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An Unscathed Past in the Face of Death:

Mortality Salience Reduces Individuals' Regrets

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Abstract

Folk wisdom and popular literature hold that, in the face of death, individuals tend to regret things in their lives that they have done or failed to do. Terror Management Theory (TMT), in contrast, allows for the prediction that individuals who are confronted with death try to minimize the experience of regret in order to retain a positive self-esteem. Three experiments put these competing perspectives to the test. Drawing on TMT, we hypothesized and found that participants primed with their own death regret fewer things than control-group participants. This pattern of results cannot be attributed to differing types of regrets (Study 1). Furthermore, we provide evidence suggesting that the effect is not purely a product of cognitive mechanisms such as differing levels of construal (Study 2), cognitive contrast, or deficits (Study 3). Rather, the reported results are best explained in terms of a motivational coping mechanism: When death is salient, individuals strive to bolster as well as protect their self-esteem and accordingly try to minimize the experience of regret. The results add to our conceptual understanding of regret and TMT, and suggest that a multitude of lifestyle guidebooks need updating.

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An unscathed past in the face of death: Mortality salience reduces individuals' regrets

"Non, je ne regrette rien" ("No, I don't regret anything") sang the French singer Édith

Piaf–three years before her untimely death in 1963. In her famous song she emphasizes that she

regrets neither the bad nor the good things in her life and will leave them all in the past. The

song's lyrics are also in line with the well-known proverb that "life is too short for regrets."

However, many people will possibly think it is difficult to follow this common saying. One might

assume that one's regrets will appear even more profound and numerous when one is reminded of

the undeniable fact that time on Earth is limited. After all, people are left with too little time to

fulfill all their wishes and to make up for all the mistakes they have made in trying to. The

internet and the popular literature market are full of advice, telling people which places to see,

which books to read, and which activities to do before they die (e.g., "1,000 Places to See Before

You Die", Schultz, 2012), or cautioning against what might happen if humans live their lives in

the "wrong way" (e.g., "The Top Five Regrets of the Dying: A Life Transformed by the Dearly

Departing", Ware, 2011). These writings share the underlying assumption that an individual will

most certainly experience regret as soon as realization sinks in that his or her life is limited,

because the individual has made uncorrectable mistakes or missed out on things he or she should

have done.

Contrary to the popular belief that humans might experience stronger regrets when

thinking about their death and in line with Édith Piaf's message, we argue that the common

saying "life is too short for regrets" might be easier to follow than people think, particularly

because it reminds them of their death. Building on Terror Management Theory (e.g., Greenberg,

Solomon, & Pyszczynski, 1997) as well as on the Theory of Regret Regulation (Zeelenberg &

Pieters, 2007), we propose that thoughts about one's own death will not increase but instead

decrease the number of regrets individuals experience due to the need to maintain one's self-esteem after a death prime.

Regret: A Threat to Self-Esteem

Regret can be defined as "a comparison-based emotion of self-blame, experienced when people realize or imagine that their present situation would have been better, had they decided differently in the past" (Zeelenberg & Pieters, 2007, p. 4). It is thought to be an aversive, cognitive feeling which individuals are typically motivated to avoid (Landman, 1987; Zeelenberg & Pieters, 2007). Regret usually occurs when individuals realize that they have made a mistake or a suboptimal decision, especially if it is very easy to imagine a different outcome (Kahneman & Miller, 1986; Medvec, Madey, & Gilovich, 1995; Zeelenberg et al., 1998). It is a complex emotion which requires both the higher cognitive ability to imagine other possible outcomes as well as personal agency, meaning that the individual made a certain choice, which he or she could have done differently (Zeelenberg & Pieters, 2007).

Regret plays a major role in people's lives; in fact, it is the most frequent out of nine negative emotions (Saffrey, Summerville, & Roese, 2008). There are many things humans may regret, such as decisions to act as well as decisions not to act (acts of commission and omission, Gilovich & Medvec, 1994), a regrettable outcome of a decision as well as a regrettable decision process (Connolly & Zeelenberg, 2002), and even mere thoughts, events, or future decisions that have not yet occurred (Landman, 1987; Zeelenberg, 1999). Regret is often related to negative states such as anger, wistfulness, emotional distress, and despair (Gilovich, Medvec, & Kahneman, 1998; Landman, Vandewater, Stewart, & Malley, 1995), and typically represents failure experiences (Wrosch & Heckhausen, 2002). It is therefore not surprising that regrets have also been found to pose a threat to people's self-esteem. Josephs, Larrick, Steele, and Nisbett

(1992) showed that people with low self-esteem in particular protect themselves against the outcomes of risky decisions by trying to minimize the regret that they will experience. Therefore, individuals should be particularly motivated to protect themselves against regret when they need to maintain a high level of self-esteem–for instance, when they are confronted with their own death.

