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Mortality salience and the desire for offspring☆, ☆☆

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Abstract

Research on terror management theory (TMT) illustrates that following mortality salience (MS) people defend their cultural worldviews and bolster self-esteem to transcend death. Recently, research additionally showed that MS increased self-reports of the number of children desired in Dutch men but not in Dutch women. We conducted three studies to further investigate the role of desire for offspring in terror management. In Study 1, we conceptually replicated previous findings for Germany and found increased desire for offspring following MS in both men and women. Extending prior research Study 2 revealed that following MS not only was the accessibility of death-related thoughts increased, but also the accessibility of thoughts related to offspring. Finally, Study 3 suggested that the MS effect on ingroup bias was eliminated under conditions of offspring salience. Relating these findings to TMT, anticipated or actual offspring is discussed as a buffer against existential anxiety.

Keywords: Motivation to have own children; Terror management theory; Self; Ingroup bias

Death and birth are the fundamental boundaries of individual existence. It can be deeply distressing to face the inevitability of one's own death. However, at the same time, it is wonderful and reassuring that by giving birth and raising children, life can be created out of nothing. Although humans are not able to determine the length of their own lives, they have the power to create new life by raising offspring. In this paper we investigate how the interplay between mortality awareness and the potential to have own offspring influences social cognition and behavior. More specifically, we focus on the role offspring concerns play in effects of mortality salience (MS) on intergroup behavior. This leads us to take an extended look at terror management processes, as they are described in terror management theory (TMT; e.g., Greenberg, Solomon, & Pyszczynski, 1997).

Terror management theory

Terror management theory (TMT), which has been derived from the writings of the cultural anthropologist Ernest Becker (e.g., Becker, 1973), suggests that both culture- and group-related behavior are ultimately rooted in the self-preservation motive (Pyszczynski, Greenberg, & Solomon, 1997; for overviews see also Greenberg et al., 1997; Solomon, Greenberg, & Pyszczynski, 2004). It is thus

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held that death is the fundamental problem of human existence. The basic model of TMT states that the human capacity to foresee one's own death together with a basic desire for survival cause a potential for existential terror to occur. TMT attributes adaptive value to preventing this anxiety from occurring, as otherwise it would leave us paralyzed. It is argued that two related anxiety buffers have developed that prevent the terror of mortality from entering daily consciousness: worldview defense (WD) and the self-esteem buffer. Individuals may try to strengthen a culture-based worldview as a symbolic – and potentially immortal – extension of the mortal self. This WD is itself complemented by the self-esteem buffer, i.e., the individual's belief that he/she is fulfilling the culturally prescribed standards and thus is personally linked to the culture of value.

In the most classical test of TMT mortality salience is manipulated experimentally, for instance by the instruction to write down thoughts and feelings associated with one's own death or with a topic unrelated to death (mortality *not* salient: MNS), such as watching television or suffering dental pain (e.g., Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). Research has found a broad variety of MS effects on WD and on variables related to self-esteem. For instance, MS (vs. MNS) participants punished ingroup norm breakers more severely (Rosenblatt et al., 1989), increased prosocial behavior towards ingroup members (Jonas, Schimel, Greenberg, & Pyszczynski, 2002) and also exhibited higher levels of relative favoritism towards ingroups over outgroups (*ingroup bias*; Castano, Yzerbyt, Paladino, & Sacchi, 2002; Fritsche & Jonas, 2005; Greenberg et al., 1990; Harmon-Jones, Greenberg, Solomon, & Simon, 1996). They also had increased perceptions of ingroup entitativity and identification (Castano et al., 2002), liked others with stereotypic attributes more (Schimel et al., 1999), and showed increased estimates of social consensus (Pyszczynski et al., 1996). Evidence for the existence of the self-esteem buffer has been found, for example, by Dechesne et al. (2003). In that study participants in the MS group bolstered self-esteem more strongly than MNS participants by attributing higher accuracy to a positive personality feedback (for a similar finding see Mikulincer & Florian, 2002). In addition, Harmon-Jones et al. (1997) have shown that MS-effects on WD are eliminated following an experimentally induced boost in self-esteem.

