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Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp

Case Report

Pushing up daisies: Goal orientations, death awareness, and satisfaction with life[☆]Kenneth E. Vail III^{*}, Dylan E. Horner, Brett Waggoner, Joseph P. Conti

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ARTICLE INFO

Keywords:

Terror management
Self-determination
Mortality salience
Satisfaction with life
Well-being
Goals

ABSTRACT

The present research built on terror management theory and self-determination theory to test whether heightened death awareness might undermine satisfaction with life among people oriented toward extrinsic goals (wealth, fame, attractiveness), yet lead people with stronger intrinsic goal orientations (personal growth, warm social connections) to reflect on life with greater satisfaction. In Study 1 ($n = 263$), participants indicated their relative intrinsic (vs. extrinsic) goal orientation (RIGO), were randomly assigned to either an MS or uncertainty salience condition, and rated their satisfaction with life. Study 2 ($n = 389$) was a preregistered follow-up, with the additional measurement of self-esteem and the MS comparison condition changed from uncertainty salience to a more neutral condition. Both studies found that: at low RIGO, MS (vs. comparison condition) decreased satisfaction with life; however, at high RIGO, MS increased satisfaction with life. Study 2 further found that the moderating role of RIGO was not due to its association with self-esteem, but also failed to replicate prior evidence suggesting self-esteem moderates the effect of MS on satisfaction with life. These findings inform the impact of death awareness on well-being, highlighting the role of value orientations in whether death awareness is taken as an unpleasant existential stressor or an occasion to reflect on life with greater satisfaction.

1. Introduction

The awareness of death can potentially be experienced as a daunting existential threat, increasing anxiety and undermining well-being (e.g., satisfaction with life). However, it is possible that death awareness might only be an unpleasant cause for despair when people are focused on fleeting and emotionally-unrewarding cultural values, such as wealth, fame, and physical attractiveness. When people are relatively less concerned with such external values and are instead relatively more concerned with authentic and personally-satisfying goals, such as facilitating personal growth and warm social connections, death awareness might prompt them to take a more appreciative look on the bright side of life—appreciating what they have, while they have it, and thus reflecting on life with greater satisfaction. To examine that possibility, the present research built on terror management theory (TMT; Greenberg, Vail, & Pyszczynski, 2014) and self-determination theory (Ryan & Deci, 2017) to test whether heightened death awareness might (A) undermine satisfaction with life among people oriented toward extrinsic status-oriented goals, yet (B) lead people with more intrinsic

goal orientations to take the opportunity to reflect on life with greater satisfaction.

1.1. TMT and well-being

TMT (Greenberg et al., 2014) posits that humans' awareness of mortality represents an existential threat, and that as a result people often strive to mitigate that threat by living up to sociocultural standards and values offering a symbolic sense of permanence. From this perspective, cultural worldviews function, in part, to offer a path to a sense of permanence by specifying beliefs, standards, and values that promise some form of secular legacy (work, family, education, art, science, etc.) and/or religious afterlife (e.g., heaven). Self-esteem, then, serves as an indicator of how well one is doing at living up to those standards and values. The bulk of TMT research has been guided by the *mortality salience hypothesis* (Greenberg et al., 1990; Routledge & Vess, 2019), which posits that if cultural worldview systems and self-esteem help manage existential concerns about death, then increasing mortality salience (MS) should motivate people to bolster and defend their

[☆] This paper has been recommended for acceptance by Kimberly Rios

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<https://doi.org/10.1016/j.jesp.2019.103891>

Received 11 November 2018; Received in revised form 22 August 2019; Accepted 24 August 2019

Available online 10 September 2019

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worldviews and strive for self-esteem. This hypothesis has been empirically supported in hundreds of different studies in over 20 countries on at least 5 continents (Burke, Martens, & Faucher, 2010; Routledge & Vess, 2019).

However, despite the large amount of research examining these basic terror management processes, relatively little work has focused on a core assumption of the theory: that death awareness represents a threat to psychological well-being. One early study found that watching a death-related film clip increased anxiety unless participants had their self-esteem experimentally boosted (Greenberg et al., 1992). More recently, three studies found that MS increased death anxiety, unless people had heightened levels of meaning in life (Routledge & Juhl, 2010), nostalgia proneness (Juhl, Routledge, Arndt, Sedikides, & Wildschut, 2010), or personal need for structure (Routledge, Juhl, & Vess, 2013). Likewise, when self-esteem was not heightened, death-related cognition increased negative affect and state anxiety and decreased meaning in life and subjective vitality (Routledge et al., 2010). Yet, although *satisfaction with life* (SWL) is a central component of overall well-being—systematically associated with positive and negative affect, subjective vitality, and physical and mental health (Pavot & Diener, 2008, 2013)—just one prior study (Routledge et al., 2010, Study 1) has directly examined the impact of death-related cognitions on overall SWL. The present research therefore further explored, in part, the possibility that MS might decrease SWL.

1.2. The moderating role of personal value orientations

Yet, although theory and some initial research suggests that MS may represent a threat to life satisfaction, there may be certain conditions under which death awareness may instead prompt a more appreciative and satisfying reflection on life. Research driven by self-determination theory (SDT; Ryan & Deci, 2017 for review) has focused on revealing the conditions that lead to the “positive” side of existential motivation, such as personal growth and well-being, and finds that people experience the greatest benefit to well-being when they pursue authentic and personally-satisfying values. On that point, SDT research (Kasser, 2002; Kasser & Ryan, 1996) distinguishes between two broad types of personal value orientations: *extrinsic goals* oriented toward external, culturally-prescribed values, such as wealth, fame, and physical attractiveness; and *intrinsic goals* oriented toward more internal needs, such as goals for personal growth and social connections.