Mortality Salience and the Self-Esteem Buffer

Terror Management Theory (TMT) and the Mortality Salience (MS) hypothesis conceptualize how death awareness affects human behavior and cognitive processes (Burke, Martens, & Faucher, 2010; Greenberg et al., 1990; Harmon-Jones et al., 1997). The theory's general assumption is that the human instinct for self-preservation and the knowledge that one is invariably going to die one day, create a great potential for anxiety (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). This potential for existential anxiety or "terror" becomes especially salient when an individual is made aware of his or her mortality, for instance, by confrontation with any stimulus that reminds the individual of death. Since death anxiety is considered to be a highly aversive state, humans will try to protect themselves against it by means of a dual process (Pyszczynski, Greenberg, & Solomon, 1999): First, proximal defenses set in when individuals consciously think about death and entail the suppression of death-related thoughts as well as the denial of one's vulnerability. Second, distal defenses set in a few minutes after a death prime. They are defined as unconscious defenses, which subsequently take place when thoughts of death are still active but not in focal attention anymore. Distal defenses are typically not directly related to death but serve the goal of reducing anxiety by enabling "the individual to construe himself or herself as a valuable participant in a meaningful universe" (Pyszczynski, et al., 1999, p. 853). For this purpose, individuals make use of certain buffering

mechanisms, which consist of (a) stronger belief in one's cultural worldview and the set of

standards and values associated with that worldview, and (b) the belief that one is meeting or

exceeding those standards (Greenberg, Arndt, Simon, Pyszczynski, & Solomon, 2000; Harmon-

Jones, et al., 1997). Both mechanisms bolster self-esteem by assuring the individual that his or

her existence in the universe has a certain meaning and by promising literal or symbolic

immortality to the ones who believe in and comply with the standards of value in a specific

culture (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004).

Several studies demonstrate that after a death prime, individuals increase their efforts or

report stronger intentions to endorse behaviors and opinions which are linked to personally or

culturally important domains of self-esteem, such as social norms of tolerance (Greenberg,

Simon, Pyszczynski, Solomon, & Chatel, 1992), individualism/collectivism (Kashima, Halloran,

Yuki, & Kashima, 2004), financial aspiration (Jonas, Sullivan, & Greenberg, 2013; Kasser &

Sheldon, 2000), charity and prosocial behavior (Gailliot, Stillman, Schmeichel, Maner, & Plant,

2008; Jonas et al., 2008; Jonas, Schimel, Greenberg, & Pyszczynski, 2002; Jonas, et al., 2013),

reciprocity (Schindler, Reinhard, & Stahlberg, 2013), and health-related behaviors (Arndt,

Schimel, & Goldenberg, 2003; Routledge, Arndt, & Goldenberg, 2004). On the same note,

individuals tend to avoid behaviors and distance themselves from opinions that pose a threat to

their self-esteem (Goldenberg, McCoy, Pyszczynski, Greenberg, & Solomon, 2000). The striving

for positive self-esteem goes so far that even irrational and potentially harmful behavior, such as

risky driving, smoking, or tanning, will be pursued if the behavior contributes to an individual's

positive self-esteem (Ben-Ari, Florian, & Mikulincer, 1999; Cox et al., 2009; Hansen, Winzeler,

& Topolinski, 2010; Routledge, et al., 2004). For instance, Hansen and colleagues (2010) showed

that participants who derived self-esteem from smoking improved their attitudes towards

smoking after being exposed to death warnings on cigarette labels compared to control warnings. In line with theoretical assumptions about different proximal and distal defenses, this pattern only occurred after a delay, suggesting that individuals unconsciously defend themselves against threat by engaging in a re-interpretation of potentially threatening thoughts in a positive, self-affirming way. In this concrete example, they might for instance have thought about reasons why smoking benefitted them (e.g., smokers are more fun and social than non-smokers).

Taken together, a broad array of studies indicate that individuals will be both motivated to maintain self-esteem as well as protect it from additional threat when mortality is salient. To do so, individuals typically engage or plan to engage in behaviors that promote self-esteem by emphasizing culturally or personally important values or norms.

To the present date, previous research has mainly focused on behavior and decisions that are related to the future or the present, and therefore can easily be changed or adapted to suit the current goal to bolster self-esteem. Different from the present or future, the past cannot be changed. However, here we suggest that even negative decisions and past behavior may be used to bolster one's self-esteem by finding some good in the bad. Specifically, we argue that the need to protect one's self-esteem, which arises from MS, will influence how individuals interpret potentially regrettable issues.

Mortality Salience Decreases Regrets

Zeelenberg and Pieters (2007) suggest that humans are motivated to regulate their regrets even in a normal state, because regrets are perceived as aversive. We assume that individuals for whom mortality was made salient will be particularly motivated not to feel regretful because they need to maintain and protect their self-esteem. While a successful pursuit of self-esteem results in positive emotions as well as a sense of control and safety, failed attempts to bolster one's self-

esteem typically result in individuals feeling even more worthless, anxious, and vulnerable to threat (Crocker & Park, 2004). Since the experience of regret poses a threat to one's self-esteem, admitting one's failures and wrong decisions after a death prime will therefore counteract the goal of pursuing self-esteem and may tear down individuals' defenses against death anxiety.