Reproduction and terror management processes

The ultimate goal of terror management processes is assumed to be attaining immortality of the self. In WD and self-esteem anxiety buffer mechanisms the self is seen as being extended to the self's culture and hence, the cultural worldview represents a potentially immortal self in a symbolic fashion (for a discussion of symbolic and literal immortality see Dechesne et al., 2003). An alternative method of preserving one's self might be to transmit one's genes and one's sense of self to offspring. A family is one of the most naturally perceived social categories, and might thus be a very secure minimum anchor of the *social* self. In common understanding parents remain parents and children remain children no matter what differences they may have and no matter how their relationship develops. In line with this, for instance, in the case of a parent's death, most laws guarantee that children receive at least statutory portions of their parent's inheritance.

Furthermore, own children are obvious proof of an individual's existence and of his/her impact on the world. This impact may even be significant long after the individual has died, as generations of possible grandchildren would never have been born without the work of this ancestor.

There is indirect evidence from TMT literature on the anxiety buffering function of relationship commitment that biological reproduction might act as an anxiety buffer. Here, Florian, Mikulincer, and Hirschberger (2002) found increased reports of romantic commitment following MS (Study 1) and a moderation of MS effects on WD (Study 2). This moderation indicates reduced MS effects under conditions of increased salience of commitment to a romantic relationship. In another study, Hirschberger, Florian, and Mikulincer (2002) found that following MS, people were willing to make more compromises in mate selection. Speculating on why relationship commitment might be relevant under conditions of MS leads to one of the most basic functions of selecting a mate, namely, producing offspring. Thinking about the increased likelihood of having offspring due to a romantic relationship may buffer death-related worries. However, it is still an open question whether the effects regarding romantic commitment can be traced back to increased likelihood of reproduction. Mikulincer, Florian, and Hirschberger (2003) point out that romantic relationships may buffer existential anxiety by satisfying attachment concerns. Furthermore, living in romantic partnerships is assumed to be an important component of most cultural worldviews as well as a source of self-esteem, which, according to TMT, is a buffer against death anxiety. In the present research, we investigate whether anticipating offspring alone is sufficient to buffer death-anxiety.

Recently, Wisman and Goldenberg (2005) tested the hypothesis that MS increases the number of children people intend to have. For male but not for female Dutch participants, this hypothesis was supported in three studies. For female participants, the authors showed that the MS effect on number of children wanted was moderated by individual worldviews regarding the relative importance of career strivings as well as by beliefs about compatibility or incompatibility of motherhood and career. Thus, MS *de*creased the number of desired children for those women who strongly emphasized career strivings and had no effect in those who less strongly approved of having a career (Study 3). However, Study 4 showed that if the compatibility of motherhood and career was pronounced MS *in*creased the number of children women desired to have. If incompatibility was pronounced MS had no effect. The authors argue that both procreation strivings as well as career strivings may be important constituents of women's cultural world-

views. Therefore, following MS both these strivings may be of increased importance. However, when motherhood and career are perceived as being incompatible career strivings may neutralize or even reverse the anxiety buffering function that desiring offspring might have.

Another perspective on why offspring concerns may be relevant to terror management comes from evolutionary theory. Here, it is not individual self-preservation but rather preservation of individual characteristics by raising one's own children, and thus reproduction that is the underlying principle guiding behavior (e.g., Hamilton, 1964; Dawkins, 1976). In line with this notion a specific preference structure that works in favor of reproduction might have evolved phylogenetically. As Solomon, Greenberg, and Pyszczynski (1997) put it, different psychologically rooted motives exist that may be assumed to be functionally equivalent in serving reproduction, including the "desires for life, sex, and the survival of one's offspring" (p. 60). However, in line with evolutionary reasoning it might be plausible to assume a psychological structure that regulates the hierarchy of these motives in accordance with their functionality for reproduction. If such a motivational structure exists, losing the opportunity to have children might be the ultimate threat rather than losing one's own life (which does not necessarily imply that reproduction has not taken place). Being reminded of the opportunity to have children might therefore reduce the threat of being mortal.