Strong sociocultural emphasis on the status-oriented extrinsic goals often leads people to place high value on those goals (Kasser, 2002). And, perhaps as a result, although people generally value and pursue both extrinsic and intrinsic goals, they tend to overestimate the rewards and underestimate the costs of pursuing extrinsic goals and incorrectly believe that accomplishing extrinsic goals will make them happiest (Sheldon, Gunz, Nichols, & Ferguson, 2010). That is, despite their optimistic forecast, those who value (and even those who actually accomplish) extrinsic goals tend to report lower happiness and SWL. In contrast, those who more strongly value intrinsic goals have a better integrated sense of self and report satisfying feelings of autonomy, competence, and relatedness, as well as greater happiness, vitality, and satisfaction with life (Kasser & Ryan, 1996; Niemiec, Ryan, & Deci, 2009; Sheldon et al., 2010). Additionally, those with more self-determined orientations tend to perceive difficult situations as invigorating challenges rather than threats, resulting in reduced anxiety and reduced perceptions of existential threat (Lynch, Plant, & Ryan, 2005; Quested et al., 2011).

Likewise, intrinsic orientations may influence reactions to death awareness. For example, on the one hand, much TMT research has suggested that death awareness can often be perceived as existential threat, increasing anxiety and undermining well-being (Routledge & Juhl, 2010). Death awareness also motivates cultural worldview defense (Routledge & Vess, 2019) and efforts to strive to attain extrinsic cultural goals of wealth (Arndt, Solomon, Kasser, & Sheldon, 2004),

fame (Greenberg, Kosloff, Solomon, Cohen, & Landau, 2010), and physical attractiveness (Cox et al., 2009; Kosloff, Greenberg, Sullivan, & Weise, 2010). Yet, on the other hand, not all people are strongly oriented toward extrinsic cultural values; some are instead more strongly oriented toward intrinsic goals—in which case, MS might not necessarily motivate cultural worldview defenses and esteem striving. Indeed, MS increased worldview-relevant self-esteem striving in the form of self-serving bias (Mikulincer & Florian, 2002), whereas personal growth orientation attenuated self-serving bias (Park, Bauer, & Arbuckle, 2009); MS increased adherence to sociocultural health appeals (exercise, smoking cessation, tanning; Arndt et al., 2009) and worldview defenses (Williams, Schimel, Hayes, & Martens, 2009) among people with high, but not low, extrinsic esteem orientation; MS increased worldview defense, but not if participants first engaged in a creative activity (Routledge, Arndt, & Sheldon, 2004) or were high in openness to experience or curiosity (Boyd, Morris, & Goldenberg, 2017); and MS also increased financial greed and worldview defense among people with stronger extrinsic, but not intrinsic, goal orientations (Cozzolino, Staples, Meyers, & Samboceti, 2004; Vail, Horner, & Conti, 2019). Together, these findings suggest that MS is perceived as an existential threat and motivates defensive worldview-relevant strivings when individuals have stronger extrinsic orientations, but not when they have stronger intrinsic orientations.

However, no prior work has directly explored the idea that people with strong intrinsic goal orientations may respond to death reminders with a more appreciative and satisfying reflection on life. The only prior work connecting intrinsic and extrinsic goal orientations to death-related concerns was a correlational study (Van Hiel & Vansteenkiste, 2009), which found that greater intrinsic vs. extrinsic goal attainment was associated with: reduced depressive symptoms, despair, and death anxiety; and greater ego-integrity, death acceptance, and well-being (vitality, SWL). This work suggests that people with a stronger intrinsic goal orientation do not view death as an anxiety-provoking existential threat, but instead accept death in a more appreciative way, and perhaps therefore reflect on the precious gift of life with greater satisfaction (see also King, Hicks, & Abdelkhalik, 2009). But no research has yet explored whether death awareness causes individuals with stronger intrinsic goal orientations to look on the bright side of life in this more appreciative way, and thus experience greater life satisfaction. The present research was therefore designed to directly investigate that possibility.

1.3. The present research

The present analysis suggests that death awareness would undermine SWL among people relatively more oriented toward extrinsic goals, but instead facilitate a more appreciative reflection on life (increased SWL) among people relatively more oriented toward intrinsic goals. In two studies exploring that possibility, participants first indicated their intrinsic and extrinsic goal orientations; following prior research (Sheldon & Krieger, 2014; Vail et al., 2019), relative intrinsic goal orientation (RIGO) scores were computed such that low RIGO scores indicated stronger extrinsic goal orientations, whereas higher RIGO scores indicated stronger intrinsic goal orientations. Participants were then randomly assigned to either an MS condition or a comparison prime condition, and subsequently rated their satisfaction with life. The present analyses led to the hypothesis that MS (vs. control topics) would decrease SWL among participants with low RIGO scores but increase SWL among those with high RIGO scores.

2. Study 1

2.1. Sample size planning

The present research adopted the strategy of selecting a minimally important effect size threshold for sample size planning. Using an a-

priori power analysis for F-family tests (G*Power; Faul, Erdfelder, Buchner, & Lang, 2009), we selected effect size of $f^2 = 0.05$ (a small effect size), and set power to 0.80 for detecting effects at $p = .05$, with 3 total predictors and 1 tested predictor (the interaction term); the analysis recommended a minimum of 159 participants.

2.2. Participants

A total of 263 participants were recruited at a mid-sized university via a research exposure program, and those who participated were compensated with partial credit toward a departmental research exposure requirement. A sensitivity power analysis for F-family tests (G*Power; Faul et al., 2009), with power set to 0.80 for detecting effects at $p = .05$, with 3 total predictors and 1 tested predictor (the interaction term), found that this sample size enabled the detection of interaction effect sizes of at least $f^2 = 0.03$ (a small effect size). The sample tended to be college-age adults (age $M = 20.01$, $SD = 4.77$, 2 did not report; years education $M = 12.53$, $SD = 1.16$, 3 did not report), including 188 females and 69 males (6 did not report); mostly White (169 Caucasian, 53 African-American, 10 Asian/Pacific Islander, 14 Hispanic, 16 "other," 1 did not report); and typically Christian (165 Christian, 4 Jewish, 6 Muslim, 4 Buddhist, 1 Hindu, 22 atheist, and 58 "other," 3 did not report).

