



An empirical comparison of the Extended Parallel Process Model with the Terror Management Health Model

David M Hunt, Omar Shehryar

This is a pre-copyedited, author-produced PDF of an article accepted for publication in Health Promotion International following peer review. The version of record [An empirical comparison of the Extended Parallel Process Model with the Terror Management Health Model. Health Promotion International 37, 4 (2022)] is available online at: <https://doi.org/10.1093/heapro/daac109>.

**An Empirical Comparison of the Extended Parallel Process Model with the Terror
Management Health Model**

David M. Hunt

Associate Professor

College of Business and Economics,

Boise State University, USA

dhunt@boisestate.edu

Omar Shehryar

Professor

Jake Jabs College of Business and Entrepreneurship,

Montana State University, USA

omar@montana.edu

Acknowledgment: The authors would like to thank the editor-in-chief, Prof. Evelyne de Leeuw, the associate editor, Prof. Stephan Van den Broucke, the anonymous reviewers, and Emma FitzGerald in the journal's editorial office, for their invaluable help with the manuscript.

An Empirical Comparison of the Extended Parallel Process Model with the Terror Management Health Model

Lay Summary

In this research, we compared two psychological models that explain how people respond to fear-based health promotion campaigns. The well-established extended parallel process model predicts that when faced with a fear-arousing message, audiences evaluate their self-efficacy in performing the recommended action, as well as the efficacy of the proposed action. Next, the efficacy appraisal is weighed against the perceived level of fear and the relevance of the threat to one's personal situation to determine a response to the threat. The more recently developed terror management health model states that fear of death is a special case. When faced with a fear-arousing message that utilizes threat of death as a consequence, audiences can cling to worldviews that grant them self-esteem. As such, defensiveness evoked by the fear of death is not in response to the level of perceived threat, but the qualitative nature of the threat. This worldview defense can create undesirable responses to fear appeals containing the fear of death. Results from a laboratory experiment indicate that the established model explains audience behavior for health-related messages that utilize threats with non-fatal consequences but the terror management health model is better suited to predicting behavior for messages that utilize threat of death as a consequence.

An Empirical Comparison of the Extended Parallel Process Model with the Terror Management Health Model

The extended parallel process model posits that fear-appeal messages are processed only when message recipients perceive a critical level of threat. The more recent terror management health model suggest that, in addition to level of perceived threat, the nature of the threat also influences how target audiences process fear appeals. Specifically, fear appeals that utilize the threat of death as a consequence trigger both conscious and non-conscious responses that influence message recipients' health-related decisions. Accounting for the influence of consciousness of death helps explain maladaptive responses that extant theory has been unable to explain. Results from an experiment indicate that, when level of perceived fear was the same across participants, the extended parallel process model successfully predicted persuasive outcomes for fear appeals that utilized the threat of arrest or serious injury as a consequence of non-compliance. However, for fear appeals that utilized the threat of death as a consequence of non-compliance, as predicted by the terror management health model, ego-involvement in the health-related behavior predicted persuasive outcomes more accurately than the dual fear control and danger control processes. These findings suggest that incorporating consciousness of death and ego-involvement can avoid conceptual problems with the level-of-fear construct, provide a meaningful way to predict fear appeal responses across target audiences, and explain maladaptive responses that have eluded the explanations of extant fear appeal theories.

Keywords: extended parallel process model, terror management health model, fear appeals.

An Empirical Comparison of the Extended Parallel Process Model with the Terror Management Health Model: A New Approach for Health Promotion

Health promotion has become a central theme of life ever since COVID-19 has affected millions across the globe. As pointed out by Van den Broucke (2020), “health promotion may be [...] more important in this time of crisis than ever before”. Governments all over the world are trying to provide their citizens with the best information possible to mitigate the spread of COVID-19. The rapid contagion of the SARS-Cov-2 virus along with dire consequences of COVID-19, including death, has instilled an underlying fear among the populace. Yet, compliance with health promotion messages exhorting use of face-masks and social-distancing has been mixed.

Past research has useful perspectives to offer regarding non-compliance toward health promotion messages that are utilized when fear-arousal is present. The dominant paradigm for understanding fear-appeals and resulting behavior is Witte’s (1992) Extended Parallel Process Model (EPPM; Witte, 1992) which established fear as a key variable that influences the persuasiveness of preventative health messages. According to the theory, following a fear arousing message, it is the perceived rather than actual threat that motivates people to action (Witte, 1994). The distinction between perceived and actual threat is critical because EPPM posits that a message recipient is motivated to process a fear arousing message only if he or she perceives a threat. Additionally, EPPM posits that in order for a threat to be perceived, a critical level of fear must be achieved to induce further processing of a fear arousing preventative health message (Witte et al., 1996). If such a critical level of fear is achieved, then EPPM proposes that two distinct cognitive processes are invoked in parallel. These processes are termed danger-control and fear-control and they are comprised of the outcome of a two-part appraisal. One part

