Tow ard Mus

3.3 Hypothesis 2

We expected an interaction effect between MS condition and social conservatism on perceived message quality of the editorial in support of the Muslim ban. However, results indicate no significant interaction effect, $F(1, 195)=0.09$, $p=.77$. Similarly, we did not find the predicted interaction effect between MS condition and fiscal conservatism on perceived message quality of the editorial participants were exposed to in the study, $F(1, 193)= 1.50$, $p=.22$. Thus, H2 was not supported. Overall, participants perceived the editorial written in support of the Muslim ban to generally have high message quality ($M=4.44$, $SD=1.16$).

4. Discussion

The present study tested an alternative method for measuring DTA based on the rationale that the traditional means of assessing DTA (i.e., word fragment completion task) has yielded inconsistent findings, with the manipulation check working in some TMT studies while not working as expected in other studies. Similar to the word fragment completion task death-related words in the IAT have been found to act as a death salience prime. Thus, this study asked participants to pair images with positive and negative emotion terms instead of words within our IAT and had participants focus on a secondary task (i.e., pairing black & white or color images with positive/negative terms based on the task instruction) designed to distract them from focusing on the fact that some of the images are death-related (e.g., coffin shown in a field) while others are not (e.g., picture of flowers in a field). Results showed our image-based IAT worked somewhat successfully to capture DTA following a delay. Specifically, when black and white death-related pictures were used for the IAT, participants primed or not primed with mortality salience did not differ in their strength of association scores (*D*-mean values), pairing black and white images with negative emotion terms.

Conversely, when color death-related images were incorporated into the IAT, mortality salient participants reported a significantly stronger association score pairing color images with negative emotion terms than non-mortality salient participants. Specifically, the negative *D*-mean values reflect a bias among mortality salient participants to be significantly *slower* in response latency when death-related images (embedded within other color photos) were paired with positive emotion terms compared to non-mortality salient individuals. Together, we find some empirical support for using an image-based IAT to measure DTA following a delay to mortality salience manipulations. One potential explanation for why black and white images may not have worked as well as the color images may have to do with the fact that participants may not have paid as much attention to the black and white pictures as the color images, thereby not noticing that some of the photos were death themed. To prevent priming mortality salience with the pictures, we selected photos where the death-related element was featured more in the background than in the foreground. Of course, future studies will need to be conducted to further test the validity of using this newly proposed image-based IAT as a manipulation check of DTA.

As a secondary check to ensure that we were measuring DTA and not some other construct, we examined whether mortality salient (vs. non-mortality salient) participants differed in their response to a message (i.e., editorial in support of the Muslim ban) that either aligned or was not aligned with their cultural worldview (i.e., political ideology). Based on TMT, we expected that mortality salient individuals who self-report to be high in conservatism (social or fiscal) would respond more positively to the editorial in support of the Muslim ban than those low in conservatism. MS should have motivated these individuals to reinforce their cultural worldview, as reflected in greater support of the Muslim ban. Our results confirm this expectation, as participants who were high in social or fiscal conservatism reported significantly more positive attitudes about the Muslim ban than those low in social or fiscal conservatism. However, regarding perceived message quality, MS did not have an impact. It was anticipated that mortality-salient individuals would also perceive the editorial in support of the Muslim ban higher in terms of message quality compared to non-mortality salient individuals. The results do not support this prediction. It may be that rather than message quality, we should have looked at measuring a variable such as message reactance or argument quality. Priming mortality salience may motivate individuals with high levels of conservatism to report significantly lower reactance and higher argument quality than those with low levels of conservatism (i.e., lower motivations to reinforce their cultural worldview). This prediction is speculative and will require future testing. Nevertheless, we report empirical support to show that DTA occurred as our results on attitudes toward the Muslim ban align with TMT predictions.

One of the main implications of this study is that given the criticisms lodged against the use of word-based assessments of DTA (i.e., they may serve as a MS prime), it may be worthwhile to consider using image-based measures of DTA within the context of future TMT studies. Another important implication of this study is that if the goal for TMT researchers is to try and capture the *subconscious* activation of DTA following a delay to a mortality salience prime, then care must be taken to ensure the DTA measure does not bring death thoughts into focal awareness. Participants should be redirected to focus their attention on completing of a *secondary task* where death-related thoughts are unlikely to occur at the conscious level, and only then can we measure DTA at the subconscious level. We argue that

our study provided an initial attempt at achieving this goal. Participants in completing the IAT were directed to focus not on identifying death-related versus non-death-related pictures but rather to discriminate between black and white or colored images. Future TMT studies could explore other means of accomplishing this task.

4.1 Limitations

Study findings should be considered alongside limitations. First, the study sample was comprised of college students and was fairly homogenous in terms of age and ethnicity. This may raise concerns about generalizability to populations outside the study sample. To address this issue, we used a well-established theory, reasoning that the theory generalizes beyond data collected in a specific context (Levine, 2011). Future research should use a terror-management approach to assess whether similar results to ours are found in other samples and settings. Second, this study was a pilot for assessing DTA without inducing proximal defenses. To do so, we used the IAT test. The IAT has been criticized for modest test-retest reliability and susceptibility to social desirability, especially for implicit attitudes about sensitive social issues, like race and gender (Jost, 2019). However, scores for implicit attitudes on topics outside race and gender have been shown as good predictors of behavioral outcomes (Kurdi et al., 2019). The findings need to replicated in other TMT studies to increase our cnnfidence in using an IAT-based approach to assessing DTA. Lastly, although we believe that social desirability was not an issue for the IAT, the study stimuli did use an actual "letter to the editor" to assess how partisans reacted to a real policy issue after having MS primed. Some participants may have had social desirability concerns, which is always a concern when researching sensitive social topics.

4.2 Conclusion

In closing, this study serves as an exploratory investigation into finding an alternative means for measuring DTA, an important process discussed within TMT. Previously, several TMT researchers argued that because mortality-salient individuals responded in a manner consistent with cultural worldview defense, whereas non-mortality salient individuals did not, following a delay to the mortality salience manipulation, this provided *indirect* evidence of DTA, even when the death-related word fragment completion task failed as a manipulation check. Perhaps now there is a way to check to ensure that death thought accessibility is occurring empirically and is the process responsible for the activation of cultural worldview defenses as a means to help individuals buffer against existential anxiety. Using an image-based IAT also extends previous efforts that tested forms of IAT measures to capture DTA.

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Appendix A

Black and White Death Image	
Color Non-death Image	
Black and White Non-death Image	
Color Death Image