2.3. Materials and procedure

The present study was conducted with IRB approval. All measures, manipulations, and exclusions are disclosed here, and data collection was completed before analysis. Participants attended a laboratory session where they were greeted by an experimenter who obtained informed consent and then administered the following materials (available in the online supplement) in the following order.

2.3.1. Goal orientation measure

To measure the relative importance of intrinsic and extrinsic goals, participants completed the 35-item Aspirations Index (Kasser & Ryan, 1996), which used 5 items each to assess the importance of three extrinsic goals (wealth, fame, and image; $\alpha = 0.90$) and three intrinsic goals (personal growth, positive relationships, and contributing to one's community; $\alpha = 0.92$).¹ The sentence stem, "How important is this to you..." was presented at the top of the page, and the importance of each item was measured using a 6-point Likert-type scale (1 = *Not at all*, 6 = *Very*). Following Kasser and Ryan (1996) and more recent work (Prentice & Sheldon, 2015; Sheldon & Krieger, 2014), relative intrinsic goal orientation (RIGO) was computed by subtracting the mean importance of extrinsic goals from the mean importance of intrinsic goals.² Scores were normally distributed ($M = 1.31$, $SD = 0.80$; skew = 0.18, SE = 0.15; kurtosis = 0.21, SE = 0.30) and nearly all participants (252 of 263) explicitly valued intrinsic over extrinsic goals (a common finding; Kasser, 2002; Schmuck, Kasser, & Ryan, 2000),

¹ Five items measure a health-oriented goal, which is not included as either an extrinsic nor intrinsic goal. Due to a human error, item number four (an intrinsic goal item, see supplemental materials) was accidentally omitted from the Aspirations Index in Study 1; the remainder of the measure was administered correctly. The full measure, including item four, was correctly administered in Study 2.

² We computed the RIGO variable as a difference score for two reasons: 1) because the importance of intrinsic *relative to* the importance of extrinsic (the difference score, showing which orientation is given greater weight by an individual) is the key variable of interest here, whereas the stand-alone mean scores for intrinsic and extrinsic goal orientations would not capture that information; and 2) because, following the aforementioned logic, that is how the measure was originally designed to be computed and analyzed (Kasser & Ryan, 1996) and that is how other recent SDT research has computed and analyzed it (Prentice & Sheldon, 2015; Sheldon & Krieger, 2014).

such that higher scores indicated stronger RIGO and lower scores indicated weaker RIGO or a roughly equal balance with extrinsic goal orientation.

2.3.2. Mortality salience

Following previous research (Gailliot, 2012; Greenberg et al., 2003, 1990), participants were randomly assigned to complete one of two versions of a "Projective Life Attitudes Assessment." In the MS condition, participants responded to the prompts, "Please briefly describe the emotions that the thought of your own death arouses in you," and "Jot down, as specifically as you can, what you think happens to you as you physically die and once you are physically dead." The control condition used a parallel "personal uncertainty" prompt: "Please briefly describe the emotions that the thought of your being uncertain arouses in you," and "Jot down, as specifically as you can, what you think physically will happen to you as you feel uncertain." This comparison condition was chosen to test the suggestion that MS exerts effects because it evokes personal uncertainty.

2.3.3. Delay and distraction

Next, participants completed the 20-item positive and negative affect schedule (PANAS, Watson & Clark, 1992), as well as a brief 3–5 minute reading task (an excerpt taken from *The Growing Stone* by Albert Camus, 1957), to provide the task-switching distraction needed to observe the consequences of non-conscious death awareness (Pyszczynski, Greenberg, & Solomon, 1999; Routledge & Vess, 2019 for review). This procedure is based on research finding that conscious awareness of death first motivates efforts to remove death thoughts from consciousness by suppressing them or reducing the direct threat of death (e.g., health and safety checks). However, when moved outside of focal awareness (e.g., subliminal primes, or an explicit MS prime followed by delay/distracter tasks), death awareness exerts a non-conscious influence on motivation and well-being.

2.3.4. Satisfaction with life

Next, participants completed a standard measure of SWL (Diener, Emmons, Larsen, & Griffin, 1985) which is comprised of five Likert-type items (1 = *Strongly disagree*, 6 = *Strongly agree*) including statements such as "I am satisfied with life" and "The conditions of my life are excellent"; a mean score was calculated such that higher scores indicated greater satisfaction with life ($\alpha = 0.88$; $M = 3.89$, $SD = 1.02$; skew (SE) = -0.33 (0.15); kurtosis (SE) = -0.15 (0.30)).

2.3.5. Demographics

Participants then completed a questionnaire recording age, sex, race, education level, political orientation, and religious affiliation, and then were fully debriefed.

2.4. Results

Multiple regression methods were used to examine the RIGO \times 2 (MS vs. uncertainty) interaction on SWL. RIGO scores were centered about the mean, the MS manipulation was dummy-coded, and the interaction term was computed by multiplying them. RIGO and MS were entered in the first step and the interaction term entered in the second. Materials, anonymized data, and commented code are available at: osf.io/kx9dm.

There was no main effect of MS ($F(1, 261) = 0.17$, $\eta_p^2 < 0.01$, $p = .68$), nor a main effect of RIGO ($\beta = -0.01$, $t(261) = -0.16$, $p = .87$). However, there was a significant RIGO \times MS interaction, $\Delta F(1, 259) = 10.09$, $\Delta R^2 = 0.04$, $p = .002$. The nature of the interaction was examined by adjusting the RIGO scores $\pm 1SD$; estimated mean SWL scores are reported in Table 1. Among those with lower ($-1SD$) RIGO scores, SWL was lower in the MS condition than the uncertainty condition ($\beta = -0.22$, $t(259) = -2.56$, $p = .01$). In contrast, among those with higher ($+1SD$) RIGO scores, SWL was higher in the MS

Table 1
Estimated mean satisfaction with life scores, at ± 1 SD relative intrinsic goal orientation (RIGO), in the MS and the uncertainty condition.