Accordingly, we propose that after a death prime, individuals will engage in what Gilovich and Medvec (1995) call "psychological repair work" (see also Zeelenberg & Pieters, 2007) to maintain self-esteem and to avoid regret. Psychological repair work consists of several regulation mechanisms, which all serve the goal of interpreting potentially regrettable issues in a more favorable light and therefore correspond to the concept of a pro-active, distal defense. First, individuals can engage in bolstering their decision and downplaying the value of rejected alternatives, thereby trivializing the importance of potentially regrettable issues (Gilovich, Medvec, & Chen, 1995). For instance, imagine a man who is trying to cope with a painful romantic break-up and who tells himself that it's not the end of the world and in a couple of weeks he will be over it. Second, individuals can try to identify the silver linings of their decisions, for instance, by convincing themselves that they have learned a lot from their mistake, that there are some positive aspects about the issue, or that they were lucky since events could have easily turned out even worse (Teigen, 2005). For instance, the aforementioned man could conclude that as a result of the break-up, at least now he is free to go out with whomever and whenever he wants. Third, individuals can frame the entire potentially regrettable issue in a positive light, for instance, by telling themselves that the chosen option was actually the best, that the experience was worth the negative outcome, or that the negative result was inevitable anyway (Tykocinski & Steinberg, 2005). For instance, the rejected partner may think that the relationship had no future anyway, and so it is better it ended earlier than later. These regret regulation

mechanisms also converge with research on the meaning maintenance model, which states that when mortality is salient, individuals strive to maintain meaning (Heine, Proulx, & Vohs, 2006; Proulx & Heine, 2006). Interpreting potentially regrettable issues in the sense that all of one's critical decisions were meaningful and for the best with regard to a bigger picture could therefore be a powerful source of meaning, which would then counteract the existential terror posed by MS. Note that these three regulation mechanisms are closely linked and the particular usefulness of a specific mechanism depends highly upon the specific issue at hand. Therefore, we will henceforth not distinguish between the three mechanisms but summarize them under "psychological repair work."

In sum, thinking about one's own death creates a potential for existential anxiety, which individuals typically buffer against by bolstering their self-esteem. Because experiencing regret threatens positive self-esteem and therefore would counteract one's defenses, we assume that individuals engage in psychological repair work when being asked about their regrets. This psychological repair work includes thinking about potentially regrettable issues and trivializing them, identifying silver linings as well as interpreting these issues in a positive light. Due to this repair work, we expect individuals to report fewer regrets when mortality has been made salient.

To test our hypothesis, we conducted three experimental studies. In Study 1, we investigated whether MS causes people to select fewer regrets from a predefined list and controlled for differences in the type of regret. Study 2 employed an open assessment of regrets and tested whether varying temporal construal (by instructing participants to list either recent or lifetime regrets) would influence the results. In Study 3, we investigated whether the effect would indeed be best explained by a motivational rather than a cognitive interpretation. More

specifically, we tested whether a death prime would only decrease the number of reported regrets or whether the effect would extend to other types of memories such as satisfying life decisions or events.

Study 1

Study 1 tested our assumption that an MS prime would decrease the number of regrets that individuals select from a predefined list. To achieve this aim, we asked participants to write either about death or a control topic (manipulation adopted from Jonas, et al., 2002) and then presented participants with a list of regrets. The participants' task was to decide whether each regret applied to them or not.

Method

Materials and pretest. To create a comprehensive list of possible regrets, we systematically selected a total of 48 regrets we thought would be considered typical in the following areas of life: education, community/culture, family, friends, relationship, self, health, and leisure time (distinction based on Roese & Summerville, 2005). We pretested this list with the following goals in mind: First, we wanted to avoid regrets which either applied to everybody or to no one. Second, we wanted the final sample of regrets to consist of both omission and commission regrets (Gilovich & Medvec, 1995; Gilovich, Wang, Regan, & Nishina, 2003) as well as regretted issues that an individual had high versus medium control of. We did not want to include incidents in the final sample that participants had little or no control of, since according to the theory of regret regulation, personal agency is central to the concept of regret (Zeelenberg & Pieters, 2007). Forty-two participants (36 % female, M_{age} = 34.43, SD = 13.33, Range: 19 - 67) judged the amount of control that people had over the different regrets on the list (7-point scale; little control – high control) as well as whether these regrets described acts of omission or

commission. Moreover, participants were asked to indicate whether they had ever experienced these particular regrets or not. We selected the items which were most distinct in regard to control and the omission/commission distinction as well as varied in whether they applied to participants or not. By this procedure, the initial sample was reduced to 16 regrets: 4 omission/high control, 4 omission/medium control, 4 commission/high control, and 4 commission/medium control (see Appendix). High and medium control regrets differed significantly in their average ratings, $t(41) = 12.18$, $p < .001$, $d = 1.88$; ($M = 6.25$, $SD = 0.88$ vs. $M = 4.90$, $SD = 0.90$, respectively). The selected regrets applied to 14 – 69 % of all participants, with an average of 38 %.