consists of an appraisal of perceived self-efficacy of the message recipient to deal with the threat and efficacy of the proposed solution. This part is aptly called the efficacy appraisal. The efficacy appraisal is weighed against a threat appraisal which consists of a cognitive evaluation of the perceived severity of a threat and the perceived relevance of the threat to the message recipient. When the efficacy appraisal outweighs the threat appraisal, message recipients are motivated to reduce or eliminate the threat by accepting the proposed solution in a fear appeal. When the threat appraisal outweighs the efficacy appraisal, message recipients are motivated to reduce or eliminate their fear by engaging in "...coping responses that diminish fear, such as defensive avoidance, denial, and reactance" (Witte, et al. 1996, pg. 320). This two-part (danger control and fear control, respectively) cognitive appraisal process is the core component of the EPPM (Witte, 1992).

Since a fundamental assumption of the EPPM is that a certain critical level of fear has to be induced in order for the two appraisal processes to ensue, Witte and colleagues provided a mathematical model to define the delicate balance between the efficacy and threat appraisal (Witte, et al. 1996). Nonetheless, the concept of level of perceived fear remains nebulous in theory and hard to quantify in practice (LaTour & Rotfeld, 1997; Rotfeld, 1988; Shehryar & Hunt, 2005). As a result, research based on EPPM and related models still cannot account for boomerang effects and maladaptive responses to fear-arousing health communication (LaTour & Tanner, 2003). Similarly, because the EPPM relies on a critical level of perceived threat, the theory predicts persuasiveness across different configurations of message components. Consequently, the ability of the EPPM to predict persuasiveness across individual differences within a target audience remains limited.

By clarifying the key constructs driving the persuasiveness of fear appeals and by identifying message conditions under which fear appeals may fail, the EPPM has paved the way for subsequent research to identify additional factors that may "...improve the explanatory and predictive power of the model..." (Maloney, Lapinski, & Witte, 2011, pg. 216). With the more recent introduction of the Terror Management Health Model (TMHM), Goldenberg and Arndt (2008) identified consciousness of death as a factor that "...can influence the motivational orientation that is most operative in the context of health decisions" (p. 1032). Consciousness of death, therefore, may influence threat and efficacy appraisals of fear appeals and health-related decisions. Witte and colleagues have also acknowledged the potential usefulness of the TMHM and have encouraged further research that could integrate the TMHM with EPPM (Maloney, Lapinski, & Witte, 2011).

The central propositions of the TMHM suggest that incorporating consciousness of death into the EPPM may improve the model's explanatory and predictive power in three important ways. First, consciousness of death could supplement measures of perceived severity of threat and address concerns that the level of fear concept is nebulous and difficult to quantify. Second, accounting for the effects of consciousness of death may reduce incidences of type II errors. Specifically, EPPM predicts that defensive mechanisms such as suppression and defensive avoidance render fear appeal messages ineffective. In contrast, TMHM suggests that depending upon the relevance of the focal behavior to a message recipient's self-esteem, initial suppression, labelled as proximal defense, against a conscious reminder of death may yet result in health-facilitating outcomes such as message acceptance once distal defenses or subconscious processing takes over after initial suppression. Finally, incorporating consciousness of death into

fear appeal studies may help account for maladaptive responses that have thus far eluded the predictive capacity of EPPM.

This study aims to improve the explanatory power of the EPPM by investigating the role of consciousness of death on outcomes of fear appeal messages. Specifically, we attempt to answer the following question: does the EPPM explain responses to fear appeals that utilize the fear of death as a consequence of non-compliance as well as it explains responses to fear appeals that utilize non-fatal consequences of non-compliance? A review of the Terror Management Health Model provides a theoretical context for our study.

Terror Management Health Model and Fear Appeals

Terror Management Theory (TMT; Greenberg, Solomon, & Pyszczynski, 1997) offers a framework for understanding peoples' reactions when confronted with their own mortality. TMT is framed by the fundamental tenet that human beings' understanding of their impending death combined with self-awareness and the instinctive drive for self-preservation engenders a tremendous potential for terror. Cognitive and behavioral mechanisms aimed at validating one's cultural worldview and at increasing one's sense of self-esteem by living up to the standards of value inherent in that worldview help individuals manage the potential terror associated with conscious awareness of mortality (Greenberg, Pyszczynski, & Solomon, 1986).