	-1SD RIGO		+1SD RIGO		n
	M	SE	M	SE	
Mortality salience	3.63	0.14	4.08	0.12	138
Personal uncertainty	4.08	0.12	3.73	0.13	125

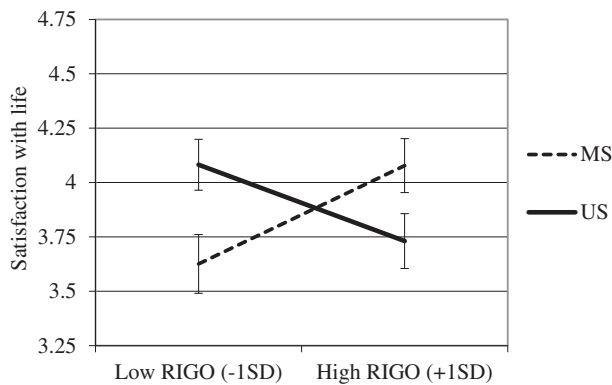


Fig. 1. MS decreased satisfaction with life among participants with low relative intrinsic goal orientation, but increased it among those with stronger intrinsic goal orientation.

Note. MS = mortality salience; US = uncertainty salience; RIGO = relative intrinsic goal orientation.

condition than the uncertainty condition ($\beta = 0.17$, $t(259) = 1.96$, $p = .05$). From another perspective: Simple slopes analyses revealed that, when reminded of personal uncertainty, RIGO was negatively related to SWL, $\beta = -0.17$, $t(259) = -2.15$, $p = .03$; but when reminded of mortality, RIGO was positively associated with SWL, $\beta = 0.22$, $t(259) = 2.34$, $p = .02$ (see Fig. 1).

2.5. Discussion

Study 1 found evidence consistent with the hypothesis that MS (vs. uncertainty) would decrease SWL among participants with low RIGO scores but increase SWL among those with high RIGO scores. However, Study 1 also raises two questions regarding the comparison condition topic and whether the RIGO effect can be explained by self-esteem.

First, although prior research has found that greater RIGO is typically associated with various indicators of personal growth and well-being, including happiness, vitality, and SWL (Kasser & Ryan, 1996; Niemiec et al., 2009; Sheldon et al., 2010), Study 1 found a more nuanced pattern depending on the prime condition. In the MS condition, RIGO was positively associated with SWL, converging with that prior SDT research and consistent with the present analysis. But in the uncertainty salience condition, RIGO was negatively associated with SWL, which diverges from the prior SDT literature. Thus, it may be the case that the distinct mechanisms of death awareness and uncertainty have opposite impacts on SWL as a function of goal orientations: MS may fuel existential threat and growth-oriented experiences, as the present analysis suggests; whereas uncertainty may, for some unknown reason, increase SWL among those with stronger extrinsic orientations and decrease SWL among those with intrinsic orientations. The RIGO slopes were sufficiently powered, but without a true neutral control condition in Study 1, it is impossible to know whether the RIGO-SWL slope observed in the MS condition was different from what might have been observed under more neutral “baseline” conditions.

Second, much prior SDT research has documented that self-esteem is related to RIGO (Ryan & Deci, 2017). There are a number of possible

reasons for a positive relationship between self-esteem and RIGO: 1) it may be that people with low self-esteem are less secure and are thereby motivated to accrue self-esteem by living up to cultural (extrinsic) values; 2) it may be that extrinsic values are based on constantly evolving external contingencies of social worth (comparative judgments of wealth, fame, attractiveness) and thus do not make lasting contributions to self-esteem; 3) it may be that heightened self-esteem provides security enough to allow people to expand their interests to intrinsically meaningful goals; and 4) it may be that intrinsic goals are more inherently rewarding (personal growth and open-mindedness, building positive relationships and communities) and thus foster more positive self-esteem. But regardless of the underlying reason for the relationship, the connection between RIGO and self-esteem is important to note because one prior TMT study found that MS reduces SWL among those with low, but not high, self-esteem (Routledge et al., 2010). Thus, one possibility is that self-esteem could be an underlying (mediating) mechanism explaining why RIGO moderated the relationship between MS and SWL.³ However, although MS similarly reduced SWL among those with low RIGO (Study 1) and those with low self-esteem (Routledge et al., 2010), we note that high RIGO is conceptualized as an appreciative growth orientation whereas self-esteem is not necessarily so; indeed, MS increased SWL among those with high RIGO but not among those with high self-esteem. Thus, a second possibility is that although RIGO may be related to self-esteem, RIGO and self-esteem likely moderate the impact of MS on SWL in different ways and for different reasons. As a result, the moderating effect of RIGO may be independent from and not mediated by self-esteem.

3. Study 2

Study 2 sought to address each of the abovementioned concerns: first, in Study 2 we replaced the uncertainty salience condition with a more neutral prime (television salience) to better estimate the natural/baseline RIGO-SWL relationship; and second, to explore the possibility that self-esteem might offer an alternative explanation, in Study 2 we measured self-esteem in addition to RIGO (Aspirations Index).

Study 2 was preregistered on the Open Science Framework (osf.io/cyhbn). Participants first indicated their intrinsic and extrinsic goal orientations as well as their self-esteem level. Then participants were randomly assigned to either an MS condition or a neutral prime (TV salience) condition, and subsequently rated their SWL. As documented in the preregistration form, the present analyses led to a target hypothesis and two competing exploratory hypotheses:

1. Target hypothesis: MS (vs. neutral topic) should decrease SWL among participants with low RIGO scores but increase SWL among those with high RIGO scores.
2. Exploratory hypotheses 1: RIGO is positively associated with self-esteem; MS impairs SWL among those with low self-esteem and increases SWL among those with high self-esteem; self-esteem mediates the effect of RIGO in moderating the relationship between MS and SWL.
3. Exploratory hypotheses 2: RIGO is positively associated with self-esteem; MS impairs SWL among those with low but not high self-esteem; self-esteem does not mediate the effect of RIGO in moderating the relationship between MS and SWL.