Participants and design. Data was collected using Amazon Mechanical Turk. Eighty-five individuals participated in the study for financial compensation. Two participants were excluded from the analyses because they had already participated in the pretest. Of the remaining 83 participants, 60 % were female and the average age was 36.30 years ($SD = 14.06$, Range: 18 - 75). All participants were US citizens. They were randomly assigned to either the MS or the control condition.

Procedure. After participants were welcomed and consented to participation, for half of them mortality was made salient by a standard manipulation (e.g., Jonas, et al., 2002), which was successfully used to induce MS in numerous previous studies (for an overview, see Burke, et al., 2010). Participants in the MS condition were asked to answer two questions related to death ("Please briefly describe the emotions that the thought of your own death arouses in you;" "Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead.") Participants in the control condition answered the same questions with regard to dental pain. Next, participants were given the expanded Positive and Negative

Affect Schedule (PANAS-X, Watson & Clark, 1992) as a filler task. This was done because previous research has shown that the distal defenses against MS, such as psychological repair work of one's potentially regrettable issues, set in after a delay of a few minutes (Greenberg, et al., 2000). Subsequently, participants were presented with the 16 regrets and had to decide whether each regret applied to them or not. After that, participants were thanked, debriefed, and provided with a code for payment.

Results

To test the hypothesis that participants would select fewer regrets in the MS compared to the control condition, a sum score was calculated over all regrets that participants reported as applicable to them. A one-way analysis of variance (ANOVA) on this sum score revealed a significant effect of MS, $F(1,81) = 4.76, p = .032, \eta^2_p = .06$. In general, individuals selected fewer regrets when primed with death compared to dental pain ($M = 6.39, SD = 3.58; M = 8.07, SD = 3.39$, respectively). To test whether the type of regrets or the amount of control had any influence on the results, we ran a 2 x 2 x 2 mixed-model ANOVA, with type (omission vs. commission) and control (high vs. medium) as repeated measures factors. In addition to the significant main effect of the prime, there was a significant main effect of control, indicating that participants selected more regrets over which they had high compared to medium control, $F(1,81) = 35.58, p < .001, \eta^2_p = .30$ ($M = 4.29, SD = 2.08; M = 3.01, SD = 1.96$, respectively). Moreover, they selected significantly more omissions than commissions; $F(1,81) = 8.09, p < .006, \eta^2_p = .09$ ($M = 3.95, SD = 2.27; M = 3.35, SD = 1.79$, respectively), thereby replicating the results of Gilovich and Medvec (1994). There was also a significant interaction of type x control, $F(1,81) = 5.29, p = .024, \eta^2_p = .06$. However, neither type nor control interacted with the MS priming (both $p > .10$), indicating that MS decreases regret independent of the type of regret.

Discussion

The results of Study 1 support our assumption that MS decreases regrets. In particular, participants selected fewer regrets from a predefined list when being primed with death compared to a control topic.

Against the background of TMT, we expected this pattern of results because participants should be motivated to maintain their self-esteem. Since participants were confronted with the list of regrets after a delay, it can be assumed that they engaged in pro-active, distal defenses such as psychological repair work. For instance, participants in the MS condition might have trivialized some issues that applied to them or interpreted them in a positive way (e.g., "I may have eaten too much junk food, but I love burgers and after all, you only live once") as well as identify silver linings (e.g., "maybe I could have had better grades if I worked harder, but if I did, I would have spent less time with my friends," or the other way around).

However, there may be a possible alternative explanation that could account for the observed pattern of results. While dental pain is a concrete incident that many people have experienced, thinking about one's death and the possible consequences requires imagining an incident that has not yet happened and that may occur in the far future. Previous research on Construal Level Theory (Trope & Liberman, 2000, 2010) has shown that thinking about a distant future facilitates abstract thinking (Förster, Friedman, & Liberman, 2004). It is therefore possible that participants in the MS condition adopted a broader, more abstract frame of mind, which may have led them to construe the given regrets on a higher level. For instance, when considering items on the list, such as "I argued with my parents," a person who wrote about death might focus on the big picture and decide that, in general, he or she has a good relationship with his or her parents and therefore there is nothing to regret. On the contrary, the same person, when being

primed with dental pain, might consider a concrete incident, such as a particular big fight, and decide that he or she did indeed regret this. Such differences in construal might have resulted in MS participants selecting fewer regrets from the list than the control group. We address this alternative explanation in Study 2.

Study 2

Study 2 replicates and extends the results of Study 1, namely that individuals report fewer regrets after a death prime. The procedure was similar to Study 1, except that individuals generated and wrote down their own personal regrets instead of choosing from a predefined list. To test for a possible effect of construal level, we also varied whether participants had to think about regrets concerning their last weeks or their lifetime. Since we hypothesized that the decrease in regrets derives from the need to maintain and protect one's self-esteem and not from the adopted mindset and is thus a motivational rather than a cognitive effect, we expected to find the effect of MS regardless of the considered time period.