Cultural worldviews are "...humanly created and transmitted beliefs about the nature of reality shared by groups of individuals" (Greenberg, Solomon, & Pyszczynski, 1997, pg. 65). TMT's two primary hypotheses – the anxiety buffer hypothesis and the mortality salience hypothesis – are oriented around cultural worldview. The anxiety buffer hypothesis posits that validation of cultural worldviews and the enhancement of self-esteem buffer the potential anxiety

and terror associated with awareness of one's mortality. The mortality salience hypothesis posits that reminding people of their mortality activates terror management mechanisms increasing peoples' needs to defend their cultural worldviews and bolster their self-esteem. Both hypotheses are widely tested and have received substantial empirical support.

TMT researchers have integrated the central tenets of TMT into studies of health-related persuasion. Goldenberg and Arndt (2008) created a terror management health model (TMHM) that utilizes TMT to forward propositions that are directly related to fear appeal communications. The TMHM proposes that the conscious fear of death is a motivating factor in regard to health-related behaviors. However, conscious fear may be attenuated by adopting recommended health behaviors as well as by avoidance. Thus, conscious fear has a limited role in changing health-related behaviors. Alternately, the TMHM suggests that the accrual of subconscious thoughts of death has the potential to undermine the efficacy of health communications by directing action toward preserving the psychological self at the expense of physical well-being. The TMHM also suggests that health scenarios themselves can act as reminders of mortality which has implications for the adoption of recommended behaviors (Bultmann and Arndt 2019).

Incorporating TMHM into models of fear-based communication can yield three positive benefits. These include deemphasizing a reliance on level of fear to delineate the fine line between the efficacy appraisal and the threat appraisal, improving understanding of suppression, avoidance, and type II errors, and providing a theoretical and empirical explanation for maladaptive responses such as reactance and boomerang effects. We address each of these potential benefits in further detail.

Level of Fear

The EPPM model relies on the level of perceived threat as a critical element of threat appraisal. It is not the actual threat but the perceived threat that calls recipients to action (Maloney, Lapinski, and Witte, 2011). Thus, a message may fail to induce fear in segments of the audience without apriori knowledge of the message sponsor. Reliance on level of fear can thus lead to inefficient use of the message sponsor's resources. In contrast, TMT and the TMHM suggest that distinctions between different levels along a continuum of fear are theoretically tenuous. A health promotion campaign may subtly suggest that inadequate social distancing can cause COVID-19 and thus be categorized as a low-fear arousing message. However, such a message might heighten one's awareness of mortality resulting in recipients adopting behaviors that enable worldview defense. Thus, even if low levels of fear are induced, worldview defense could entail further clinging to undesirable behaviors that confer self-esteem. Past research has shown this to be the case. Ben-Ari, Florian, and Mikulincer (1999) found that drivers who gained self-esteem from reckless driving behaviors showed an even greater inclination to do so following reminders of mortality. Shehryar and Hunt (2005) found that message recipients who were ego-involved with drinking alcohol expressed greater incongruence with desirable attitudes toward drinking and driving following manipulations that made mortality salient. Upon encountering such results, EPPM would point toward the high level of fear as a possible contributor to the reactance in response to the message. However, according to TMT and the TMHM, researchers would be better served by evaluating components of fear appeal messages in terms of their potential to arouse conscious as well as subconscious thoughts of death. Thus, addressing the potential confound of the qualitative nature of fear-provoking statements (i.e., whether or not a fear appeal makes mortality salient) may help break the empirical deadlock that has produced equivocal results in research emanating from the level-of-fear paradigm.

Defensive avoidance, suppression, and type II errors

EPPM as well as other models in past research suggest that reactions to threats are governed by both fear control and danger control processes (Tanner, Hunt, & Eppright, 1991; Witte, 1992; Witte & Allen, 2000). Fear-control processes include immediate suppression of the message in order to avoid the message altogether. Suppression and defensive avoidance of threatening messages can stop further processing of a message and past research suggests that such a defense leads to message rejection (Keller, 1999; Liberman & Chaiken, 1992). The TMT approach is consistent with fear-control and danger-control processes in that it delineates responses to fear into two categories: proximal and distal defenses (Routledge, Arndt, & Goldenberg, 2004). Proximal defenses follow conscious death thoughts and lead to suppression much like the EPPM suggests. TMT posits that a temporal delay introduced after mortality salience allows death thoughts to escape conscious attention. The passage of mortality salience from conscious to subconscious thought results in a distal defense that increases self-affirmation of individuals' symbolic self to shield them from the fear of death. Advancements in testing TMT have led to empirical support for the role played by temporal delay in evoking categorically different responses. In particular, TMT studies show that introducing a delay after exposing participants to fear arousing communication can facilitate manifestation of distal defenses (Pyszczynski, Greenberg, & Solomon, 1999). TMT researchers use a filler task to introduce a time delay before participants complete the dependent measures (Arndt et al. 1997). A time delay ensures a conservative test of the mortality salience hypothesis by testing the subconscious effect of mortality salience rather than measuring immediate effects following a conscious reminder of death. This approach makes it possible to rule out suppression or

defensive avoidance. Thus, whereas the EPPM assumes that suppression of a threat renders the accompanying message ineffective, TMT shows that fear appeals may be effective in curbing behaviors once proximal defenses are let down and distal defenses are triggered. While not all fear appeals may heighten contemplation of mortality, an allowance for temporal delays may decrease type II errors and enable comparisons of results across a variety of theoretical approaches. Further, there is no evidence that introducing a temporal delay where it may be unnecessary, such as following exposure to very low levels of fear and an absence of death thoughts leads to type I errors.