3.1. Sample size planning

As in Study 1, using an a-priori power analysis for F-family tests (G*Power; Faul et al., 2009), we selected effect size of $f^2 = 0.05$ (a small effect size), and set power to 0.80 for detecting effects at $p = .05$, with 3 total predictors and 1 tested predictor (the interaction terms);

³ Thanks to an anonymous reviewer for pointing out this connection.

the analysis recommended a minimum of 159 participants.

3.2. Participants

As per the preregistration plan, participants were recruited via both a research panel company (TurkPrime.com) and via a mid-sized university research exposure program. The research panel company was hired to reach participants throughout the USA on April 25, 2019, and participants who completed the study were compensated with US\$1.00. Four hundred thirty-four such respondents clicked the link and began the study; 15 provided no data beyond the informed consent form, 20 discontinued before completing the dependent measure, and 34 failed one or both of the attention check items (described below) and were excluded listwise; the remaining 365 were included in the final sample. The university research pool participants were recruited the week of April 24 to May 2, and compensated with partial credit toward a departmental research exposure requirement. Thirty-nine such participants clicked the link and began the study; all completed the study; 15 failed one or both of the attention check items and were excluded listwise; the remaining 24 were included in the final sample.

The final sample included 389 participants, which tended to be middle-age adults (age $M = 30.53$, $SD = 10.76$, 2 did not report; years education $M = 14.35$, $SD = 2.87$, 5 did not report), including 165 females and 222 males (2 did not report); mostly White (267 Caucasian, 48 African-American, 34 Asian/Pacific Islander, 29 Hispanic, 4 American Indian/Native Alaskan, 4 “other,” 3 did not report); and typically Christian (234 Christian, 5 Jewish, 3 Muslim, 7 Buddhist, 3 Hindu, 86 atheist, and 50 “other,” 1 did not report). A sensitivity power analysis for F-family tests (G*Power; Faul et al., 2009), with power set to 0.80 for detecting effects at $p = .05$, with 3 total predictors and 1 tested predictor (the interaction term), found that this sample size enabled the detection of interaction effect sizes of at least $f^2 = 0.02$ (a small effect size).

3.3. Materials and procedure

The present study was conducted with IRB approval. All measures, manipulations, and exclusions are disclosed here, and data collection was completed before analysis. Participants completed the study online; the Qualtrics web-based research platform administered the following materials (available in the online supplement) in the following order.

3.3.1. Goal orientation measure

As in Study 1, participants completed the 35-item Aspirations Index (Kasser & Ryan, 1996), which used 5 items each to assess the importance of three extrinsic goals (wealth, fame, and image; $\alpha = 0.95$) and three intrinsic goals (personal growth, positive relationships, and contributing to one's community; $\alpha = 0.91$). The importance of each item was measured using a 6-point Likert-type scale (1 = *Not at all*, 6 = *Very*). Again, relative intrinsic goal orientation (RIGO) was computed by subtracting the mean importance of extrinsic goals from the mean importance of intrinsic goals; scores were normally distributed ($M = 2.04$, $SD = 1.42$; skew = 0.18, SE = 0.12; kurtosis = -0.98, SE = 0.25) and nearly all participants (364 of 389) valued intrinsic over extrinsic goals (Kasser, 2002; Schmuck et al., 2000), such that higher scores indicated stronger RIGO and lower scores indicated weaker RIGO or a roughly equal balance with extrinsic goal orientation.

3.3.2. Self-esteem measure

Participants completed the 10-item Rosenberg self-esteem scale (Rosenberg, 1965; $\alpha = 0.93$) using a 6-point Likert-type scale (1 = *Strongly disagree*, 6 = *Strongly agree*). An example item is: “I take a positive attitude toward myself.” Reverse phrased items were reverse coded, and the mean score calculated such that higher scores indicated greater self-esteem.

3.3.3. Mortality salience

As in Study 1, participants were randomly assigned to complete one of two versions of a “Projective Life Attitudes Assessment.” In the MS condition, participants responded to the prompts, “Please briefly describe the emotions that the thought of your own death arouses in you,” and “Jot down, as specifically as you can, what you think happens to you as you physically die and once you are physically dead.” The control condition, however, was changed to use a more neutral “television salience” prompt: “Please briefly describe the emotions that the thought of watching television arouses in you,” and “Jot down, as specifically as you can, what you think physically happens to you as you watch television.” This comparison condition was chosen to better estimate natural/baseline effects.

3.3.4. Delay and distraction

As in Study 1, participants completed the 20-item PANAS, as well as a brief 3–5 minute reading task (an excerpt taken from *The Growing Stone* by Albert Camus, 1957), to serve as the requisite task-switching distraction (Pyszczynski et al., 1999; Routledge & Vess, 2019).

3.3.5. Satisfaction with life

As in Study 1, participants completed the 5-item measure of SWL (Diener et al., 1985); a mean score was calculated such that higher scores indicated greater SWL ($\alpha = 0.89$; $M = 4.05$, $SD = 1.11$; skew (SE) = -0.57 (0.12); kurtosis (SE) = -0.06 (0.25)).

3.3.6. Demographics

Participants then completed a questionnaire recording age, sex, race, education level, political orientation, and religious affiliation, and then were fully debriefed.

3.3.7. Attention check items

As per the preregistration plan, one attentiveness-check item (“For this item, select the ‘slightly important’ option”) was inserted within the Aspirations Index and another (“For this item, please select the ‘somewhat agree’ option”) was inserted in the satisfaction with life measure.

3.4. Results

3.4.1. Target analyses: RIGO as moderator

Multiple regression methods were again used to examine the RIGO \times 2 (MS vs. TV salience) interaction on SWL. RIGO scores were centered about the mean, the MS manipulation was dummy-coded, and the interaction term was computed. RIGO and MS were entered in the first step and the interaction term entered in the second. Materials, anonymized data, and commented code are available at: <https://osf.io/kxmd9/>.