Method

Participants and design. Data was collected using the social psychology online pool of a European university. Participants were told that they had the chance to take part in a lottery for one of five book coupons worth 10 € each (about 13 US dollars at the time). A sample of 116 individuals participated in the study. Three participants were excluded from the analyses because they either had not followed the instructions or had indicated that their data should not be analyzed, for instance, because they had not participated seriously (response to one yes/no item at the end of the study). Of the remaining participants, 72% were female and the average age was 25.6 years ($SD = 8.5$, Range = 18 - 70). 75% of the participants were students. Participants were

randomly assigned to a 2 (prime: mortality salience vs. dental pain) x 2 (time period: last weeks

vs. lifetime) between-subject factorial design.

        Materials and Procedure. The priming procedure was identical to the procedure

described in Study 1. To assess regret, participants were then asked to look back on their lives /

the last weeks and name the things they regretted most. Participants were presented with five

empty slots to fill in their regrets and were told to name at least one regret. Six participants,

however, explicitly replied that they regretted nothing and therefore, their number of regrets was

coded as zero. Consequently, the total count of regrets varied between zero and five. An example

for a lifetime regret read *"I regret that I did not spend more time with my grandma,"* and an

example for a regret with regard to last week read *"I regret that I did not attend the birthday

party of a good friend because I was tired."* To control for the type of regrets the participants

named, participants were subsequently asked to decide whether the regrets they had just named

were acts of omission or acts of commission. Finally, participants were thanked, debriefed, and

forwarded to a separate site where they could leave their e-mail address for the lottery.

Results

        To test the hypothesis that participants in the MS condition would name fewer regrets, all

regrets that a person reported were totaled. A 2 (mortality salience vs. dental pain) x 2 (regrets

with regard to the last weeks vs. lifetime regrets) ANOVA on the total number of reported regrets

revealed a significant main effect of MS, $F(1,109) = 6.70$, $p = .009$, $\eta^2 = .06$. MS participants

reported significantly fewer regrets than participants who had thought about dental pain ($M =$

1.65, $SD = 0.93$; $M = 2.20$, $SD = 1.29$, respectively). There was neither a significant effect of the

time span nor a significant interaction; both $ps > .215$.

To test whether the effect of MS would differ depending on the type of regrets participants reported, we ran a 2 (Prime: mortality salience vs. dental pain) x 2 (Regret: omission vs. commission) mixed ANOVA with repeated measures on the second factor. Again, we found a significant main effect of MS, $F(1,111) = 6.61$, $p = .011$, $\eta^2 = .06$. Moreover, we found a significant main effect of the type of regrets, $F(1,111) = 5.26$, $p = .024$, $\eta^2 = .05$. Participants reported regretting more omissions than commissions ($M = 1.14$, $SD = 1.07$; $M = 0.80$, $SD = 0.90$, respectively.) However, there was no significant interaction, $F < 1$, indicating that MS did not differentially influence the number of reported omissions and commissions.

Discussion

Study 2 corroborates and extends the results of Study 1. Again, we observed the hypothesized effect that participants primed with death reported fewer regrets than participants from a control group. Because participants generated personal regrets and did not choose from a predefined list, the matching results from Study 2 suggest that the pattern of results observed in Study 1 was not due to a peculiar selection of regrets that were specifically rejected by individuals in the MS condition. Moreover, the relevant time period did not affect the number of reported regrets: participants in the MS condition reported fewer regrets regardless of whether they wrote about lifetime regrets or about things they regretted during the last weeks. This suggests that the lower number of reported regrets in the MS condition is unlikely to be singularly due to a wider cognitive scope and a focus on major life events. Indeed, if the effect had been driven by cognitive construal, one would have expected different results in the long versus the short timeframe.

We argue that participants report fewer regrets due to the need to protect their self-esteem, that is, due to a motivational process. The results of Study 2 are in favor of this explanation, as

the effect was not moderated by levels of temporal construal, which entails a cognitive process. However, another possible cognitive explanation unrelated to construal level could be that the observed pattern of results was the result of a comparison process. After all, compared to the horrible notion of death, minor regrets such as being too lazy to exercise more often might appear relatively trivial and negligible. Note that both the motivational (via self-esteem) as well as the alternative cognitive comparison explanation could be driven via trivialization of potentially regrettable issues. However, in the case of the motivational explanation, individuals trivialize due to the need to protect their self-esteem. Accordingly, they should selectively try to protect themselves against negative, regrettable memories. On the other hand, if the cognitive comparison explanation applies, we would expect individuals to recall fewer memories in general after a death prime. After all, in the face of death, positive issues such as having lost weight might appear just as trivial as negative events such as missing a friend's party. Study 3 allows testing these competing assumptions against each other.