Maladaptive responses

EPPM relies on the outcome of efficacy and threat appraisals to posit that desirable behaviors result when efficacy appraisal is higher than the threat appraisal. However, if the threat appraisal outweighs the efficacy appraisal, undesirable behaviors such as suppression, avoidance, and reactance may occur. Contrarily, TMHM suggests that undesirable behaviors may result even if efficacy appraisal is higher than the threat appraisal. For instance, according to EPPM adolescents and youth may not consider themselves vulnerable to death and thus exhibit a low threat appraisal. However, TMT suggests that danger-control efforts or distal defenses prompted by the subconscious fear of death also influence message acceptance. Thus, if adolescents reject a message it may not be because of suppression alone. In light of TMHM, initial suppression is not to be confounded with message rejection that may result from increased awareness of one's mortality or action that may promote self-esteem and unwittingly prioritize the integrity of the psychological self to the detriment of the physical self.

In sum, both EPPM and TMHM offer explanations for individuals' responses to fear. While the theories share fear as a common denominator, they differ in one important way. EPPM distinguishes responses to high fear from responses to low fear. In contrast, TMHM distinguishes responses to fear of death from responses to other forms of fear. Distinguishing fear of death from other types of fear allows TMHM to incorporate an important dimension of fear appeal communications not captured by extant theories. As a result, a TMHM perspective can account for potentially maladaptive responses to fear appeal communications.

Study Design

In order to compare the efficacy of EPPM and TMHM, we sought to compare three different types of fear appeals including fear of arrest, injury, and death. Our objective was to use EPPM variables including self-efficacy, efficacy of recommended solution, perceived severity of threat, and perceived relevance of threat in order to construe the efficacy and threat appraisals. In addition, we included ego-involvement as an explanatory variable that reflects investment in a worldview that is relevant to an undesirable behavior that a message sponsor is seeking to curb. Our objective is to determine whether EPPM variables explain audience responses for all types of fear. TMHM considers the fear of death as a unique fear the response to which is tempered by respondents' ego-involvement in the behavior that is targeted for change. Therefore, we attempt to study the role of ego-involvement in addition to the appraisals construed by EPPM variables in explaining responses to fear based communication. We expect that if the level of fear aroused by the three different threats is equivalent, then EPPM would predict that an efficacy appraisal surpassing the threat appraisal should lead to adaptive outcomes. In contrast, TMHM posits that in case of fear of death, ego-involvement with the targeted behavior will influence responses to

fear based communication such that respondents exhibiting high ego-involvement are likely to exhibit reactance and maladaptive responses.

Experiment

One hundred seventy eight college students (78 male, 100 female) from a large U.S. university participated in the study conducted in the context of drinking and driving. The average age was 22.8 years. Using a random number function in Excel, the packets for study conditions were random-ordered for distribution to study participants. Participants were assigned to one of four fear-appeal conditions and each group was exposed to one of four types of fear messages (fear of arrest, $n = 48$; fear of death $n = 44$; fear of serious injury, $n = 46$; control condition involving an advertisement for Jell-O which was meant to elicit no fear, $n = 40$). Each participant was given a booklet titled “Magazine Study,” containing dependent measures, control measures, and the stimuli. The booklet included distraction tasks and filler measures designed to disguise the intent of the questionnaire and manage potential demand effects. The main stimulus was a full-page anti-drinking-and-driving advertisement. The ad for the mortality-salience condition showed a family around a casket with statistics on drunk-driving deaths and the persuasive slogan “Don’t let this be the occasion for your next family gathering: Do not drink and drive.” The fear-of-arrest condition showed a person being handcuffed by a police officer and statistics including threats such as attorney fees, license revocation, and fines, along with the same slogan as the mortality salience condition. In the serious-injury ad a young man was shown in a wheel chair with statistics regarding serious injuries due to drinking and driving. In all fear conditions, a proposed solution was stated as “You think calling a cab is too much trouble? Think again”. In the control condition an ad for Jell-O dessert was featured. Statistics used in the advertisements

contained actual figures taken from the United States National Highway Traffic Safety Administration (NHTSA) website (<http://www.nhtsa.dot.gov>). Following the ads, the questionnaire measured the severity of the threat evoked by the stimuli, perceived relevance of the threat, perceived self-efficacy, perceived efficacy of the proposed solution, mortality salience evoked by the stimuli, attitude towards drinking and driving, and demographic variables. All items were measured on 7-point Likert-type scales.