There was no main effect of MS ($F(1, 387) = 0.001$, $\eta_p^2 < 0.001$, $p = .98$), though this time there was a main effect of RIGO such that it was positively associated with SWL ($\beta = 0.23$, $t(387) = 4.63$, $p < .001$). However, there was also a significant RIGO \times MS interaction, $\Delta F(1, 385) = 8.71$, $\Delta R^2 = 0.02$, $p = .003$. The nature of the interaction was examined by adjusting the RIGO scores \pm 1SD; estimated mean SWL scores are reported in Table 2. Among those with lower (-1SD) RIGO scores, SWL was lower in the MS than the TV salience condition ($\beta = -0.15$, $t(385) = -2.10$, $p = .037$). In contrast,

Table 2

Estimated mean satisfaction with life scores, at \pm 1SD relative intrinsic goal orientation (RIGO), in the MS and the TV salience condition.

	-1SD RIGO		+1SD RIGO		n
	M	SE	M	SE	
Mortality salience	3.63	0.11	4.48	0.11	182
TV salience	3.95	0.11	4.16	0.11	207

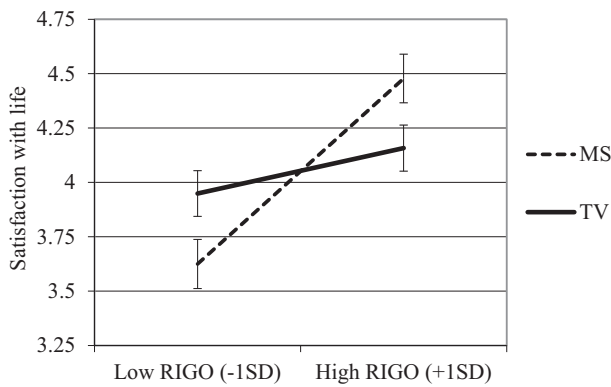


Fig. 2. MS decreased satisfaction with life among participants with low relative intrinsic goal orientation, but increased it among those with stronger intrinsic goal orientation.

Note. MS = mortality salience; TV = television salience; RIGO = relative intrinsic goal orientation.

among those with higher (+1SD) RIGO scores, SWL was higher in the MS than the TV salience condition ($\beta = 0.14$, $t(385) = 2.08$, $p = .038$). From another perspective: Simple slopes analyses revealed that, in the TV salience condition, RIGO tended to be positively related to SWL, $\beta = 0.09$, $t(385) = 1.40$, $p = .16$; but when reminded of mortality, RIGO was significantly and strongly positively associated with SWL, $\beta = 0.38$, $t(385) = 5.35$, $p < .001$ (see Fig. 2).

3.4.2. Exploratory analyses: Self-esteem as competing moderator

Following the preregistered analysis plan, we then checked zero-order correlations and found that RIGO was indeed positively associated with self-esteem, $r = 0.45$, $p < .001$. Thus, we then tested the possible Self-esteem \times MS interaction on SWL scores using the same multiple regression techniques described above for the RIGO \times MS interaction.

There was no main effect of MS (described above), though there was a main effect of self-esteem such that it was strongly positively associated with SWL ($\beta = 0.57$, $t(387) = 13.68$, $p < .001$). However, there was no significant Self-esteem \times MS interaction, $\Delta F(1, 385) = 0.07$, $\Delta R^2 < 0.001$, $p = .786$. The lack of Self-esteem \times MS interaction rules out self-esteem as a possible mediator in the RIGO \times MS interaction reported above. However, for transparency, we nevertheless explored the interaction as was done for RIGO. Among those with lower (-1SD) self-esteem scores, SWL was lower in the MS than the TV salience condition ($\beta = -0.04$, $t(385) = -0.69$, $p = .49$); and (in contrast to the RIGO pattern described above), among those with higher (+1SD) self-esteem scores, SWL was also lower in the MS than the TV salience condition ($\beta = -0.02$, $t(385) = -0.30$, $p = .76$). Simple slopes analyses revealed that self-esteem tended to be positively related to SWL both in the TV salience condition ($\beta = 0.56$, $t(385) = 9.41$, $p < .001$) and when reminded of mortality ($\beta = 0.58$, $t(385) = 9.92$, $p < .001$).

Although self-esteem was correlated with RIGO, self-esteem did not moderate the impact of MS on SWL; nor did the (non-significant) Self-esteem \times MS interaction pattern resemble the RIGO \times MS interaction pattern. These findings suggest that self-esteem did not explain (mediate) the role of RIGO in the present findings. However, we further explored the question by conducting a formal test of the possible conditional indirect effect (mediation) of RIGO \rightarrow self-esteem \rightarrow satisfaction with life within the MS and TV salience conditions, using model 15 (see supplemental materials Fig. S1, Table S1 for statistical details) of the PROCESS statistical macro for SPSS (Hayes, 2017), which used a bootstrapping method (5000 bootstrapped resamples) to estimate the various path coefficients. The model again failed to find the Self-esteem \times MS interaction and found the (RIGO \rightarrow self-esteem \rightarrow SWL) relationship did not differ by condition. We also found that the RIGO \times

MS interaction pattern remained, similar to that reported in the target analysis section above, even when controlling for self-esteem and the self-esteem \times MS interaction (see supplemental materials for details).

4. Brief discussion

Study 2 addressed three lingering concerns from Study 1. First, it conceptually replicated the finding that MS (vs. comparison topic) decreased SWL among participants with low RIGO scores but increased SWL among those with high RIGO scores. Second, it replicated prior findings that under true neutral “baseline” conditions RIGO was positively associated with SWL, and further revealed that MS accentuated that relationship. And third, it found that although RIGO was indeed related to self-esteem, there was no Self-esteem \times MS interaction, ruling out the idea that self-esteem was a possible mediator of the presently focal RIGO \times MS interaction.

5. General discussion

Two studies found evidence consistent with the target hypothesis: that death awareness would harm SWL when people were oriented toward extrinsic goals, but facilitate an increase in SWL when oriented toward intrinsic goals. This finding both extends and qualifies the prior literature in a number of ways, and also points the way to some more substantial theoretical advances that may lie ahead.