Study 3

The goal of Study 3 was to replicate the effect of an MS prime decreasing regrets, which was demonstrated in Studies 1 and 2. Moreover, we tested whether a death prime would lead to participants reporting fewer incidents in general, which should be the case if everything just seems trivial in comparison to the horrible notion of death, or whether the effect would be specific for regrets, which should be the case if participants actively engage in psychological repair work to bolster their self-esteem. In this case, MS should not keep participants from reporting other events that do not pose a threat to self-esteem, such as things that they did or did not do, which they are glad about (henceforth referred to as "rejoices").

Method

Participants and design. Fifty-nine psychology students participated in the study for course credit. Two participants were excluded from the analyses because they did not consent to the use of their data. Of the remaining 57 participants, 83 % were female and the average age was 21.42 years (SD = 5.67, Range: 18 - 55). They were randomly assigned to a 2 (Death vs. Dental Pain) x 2 (Regrets vs. Rejoices) mixed factorial design with the second factor as repeated measure.

Materials and procedure. The study was assessed via computer in the laboratory. The MS priming was the same as in Studies 1 and 2. To assess the amount of regrets and rejoices, participants were asked to name both things they regretted and things they were glad about (rejoices), without any instruction with regard to which kind of memories to begin with or how many of each to recall. The number of reported memories was limited to a total of fifteen memories (regrets and rejoices). An example for a reported regret read *"I regret that I did not focus more on my work during my time in school,"* and an example for a reported rejoice read *"I am glad that I took a gap year before starting university and went travelling for six months."* After finishing this task, participants were presented with their answers again and asked to decide for each whether it represented a rejoice or a regret, and whether it represented a commission or an omission.

Results

Regrets and rejoices were totaled separately for each participant. To test the hypothesis that participants would only report fewer regrets but not fewer rejoices in the MS compared to the dental pain condition, we used the mixed model procedure in SPSS to model and test the expected ordinal interaction as a specific contrast hypothesis, following the recommended procedure of Bobko (1986) for testing hypothesized ordinal interactions (see also Rosenthal &

Rosnow, 1985). More specifically, the MS/Regret condition was tested against the other three

conditions (contrast weights: -3 1 1 1).

In general, participants named more rejoices than regrets, $F(1,55) = 9.11$, $p = .004$,

$\eta^2 = .14$. There was no significant main effect of MS, $F(1,55) = 2.38$, $p = .13$. However, the

specified ordinal interaction was significant, $t(89.04) = 3.48$, $p = .001$. Analyzing the simple main

effects revealed that individuals reported significantly fewer regrets after a MS compared to a

dental pain prime, $F(1,55) = 5.00$, $p = .029$, $\eta^2 = .08$ ($M = 2.18$, $SD = 1.31$; $M = 2.97$, $SD = 1.35$,

respectively). There was no significant difference in the number of rejoices participants named

after an MS compared to a dental pain prime, $F < 1$ ($M = 3.04$ $SD = 1.86$; $M = 3.41$, $SD = 1.90$,

respectively). Moreover, participants who were primed with MS reported significantly fewer

regrets than rejoices; $F(1,55) = 7.72$, $p = .007$, $\eta^2 = .12$ ($M = 2.18$ $SD = 1.31$; $M = 3.04$,

$SD = 1.86$, respectively). Participants who were primed with dental pain did not significantly

differ in the amount of regrets and rejoices they named, $F(1,55) = 2.19$, $p = .14$ ($M = 2.97$

$SD = 1.35$; $M = 3.41$, $SD = 1.96$, respectively).

Discussion

Study 3 replicated the results of Studies 1 and 2 and further demonstrated that a death

prime significantly reduces the number of reported regrets, but not the number of reported

rejoices. This pattern supports the hypothesis that a death prime decreases the amount of regrets

individuals report because of a motivational process, namely the need to maintain one's self-

esteem after a death prime. Similarly, our findings are not easily explained by a purely

cognitively driven process. If the decrease in regrets would occur solely due to MS participants

trivializing everyday issues due to a different comparison standard, we would have expected this

trivialization effect to emerge for rejoices as well. However, while our data suggests that a

cognitively driven process cannot account for all of the current results, we believe that it might indeed complement the motivational process that we assume.

The results from Study 3 also render other alternative explanations unlikely. For instance, one might have assumed a general cognitive impairment after MS, as it has been shown for some self-regulation tasks (Gailliot, Schmeichel, & Baumeister, 2006). Moreover, one might have assumed that MS participants would try to report fewer self-related memories in order to avoid self-awareness (Arndt, Greenberg, Simon, Pyszczynski, & Solomon, 1998). However, both alternative explanations would have predicted a decrease for both rejoices and regrets. Therefore, we think our results are best explained by a motivational explanation stating that MS specifically reduces regret due to individuals' need to maintain their self-esteem.