Measures

Control variable: Level of fear aroused. Consistent with past research, the level of fear aroused was measured using the positive and negative affect scale (PANAS) (Watson, Clark, & Tellegen, 1988). Participants were instructed to rate their feelings on a variety of adjectives indicating positive as well as negative affective states, such as frightened, interested, inspired, excited, and nervous, among others (seven-point scale: 1 = strongly disagree, 7 = strongly agree). The complete instrument consists of 22 positive and negative states. Principal component factor analysis was used to arrive at a factor labeled “level of fear” that included the affective states labeled distressed, frightened, afraid, upset, anxious, scared, and nervous (Cronbach’s $\alpha = .89$).

Independent variable: Type of fear. To measure the qualitative dimension of fear, participants filled out a word fragment completion task that has been used in previous studies to test for mortality salience (Greenberg et al. 1994). The task required participants to complete 25 incomplete word fragments. Five of the 25 word fragments could be completed by either death-related words or neutral words. For example “d e _ _” could be completed as “dead,” “desk,” or “debt.” Similarly “g r a _ _” could be completed as “grave,” “grace,” or “grape.” Word fragments that cannot be completed with death-related words included such words as “t r _ _,” “_

ok,” and “follow.” The mean number of death-related words completed by each participant was compared across the experimental conditions. Higher means suggested greater accessibility of death-related words and provided evidence for mortality salience.

Independent variable: Ego-involvement. To reduce potential demand effects data on ego-involvement were collected two months prior to the main data collection as part of an in-class assignment. To measure level of ego-involvement with drinking alcohol, participants completed an ego-involvement scale adapted from Neese and Taylor (1994). Participants were asked to indicate their agreement with such items as “when I have a couple of drinks with my friends, I feel that I can express the real me,” “I like being known as a person who has a high tolerance for alcohol,” and “drinking alcohol is an important part of who I am” (seven-point scale: 1 = strongly disagree, 7 = strongly agree; Chronbach’s $\alpha = .80$).

Independent variable: Perceived relevance of threat. Participants’ perception of the relevance of the threat of a drinking and driving mishap was measured by items such as “How likely is it that you will be involved in an alcohol related driving accident due to your fault?” and “How likely is it that you will be involved in an alcohol-related traffic violation?” (six-point scale; 1 = impossible, 2 = highly unlikely, 3 = unlikely, 4 = likely, 5 = highly likely, 6 = inevitable; Chronbach’s $\alpha = .86$ for the scale).

Independent variable: Perceived self-efficacy. Participants self-efficacy in managing drinking and driving behavior was measured by the following items: “Calling a cab is not for me,” “I doubt I will ever call a cab after a few drinks,” and “I don’t think I’m the type who will call a cab after a few drinks” (seven-point scale: 1 = strongly disagree, 7 = strongly agree; Chronbach’s $\alpha = .71$).

Independent variable: Perceived efficacy of proposed solution. Participants responded to items measuring participants' perceptions of the efficacy of the solution proposed by the ads. Items were: "Calling a cab can reduce drunk driving accidents," "Calling a cab is too much trouble," "Calling a cab is for wimps" (seven-point scale: 1 = strongly disagree, 7 = strongly agree; Chronbach's $\alpha = .77$).

Dependent variable: Attitude congruence with advertised message. Participants rated their agreement with the following scales comprising statements expressing socially acceptable attitudes toward drinking and driving: "I think more time and effort should be spent patrolling for drunk drivers," "I think drunk driving is a very serious problem," "I think people who drink and drive have very low moral standards," "I think penalties for drunk driving should be stiffened," and "I think drunk driving is made out to be a bigger problem than it is" (reverse coded) (seven-point scale: 1 = strongly disagree, 7 = strongly agree, Chronbach's $\alpha = .80$). The advocated message in all conditions recommended that participants not drink and drive. A high score on the attitude measures indicates attitude congruence. A low score on the attitude measure is indicative of attitude incongruence.

Analysis and Results

In order to test the efficacy of the EPPM, the summated items comprising scales measuring self-efficacy, efficacy of proposed solution, perceived level of fear, and perceived relevance were converted from raw scores to standardized scores. In quantifying efficacy and threat appraisals, Witte et al. (1996) advise using standardized values of these scales. The established reason for using standardized variables is to avoid multi-collinearity in computed variables, as is the case in EPPM variables. To remain consistent in replicating the EPPM, we

followed Witte et al.'s (1994) suggestion and standardized attitude congruence with the advertised message and ego-involvement for a valid and robust comparison.