First, although the bulk of TMT research has explored the impact of MS on worldview defenses and worldview-relevant strivings, relatively little work has explored the impact of death awareness on well-being. This is a notable gap in the literature, given that a core assumption of TMT is that death awareness typically represents a threat to well-being. Further, the little prior TMT research on “well-being” has typically focused on anxiety and negative affect, with just one prior study (Routledge et al., 2010) exploring the impact of death awareness on SWL specifically, despite SWL being a central component of well-being (Pavot & Diener, 2008, 2013). The present research therefore further explored the impact of MS on SWL and similarly found that, when participants had a more extrinsic cultural orientation (low RIGO), MS did indeed harm well-being by undermining SWL.

Second, the present research also points to a more substantive advance in the current understanding of the relationship between existential threat and growth orientations. When prior studies have investigated the impact of death awareness on well-being, they have typically explored whether activated psychological buffers can prevent MS from harming well-being. In fact, that work not only found that MS can produce detrimental effects on psychological well-being, but—consistent with TMT—this threat to well-being can be mitigated when certain sociocultural buffers are elevated (Juhl & Routledge, 2016; Routledge et al., 2010). However, no prior research has investigated conditions under which death awareness might produce a more positive, appreciative, growth-oriented response. The present research addressed this issue directly. Building on SDT, the present analysis did not view intrinsic goal orientations as merely a type of protective buffer, but rather as a “positive” existential motivational orientation focused on authentic and personally-satisfying values that facilitate personal growth and well-being (Kasser, 2002; Ryan & Deci, 2017). In that light, the present analysis did not predict that intrinsic goal orientations would merely shield against the detrimental effect of MS on SWL, but went further to make the novel prediction that death awareness would instead prompt people with more intrinsic goal orientations to take a more appreciative and satisfying reflection on life. And, indeed, when participants had a more intrinsic goal orientation (high RIGO), MS increased SWL.

This finding represents a marked departure from the traditional focus of TMT research, and yet converges with a number of other studies. Correlational SDT research has found that individuals with self-determined orientations tend to look on the bright side of difficult

situations, seeing them more as challenges than as threats, and thus experience less anxiety and reduced existential threat (Lynch et al., 2005; Quedstedt et al., 2011). Some experiments have found that MS only motivates worldview defense and worldview-relevant strivings when people have extrinsic, but not intrinsic, goal orientations (Cozzolino et al., 2004; Vail et al., 2019). And further correlational work found that stronger intrinsic orientations were associated with reduced depressive symptoms, despair, and death anxiety, and greater ego-integrity, death acceptance, and well-being (Van Hiel & Vansteenkiste, 2009). These findings suggest that those with intrinsic goal orientations perhaps do not view death as an anxiety-provoking existential threat requiring defensive responses, but instead accept death in a more appreciative way and reflect on life with greater satisfaction. But the present research is the first to offer an experimental investigation of whether increased death awareness can cause people with stronger intrinsic goal orientations to make a more appreciative reflection on the bright side of life—resulting in greater life satisfaction.

On a related note, future research might investigate whether individuals with stronger intrinsic goal orientations experience a more appreciative satisfaction with life after MS because they perhaps engage in more vivid reflections on death when given explicit MS prompts. More vivid reflection (but not rumination) on mortality is associated with authenticity and more intrinsic goal orientations (Seto, Hicks, Vess, & Geraci, 2016). Other work has compared the traditional open-ended MS prompt to a more vivid “death reflection” prompt followed by a series of prompts which asks participants to a) visualize their own death in vivid detail, b) adopt a limited time perspective, c) engage in an appreciative life review, and d) consider how their death would impact their family (Cozzolino et al., 2004). Compared to a control condition (imagining a typical day), gratitude was increased following both the standard MS and the death reflection prompt—but most strongly following the more vivid death reflection (Frias, Watkins, Webber, & Froh, 2011). In that light, there may be differences in whether people with low and high RIGO think about death (and its consequences) in a more vague abstract/conceptual way or a more specific concrete/vivid way, potentially identifying the mechanism by which high RIGO might lead to more appreciative/grateful satisfaction with life after MS.

Third, Study 1 compared MS against uncertainty salience and found that MS produced effects on SWL at low and high RIGO. That finding is relevant to some ongoing discussions about the mechanisms involved in MS effects. TMT suggests that death awareness, specifically, is the primary mechanism (Pyszczynski, Greenberg, Solomon, & Maxfield, 2006); whereas some alternative models have instead proposed that MS increases uncertainty salience, which is presumably uncomfortable and produces worldview defense and worldview-relevant strivings as a way to restore feelings of certainty (Jost & Napier, 2012; McGregor, Zanna, Holmes, & Spencer, 2001; van den Bos, 2009). However, the present findings are consistent with the TMT perspective, showing that MS exerted an effect beyond uncertainty salience, and converges with a growing body of work finding that death awareness and uncertainty awareness appear to trigger two distinct processes (Martens, Burke, Schimel, & Faucher, 2011).

Relatedly, we noted that in Study 1, greater RIGO was only positively associated with SWL (replicating prior research, e.g., Kasser & Ryan, 1996; Niemiec et al., 2009; Sheldon et al., 2010) in the MS condition, whereas RIGO was *negatively* related to SWL in the uncertainty condition. These opposing slopes made it difficult to know whether the RIGO-SWL slopes observed in the MS and uncertainty conditions were different from the true “baseline” relationship. In Study 2, we replaced the uncertainty prime condition with a television salience prime condition to better estimate the slope under a more neutral/baseline condition. In that TV salience condition, RIGO was positively associated with SWL, consistent with prior SDT research. However, in the MS condition, RIGO was more strongly positively related to SWL, such that MS (vs. TV salience) reduced SWL among those

with low RIGO and increased it among those with high RIGO. Together, these findings suggest that MS amplified the RIGO-SWL relationship whereas uncertainty salience seems to have reversed it.