At first glance, it may seem surprising that the MS prime only decreased regrets but did not increase rejoices if MS heightens the need to maintain self-esteem. However, our results match those from a recent set of studies by Ma-Kellams and Blascovic (2012), who did not find an effect of MS on different measures of enjoyment of daily activities for Western compared to Eastern participants. They explained this difference with regard to culturally differing coping styles. According to the authors, Western participants engage relatively more in defensive coping styles such as bolstering their worldviews and trying to maintain their self-esteem, but do not tend to engage in distraction-based coping styles such as increased enjoyment of life. Similarly, studies on nostalgia, that is, reminiscing about positive past events, have also demonstrated that following a death prime, individuals become temporarily more nostalgic only when they have a high disposition for nostalgia anyway. For those who do not, state nostalgia was even marginally lowered after a death prime (Juhl, Routledge, Arndt, Sedikides, & Wildschut, 2010).

General Discussion

Death is something that all individuals must face at some point. Moreover, people are constantly reminded of the fact that they are, eventually and inevitably, going to die, for instance, when watching the news or crime shows or when passing by a cemetery. How does this make us feel about our lives? Does it remind us of all the things we were going to do but haven't yet? Or does it make us feel guilty about all the mistakes we have made that we cannot undo anymore?

Even though death and regret are two concepts that one may expect to be closely linked, the present studies are the first to combine these two fields of research. Common sense might suggest that regrets will seem more profound with the thought of one's own death in mind. However, building on TMT as well as previous research about regret regulation, we hypothesized instead that a death prime should even reduce the amount of regrets reported by an individual. This is because the motivation to protect one's self-esteem while mortality is salient is likely to conflict with experiencing regret—an emotion that is highly threatening to one's self-esteem. As a consequence, we assumed that individuals would regulate potentially regrettable issues by engaging in psychological repair work (trivialization, identifying a silver lining, positive interpretation), which would result in fewer reported regrets. We demonstrated the hypothesized decrease in regrets after a death prime in three studies, of which two assessed regrets in an open-ended format (Studies 2 and 3) and one had participants select regrets from a predefined list (Study 1). Moreover, we tested for several alternative explanations. For instance, one might have assumed that following a death prime, individuals would report fewer regrets of a particular type or that writing about something as abstract as death would result in regrets being construed on a higher level which could result in fewer reported regrets as well. However, in our studies the type of regret (Study 1), the amount of perceived control (Study 1), or the considered timeframe (Study 2) did not moderate the effect of MS on the reported or selected number of regrets. That

type, time period, and assessment procedure did not moderate our results can be taken as an indication that the hypothesized effect is robust and generalizes across various contexts. In Study 3, we additionally tested whether thinking about one's death reduces all types of memories, but observed that MS reduces regrets only. Together, these findings support the notion that the reduction of reported regrets is a motivational (i.e., to maintain a positive self-esteem) rather than a purely cognitive effect.

Our research adds to the literature in several ways: By investigating the interrelationship between death and regret, first we extend the literature of research on Terror Management Theory, and second on regret regulation. Third, our results give rise to speculations about possible benefits of (not) experiencing regret. Fourth, because of the many decisions that individuals regret in their lives as well as the potential threat that both the experience of regret and thinking about death pose to an individual's self-esteem, our findings are highly relevant with regard to research focusing on life-span development. We elaborate on all four aspects in the following.

Terror Management and Regret

Prior research on Terror Management Theory has mainly focused on the aspect of cultural worldview defense as an anxiety buffering mechanism response to MS (for a review, see Burke, et al., 2010). However, while one's worldview typically depends on socially shared standards or norms, the second aspect of the anxiety buffer, self-esteem, may also be influenced by more personal or private standards. The present results significantly contribute to the growing literature suggesting that death primes may also affect very personal emotions associated with self-esteem, such as regrets. To our knowledge, our results are the first to investigate how individuals deal with potentially negative events of their past in order to maintain self-esteem in the present and

defend themselves against existential anxiety. By trivializing potentially regrettable issues or

interpreting ambiguous events in a positive way, individuals create and derive meaning from

issues that might otherwise appear to be regrettable mistakes. This tendency to derive a positive

meaning from seemingly negative events to fight existential threat might be reflected in many

sayings such as the adage that fate (or God) sometimes works in mysterious ways. After all, it is

not just the positive but also the negative experiences that ultimately shape an individual and

contribute to a meaningful existence.

Coping with Regret

We have suggested that, in order to maintain their self-esteem, individuals regulate their

regrets by engaging in psychological repair work (trivialization, identifying silver linings,

positive interpretation). However, Zeelenberg and Pieters (2007) have suggested other

possibilities of how individuals might cope with regret aside from psychological repair work,

such as the complete denial and suppression of certain regrets. While such a coping process

might occur in some cases, we believe it unlikely that it is the main process driving the effect in

the current studies for theoretical as well as empirical reasons. First, from a terror management

perspective, suppression and blocking of harmful information is typical for proximal defenses

which occur immediately after a death prime (Pyszczynski, et al., 1999). However, since we used

a delay in all studies, it is more likely that our participants engaged in pro-active, distal defenses

such as psychological repair work. Second, if participants were suppressing or denying regrets,

they should have been significantly faster in writing down the remaining regrets compared to the

control group. But despite reporting fewer regrets, MS participants took about the same time for

the task in Study 2 as the control group (M_{MS} = 95.28 s, SD = 64.56, M_{DP} = 101.68 s, SD =

66.09, F < 1). Third, MS also decreased regrets in Study 1, where suppression of regrets was

unlikely since participants selected their regrets from a predefined list, which was the same for all participants. While individuals might engage in suppression when asked to recall information, it appears unlikely that they would fail to remember that a specific issue potentially applies to them when being presented with it.