Next, a variable titled "threat appraisal" was computed in concordance with Witte et al.'s (1994, 1996) mathematical function such that:

$$\text{Threat Appraisal} = f[(\text{self efficacy} + \text{efficacy of solution}) - (\text{perceived level of fear} + \text{perceived relevance})].$$

Scores of the computed appraisal variable were standardized to be used in regression analysis. Thus, the threat appraisal variable reflects the discriminating value (Witte et al. 1996) that depicts the overall judgment made by participants following the outcome of individual efficacy and fear appraisals.

Regression analysis was conducted within each of the three fear conditions with threat appraisal as the independent variable and congruence with the advertised attitude as the dependent variable. Results are presented in Table 1.

<please insert Table 1 here>

The results indicated that for the arrest condition, appraisal was a significant predictor of attitude ($R^2 = .36$, $F_{44,1} = 24.5$, $p < .01$, $\beta = 0.598$, $t = 4.95$, $p < .01$). Thus, the EPPM successfully predicted the outcome for the condition involving fear of arrest.

For the injury condition, threat appraisal was again a significant predictor of attitude ($R^2 = .13$, $F_{39,1} = 5.1$, $p < .05$, $\beta = .355$, $t = 2.34$, $p < .05$) thus demonstrating the efficacy of EPPM. However, in the fear-of-death condition, threat appraisal was not a significant predictor of attitude ($R^2 = .05$, $F_{39,1} = .12$, $p = .732$, $\beta = .06$, $t = .344$, $p = .732$). Before concluding that the EPPM did not explain the outcome in the condition involving fear of death, it is necessary to

compare the outcomes of the threat appraisals in each condition. If threat appraisals are significantly different across the conditions then the non-response in the death condition observed by using EPPM variables can be attributed to the threat appraisal outweighing the efficacy appraisal in the condition involving fear of death. Therefore, ANOVA was conducted with appraisal as dependent variable across the three fear conditions. The mean scores for appraisal across the three fear conditions were as follows: arrest: $\mu = .04$, $\sigma = 2.72$, injury: $\mu = -.44$, $\sigma = 1.77$, death: $\mu = -.78$, $\sigma = 2.24$, control: $\mu = 1.32$, $\sigma = 1.28$. ANOVA results indicated that there was no significant difference in means of appraisal among the three fear conditions ($F_{163,3} = 7.66$, $p < .05$). In addition, a post-hoc Bonferroni test indicated that appraisal for all fear conditions was significantly different than the appraisal for the control condition. In the control condition where no fear was present, respondents' efficacy appraisal easily surpassed their threat appraisal because no threat was perceived. Further, power analysis revealed that a four-cell design with the current sample size had statistical power of 0.90 for detecting a moderate effect size of 0.4 ($p < .05$). Thus, the sample size is also adequate for the domain of measurement to detect an expected moderate effect size.

Another important variable that ought to be compared across the three fear conditions is level of fear. If level of fear is indeed different across conditions then there is reason to believe that the result observed in the condition involving fear of death is based on greater fear arousal when mortality is made salient. ANOVA with level of fear as dependent variable across fear conditions indicated that there was no significant difference in the perceived level of fear across the three fear conditions ($F_{171,3} = 19.06$, $p < .05$). In addition, the level of fear evoked in all three conditions was significantly different than the control condition.

Whereas the EPPM successfully predicted the outcomes based on efficacy and threat appraisal in the conditions involving fear of arrest and injury, the outcome for the condition involving fear of death seemed to indicate that participants exhibited no response. However, based on TMHM, when mortality is made salient, respondents' ego-involvement with the targeted behavior influences respondents' attitudes toward a behavior. Specifically, those with high ego-involvement are likely to cling to a self-esteem granting worldview thus prioritizing the psychological self regardless of whether the worldview is hurtful to their physical self.

To study the role of ego-involvement a separate regression analysis was run in the condition involving fear of death with ego-involvement as the predictor of attitude. As posited, ego-involvement was a significant predictor of attitude congruence such that greater ego-involvement led to less congruence with the advertised recommendation in the message ($R^2 = .455$, $F_{43,1} = 35.02$, $p < .01$, $\beta = -.67$, $t = -5.92$, $p < .01$). Thus, when fear of death was used, the use of ego-involvement led to an outcome that was different than that observed with the use of EPPM.

The use of EPPM would lead researchers to believe that a negative overall appraisal led to suppression and no response. However, the appraisal in the condition involving fear of death was not significantly different than the appraisal for the other fear conditions. Additionally, the average appraisal in the condition involving fear of arrest was also negative. Furthermore, the negative relationship between ego-involvement and attitude also fits the prediction based on TMHM thus providing further support that maladaptive behaviors such as reactance and boomerang effect may indeed stem from fear evoked by the threat of one's demise. As such, the fear of death is a unique variable that is responsible for outcomes unexplained by previous models of fear-based communication.