Further, we note that whereas the “default” seems to be a positive correlation between RIGO and SWL, which is amplified when existential concern is heightened (in the MS condition), the uncertainty condition was “special” in that it seemed to produce effects in the *opposite* direction. The reasons for that reversal are not readily apparent. But one possibility is that people may hold their “default” value orientations with relative confidence, and an uncertainty prompt may shake those orientations, either by impairing self-regulation or causing participants to consider adopting the alternative values/goals (Light, Rios, & DeMarree, 2018). That is, after rating a variety of values/goals on the Aspirations Index (RIGO), the uncertainty prompt may have created a condition where those who initially indicated an extrinsic orientation wavered, considered adopting the alternative intrinsic values instead, and experienced greater SWL, whereas those who initially indicated an intrinsic orientation wavered, considered adopting the alternative extrinsic values instead, and experienced a dip in SWL. Such an effect, following an uncertainty prompt, would have indeed produced a negative correlation between the earlier RIGO measure and the subsequent SWL measure. Without a second measure of RIGO after the uncertainty prompt, it is impossible to say for sure, but it seems plausible and would be a ripe topic for future research.

Fourth, in Study 2 we noted that much prior SDT research has found that RIGO is positively associated with self-esteem (Ryan & Deci, 2017), which is important because one prior TMT study found that MS reduces SWL among those with low, but not high, self-esteem (Routledge et al., 2010). Thus, one exploratory hypothesis was that self-esteem was an underlying (mediating) mechanism explaining why RIGO moderated the relationship between MS and SWL. However, we also noted that high RIGO is thought to be an appreciative growth orientation whereas self-esteem is typically not, and that MS *increased* SWL among those with high RIGO (Study 1) but not among those with high self-esteem (Routledge et al., 2010). Thus, a second and competing exploratory hypothesis was that although RIGO may be related to self-esteem, and self-esteem may also moderate the impact of MS on SWL, RIGO and self-esteem would moderate the MS effect in different ways and for different reasons—thus, the moderating effect of RIGO would be independent from and not mediated by self-esteem. As it turned out, the Study 2 data patterns produced some mixed results. Study 2 replicated the Study 1 finding that MS reduced SWL among those with low RIGO but increased it among those with high RIGO, and further found that the moderating role of RIGO was not due to (mediated by) its association with self-esteem. But on the other hand, Study 2 also failed to replicate the one prior study (Routledge et al., 2010) finding that self-esteem had moderated the effect of MS on SWL. Yet, given that the Routledge et al. study was part of a broader program of research obtaining similar findings, one should exercise caution against interpreting the present failure to replicate as if it plainly refutes that prior body of work. As has been compellingly illustrated in other research areas (e.g., Noah, Schul, & Mayo, 2018), seemingly minute differences in experimental protocol can lead to theoretically meaningful changes in outcomes such that both an original-study finding and a failed replication attempt can each be “correct.” In the present Study 2, we measured RIGO immediately prior to measuring self-esteem, and it is possible that activating some level of awareness of one’s goal orientations by explicitly measuring it could have somehow disrupted or mitigated the perhaps otherwise-typical influence of high or low self-esteem. Future research could further investigate the replicability and explore the perhaps subtle boundary conditions of both the RIGO and the self-esteem effects in terror management processes.

Lastly, we caution against the temptation to characterize extrinsic and intrinsic goal orientations as a clear-cut and unconditional division between defense and growth orientation. Although it seems likely that extrinsic goal pursuit may be defense oriented, there are likely

conditions (e.g., abstract/broader recognition of how wealth can facilitate meaningful personal growth via travel, education, comfortable support of one's friends and family, and so on) under which extrinsic pursuits would facilitate growth. Intrinsic goals may similarly entail some complex set of defense and growth dynamics as well. There may be conditions under which defense and growth are dialectically opposing forces (defensive closed-mindedness prevents growth, and open-minded exploration threatens defensive protections), where extrinsic goal pursuit protects against threat but stifles growth and where intrinsic orientations undermine protections but promote growth. And there may be conditions under which defense and growth are complementary forces (effective defenses shield from anxieties and mitigate threat appraisals, thus allowing people to experience well-being, venture forth, explore the world, and grow), where extrinsic goal orientations may both defend against threat and promote growth and where intrinsic goal pursuit connotes both defensive protection and growth orientation. The issue lay beyond the limited scope of the present research, but future work might better and more comprehensively address the topic.

One limitation is that Study 1 primarily involved college-age Christian White women recruited at Cleveland State University in Northeast Ohio; and, although recruited from a broader internet source, Study 2 primarily involved a mix of college-educated middle-aged Christian White men and women. As has been articulated elsewhere, most people in the world bear little resemblance to these kinds of samples (Henrich, Heine, & Norenzayan, 2010), but even within the American context there is considerable heterogeneity in psychological processes across regions of the US (Vandello & Cohen, 1999), generation (Twenge, Campbell, & Freeman, 2012), racial and ethnic groups (Markus & Kitayama, 1991), sex (Wood & Eagly, 2002), and religion (Li et al., 2012; Norenzayan et al., 2016). The generalizability of the present findings therefore remains an open question. Yet, given that TMT and SDT processes have been observed in hundreds of studies across dozens of countries and cultures (Routledge & Vess, 2019; Ryan & Deci, 2017), one may have justifiable reason for optimism in that regard.

6. Conclusion

In sum, the present research offers a number of contributions. It converges with the TMT perspective and prior research that death awareness can be experienced as an existential threat, undermining well-being. But it also offers a novel twist on that idea, building on SDT to explore the possibility that there might be conditions under which death awareness is not experienced as a threat, but as an occasion to more positively reflect on the brighter sides of life with greater satisfaction. Indeed, among individuals with low RIGO, MS (vs. comparison conditions) decreased SWL; whereas among those with high RIGO, the opposite effect was observed and MS increased SWL. These findings help to better understand the impact of death awareness on well-being, and highlight the role of value orientations in determining whether death awareness is taken as an unpleasant existential stressor or taken as an occasion to reflect on life with greater satisfaction.

Open practices

Materials, anonymized data, commented code, and preregistration are available at: <https://osf.io/kxmd9/>.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jesp.2019.103891>.

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