Benefits of (not) Experiencing Regret

Our results give reason to speculate about possible functions of (not) experiencing regret. According to a situated social cognition perspective, all cognitions as well as motivational and affective states serve the ultimate goal of preparing an individual for action, meaning a quick and adaptive reaction (Smith & Semin, 2004). Correspondingly, the experience of regret can caution an individual about repeating a certain mistake and serve as a source of motivation for correcting that mistake if possible or searching for alternative courses of action (Camille et al., 2004; Galinsky & Moskowitz, 2000; Roese, 1997; Zeelenberg & Pieters, 2007). Following that line of thought, experiencing fewer regrets and re-interpreting or euphemizing potentially regrettable issues, as individuals did under MS, would be disadvantageous. This is because individuals might miss out on important chances for self-improvement and learning from their mistakes. In line with this argumentation, Crocker and Park (2004) have argued that the pursuit of self-esteem can interfere with learning and mastery, because negative feedback and mistakes are interpreted as self-threats instead of chances for improvement. On the other hand, bothering too much with specific regrets and ruminating about single events in one's past and what one should have done better can also be impedimental in moving forward and result in biased reasoning and counterproductive behavior (Sherman & McConnell, 1996). In the worst case, individuals can get into vicious circles out of negative affect and counterfactual thoughts which are characteristic for depression (Roese, 1997). In this sense, MS could even have positive consequences by

helping the individual not to worry too much about past events. Accordingly, it has been shown that under certain conditions, MS can enhance creativity, innovation, the exploration of novel alternatives as well as flexible cognitive structures (for an overview, see Vail et al., 2012).

Regret in the Face of Actual Death

Our research offers an interesting new perspective on how individuals react when they receive a reminder that one day in the distant future they are going to die. On average, our participants were young, healthy persons in the prime of their lives. But how does MS affect an individual who is confronted with the actual end of his or her life, for instance, people who suffer from a terminal illness and therefore are subjected to a "permanent death prime?" How do these people cope with their regrets and do they report fewer regrets than healthy individuals?

We would assume that the experience of regret might even decrease to a stronger degree when an individual is close to the end of his or her life. Although regret has positive functions, too (such as serving as a motivator which prevents individuals from repeating their mistakes, see above), these positive functions may be unimportant in the face of death, when action is not possible anymore. Hence, for an individual who is about to die, experiencing a motivational state that fosters future action may be pointless and only bring additional discomfort to the dying (Neimeyer, Currier, Coleman, Tomer, & Samuel, 2011). Accordingly, Wrosch and Heckhausen (2002) showed that older people experienced a lower intensity of regretful feelings especially if they reported having little control over the things they regretted. Similarly, at the end of their life people might be increasingly motivated to make this end appear as positive as possible and to believe that they have lived an overall meaningful life. Against this background, we speculate that at the end of their lives, people regret less than before.

Taken together, there is theoretical as well as empirical evidence that when the end of one's life nears, people are motivated to believe that the things they could potentially regret are "too few to mention," as Frank Sinatra put it in his song "My Way." Knowing how dying individuals deal with regret could be of great importance for practitioners working in palliative care and treating patients with incurable illnesses, such as medical practitioners, nurses or therapists.

Conclusion

In sum, three studies consistently demonstrate that thinking about death decreases the amount of regrets that individuals report. This effect is most likely due to individuals trying to protect their threatened self-esteem and, therefore, trying to trivialize and re-interpret potentially regrettable issues. In line with Terror Management Theory, it therefore seems that life is indeed "too short for regrets"–at least when we realize how short it really is.

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Acknowledgements

Appendix

Predefined regrets from Study 1 by type of regret

Omission / High control

I regret that I didn't work harder to get better grades.

I regret that I didn't spend enough time with my family.

I regret that I didn't invest more time and effort in my friendships.

I regret not having pursued more hobbies.

Commission / High control

I regret the educational/career choices I made.

I regret that I argued with my parents.

I regret that I ate junk food on a routine basis.

I regret that I wasted my leisure time on useless activities.

Omission / Medium Control

I regret that my teachers and I did not choose the best academic options for me.

I regret that my family and I never tried to become more attached to each other.

I regret that my family and I did not take any actions for me to become more independent.

I regret that my family and I didn't do many leisure activities together.

Commission / Medium control

I regret that my family and I complied with certain traditions we were not convinced of.

I regret that my family and I often quarreled about daily life issues.

I regret that my partner and I broke up.

I regret that my family and I became negative because of the bad luck that happened to us.