Discussion

Limitations

These results should be interpreted in consideration of two important limitations. First, the small sample of college students who participated in the study may limit the generalizability of the findings in contexts other than the population from which the sample was drawn. While the results achieved in this study cannot be generalized to all health communications audiences, drinking and driving is highly relevant to college students. The highest intoxication rates in fatal crashes are typically recorded for drivers 21 to 24 years old (27 percent; National Highway Traffic Safety Administration, NHTSA 2018). In addition, the prevalence of binge drinking among adults aged 18 to 25 is a close second (25 percent) to the highest binge drinking group of 25-34 year olds (Center for Disease Control, 2015). Thus, studying fear-appeals with a student sample in a drinking-and-driving context is both practical and justified. Nonetheless, future research could improve upon the generalizability of these findings by conducting studies in different fear appeal contexts among broader groups of participants.

Second, we were constrained in our analysis to follow statistical methods used in testing the EPPM. While this approach was required to scientifically replicate past research, the necessity of standardizing raw variables as originally done by Witte et al. (1994) may be questioned. Although standardization can arguably reduce collinearity in polynomial and interaction terms, the independent variables used in our research were simple enough to forego standardization. We repeat that standardization was done to maintain to remain consistent with the testing of the EPPM. Despite these limitations, we can draw a number of important conclusions from this research as presented next.

Conclusion

Incorporating consciousness of death and ego-involvement into fear appeal research could improve the predictive capacity of extant theory in three important and interrelated ways. First, accounting for effects of consciousness of death may help researchers avoid conceptual problems with the level-of-fear construct. Second, incorporating ego-involvement as an individual difference variable provides a meaningful and relevant way to predict fear appeal responses across different groups of message recipients. Finally, by accounting for consciousness of death and by incorporating ego-involvement, extant health communications models can better explain maladaptive responses that have eluded the explanations of fear appeal theories.

Our results suggest that threat is a more nuanced construct than is currently accounted for in the EPPM. The EPPM considers severity of threat as the sole driver of message processing and persuasive outcomes. But severity alone may not account for unique responses to fear appeals that raise conscious awareness of death. Fear appeals that utilize death as a consequence of non-compliance activate conscious thoughts of death and trigger terror management responses that have a direct bearing on health-related decisions. Thus, in addition to severity of threat, future research designs should account for differential responses to messages that utilize the threat of death as a consequence of non-compliance versus messages that threaten audiences with non-fatal consequences. Additionally, ample anecdotal evidence supports the idea that type of threat is an important variable in designing fear appeal messages in practice. For instance, some anti-smoking ads emphasize the possible fatal health hazards of tobacco while others emphasize potential negative social consequences. By excluding type of threat from past studies, the extant body of fear appeal research overlooks an important dimension that delineates the way fear appeals are implemented in practice.

Our results also suggest that ego-involvement in a health-related behavior should be included as an important individual difference variable in fear appeal and health promotion research. The parallel processes based on dual cognitive appraisals – fear appraisal and efficacy appraisal – central to the EPPM, depict the processing of fear appeals as individual efforts. Yet, very little empirical evidence supports how fear appeal responses likely differ across individual differences among message recipients. Incorporating ego-involvement into fear appeal studies can help predict how differences across message recipients likely produce different responses to fear appeals that raise conscious thoughts death. In the case of Covid-19, it is evident from the bifurcated response to health mandates involving use of masks that ego-involvement in one's political worldview has marred health promotion efforts. As stated earlier, Bultmann and Arndt (2019) point out that health concerns by their nature engender the threat of death. The subconscious threat has the potential for worldview defense, and an undesirable response to health promotion messages.

Ego-involvement is similar in conceptualization to Cho and Salmon's (2006) stages-of-readiness construct. Cho and Salmon (2006) suggest that individuals at different stages of readiness for change (Prochaska & DiClemente, 1983) are likely to react differently to fear appeals. However, ego-involvement offers a more parsimonious and meaningful mechanism by which to segment message audiences. For those who design preventative health promotion messages, it is difficult to identify stages of readiness among a target audience for a health-related promotion. In contrast, ego-involvement in a target behavior reflects a natural basis to divide a target audience based on the objective of cessation or prevention. Thus, identifying a person's stage of readiness for change may be more important for clinical considerations

whereas identifying a person's ego-involvement may be more important in message design contexts.

Taken together these findings can help explain maladaptive responses that have eluded the explanatory power of the EPPM. The EPPM accounts for three types of responses to fear appeal messages: non-response (when perceived threat is low), danger-control (when perceived fear is "sufficient" for further message processing and exceeded by perceived efficacy), or fear control (when perceived fear is "sufficient" for further message processing but exceeds perceived efficacy). By incorporating consciousness of death and ego-involvement, the explanatory power of EPPM can be expanded to account for a fourth type of response – worldview defense and maladaptive behavioral responses. That is, consciousness of death is a unifying construct that can reconcile differences between the "risk as message component" perspective of EPPM and the "risk as property of individual" perspective of RPA (Maloney et al., 2011, pg. 215).

In sum, our study provides researchers and practitioners theoretically grounded reasons to consider consciousness of death as an important message element that can improve the predictability of a message's success across audiences that differ in terms of their ego-involvement in a target behavior. That is, ego-involvement offers a meaningful, a priori variable by which to segment target audiences for preventative health promotion messages. Our results also support the general notion that exogenous variables (i.e. components of fear appeal messages) drive perceptions of threat and efficacy and experiences of fear, in turn, motivate message acceptance or rejection. Thus, we offer a meaningful comparison of EPPM with TMHM. And we demonstrate how the predictive power of EPPM could be improved by accounting for the unique psychological responses to messages that raise conscious thoughts of death.

References

- Arndt, J., Greenberg, J., Solomon, S., Pyszczynski, T., & Simon, L. (1997). Suppression, accessibility of death-related thoughts, and cultural world view defense: Exploring the psychodynamics of terror management. *Journal of Personality and Social Psychology*, 73, 5–18.
- 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, 35-45.
- Bultmann, M. N. & Arndt, J (2019). Physical Health Under the Shadow of Mortality: The Terror Management Health Model, in Routledge, C. and Vess, M. (eds), *Handbook of Terror Management Theory*, Chapter 16, Academic Press, 369-390.
- Cho, H. & Salmon C. T. (2006). Fear appeals for individuals in different stages of change: Intended and unintended effects and implications on public health campaigns. *Health Communication*, 20, 91-99.
- Goldenberg, J. L. & Arndt, J. (2008). The implications of death for health: A terror management model of behavioral health promotion. *Psychological Review*, 15, 1032–1053.
- 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). New York, NY: Springer-Verlag.
- 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., Solomon, S., & Pyszczynski, T. (1997). Terror management theory of self-esteem and cultural worldviews: Empirical assessments and conceptual refinements. *Advances in Experimental Social Psychology*, 29, 61-139.
- Keller, P. A. (1999). Converting the unconverted: The effect of inclination and opportunity to discount health-related fear appeals. *Journal of Applied Psychology*, 84, 403–415.
- LaTour, M. S., & Rotfeld, H. J. (1997). There are threats and (maybe) fear-caused arousal: Theory and confusion of appeals to fear and fear arousal itself. *Journal of Advertising*, 26, 45–59.
- LaTour, M. S. & Tanner, J. F. (2003). Radon: Appealing to our fears. *Psychology & Marketing*, 20, 377-394.
- Liberman, A. & Chaiken, S. (1992). Defensive processing of personally relevant health messages. *Personality and Social Psychology Bulletin*, 18, 669–679.
- Maloney E. K., Lapinski, M. K. & Witte, K. (2011). Fear appeals and persuasion: A review and update of the extended parallel process model. *Social and Personality Psychology Compass*, 5, 206-219.
- Neese, W. T., & Taylor, R. D. (1994). Verbal strategies for indirect comparative advertising. *Journal of Advertising Research*, 34, 56–59.
- Prochaska, J. O. & DiClemente, C. C. (1983). Stages and processes of self-change in smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51, 390–395.
- Pyszczynski, J., 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.

- Rotfeld, H. J. (1988). Fear appeals and persuasion: Assumptions and errors in advertising research. *Current Issues & Research in Advertising*, 11, 21-40.
- Routledge, C., Arndt, J., & Goldenberg, J. L. (2004). A time to tan: Proximal and distal effects of mortality salience on sun exposure intentions. *Personality and Social Psychology Bulletin*, 30, 1347–1358.
- Shehryar, O. & Hunt, D. M. (2005). A terror management perspective on the persuasiveness of fear appeals. *Journal of Consumer Psychology*, 15, 275-287.
- Tanner, J. F., Hunt, J. G., & Eppright, D. R. (1991). The protection motivation model: A normative model of fear appeals. *Journal of Marketing*, 55, 36-45.
- Van den Broucke, S. (2020). Why health promotion matters to the COVID-19 pandemic, and vice versa, *Health Promotion International*, Vol. 35, 2, 181–186.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54, 1063–1070.
- Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs*, 59, 329-349.
- Witte, K. (1994). Fear control and danger control: A test of the extended parallel process model (EPPM). *Communication Monographs*, 61, 113–134.
- Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education and Behavior*, 27, 591–615
- Witte, K., Cameron, K. A., McKeon, J., & Berkowitz, J. (1996). Predicting risk behaviors: Development and validation of a diagnostic scale. *Journal of Health Communication*, 1, 317–341.