The present research

In this paper we present three studies in which we further explored the general assumption that pursuing and anticipating own biological reproduction might work as a buffer of existential anxiety. This assumption is based on the idea that the biological reproduction of one's own characteristics might be an effective way of attaining symbolic immortality of the individual self. Additionally, in a hierarchy of motives, reproduction may even be more important than the desire for individual self-preservation. From this latter perspective, death anxiety would serve the reproduction motive. Hence, if reproduction is anticipated threats to the life of the individual self would cease to be worrying.

We conducted Study 1 to test the hypothesis that the desire for offspring is increased following MS for German participants. In Study 2, we proposed that if reproduction acts as an anxiety buffer, the accessibility of children-related thoughts should be increased following MS. Finally, in Study 3, we investigated whether the salience of one's own offspring eliminates the MS effect on WD.

Study 1

In Study 1, we examined the hypothesis that desire for offspring is increased following MS in a German sample. This idea is grounded in the assumptions that MS causes the desire to ensure symbolic immortality and that strivings for offspring are a way of increasing the likelihood of attaining this by extending the self to a generative organism.

In contrast to the research by Wisman and Goldenberg (2005) we decided to operationalize desire for offspring not by asking about the *number* of children people wanted to have but by asking about the desire to have *any children at all*. We propose that this absolute decision for or against children should be less prone to being influenced by specific conflicting worldviews such as those regarding women's career strivings (Wisman & Goldenberg, 2005). Thus, in our study we did not expect MS effects on desire for offspring to be moderated by participant's gender.

Method

Participants and design

At the University of Munich we asked 15 men and 79 women with an average age of $M = 24.0$ ($SD = 5.2$) to participate in a short questionnaire study on different attitudes towards their own life and society. Eight of them indicated having children.[1]

We used a one factor design with two conditions, manipulating MS (MS/MNS).

Procedure and materials

On receiving a packet of questionnaires participants first read a brief instruction. MS was then manipulated using an adaptation of "The Projective Life Attitudes Assessment" that has been used in previous studies on terror management (cf. Dechesne et al., 2003). In the MS condition participants were asked to write down the first sentence that came to their mind when they thought about their own death. In the control condition, the same question was asked with regard to dental pain. We then used the PANAS scales (Watson, Clark, & Tellegen, 1988; in a German version by Krohne, Egloff, Kohlmann, & Tausch, 1996) as a filler questionnaire to enable us to measure our central dependent variables after a delay in line with the procedure used in preceding MS-studies (e.g., Arndt, Greenberg, Solomon, Pyszczynski, & Simon, 1997). As has been reported in other terror management research, MS did not influence the PANAS-values. This was also the case in Studies 2 and 3. Thus, we did not include the PANAS-values in any of the following analyses.

After two questions concerning parental status, the participants were asked, in a dichotomous format, whether or not they had a general desire to have own children one day. Then, as our central dependent measure, participants were asked to answer six Likert-type items regarding their desire to have any own children on 11-point scales. The questions were "How strong is your desire for children at present?" (from 0 = "not at all" to 10 = "very much"), "When do you

[1] We included both parents and non-parents in the main analyses, as the effect of MS on the desire for having children should not be restricted to the wish for a first own child but is also assumed to apply to the urge for *additional* children.

intend to fulfil your desire for children?" (from 1 = "in 1 year" to 11 = "more than 10" years), "Can you imagine that you won't have own children?" (from 0 = "not at all" to 10 = "very much"; inverted), "Would you like the idea of having a child soon?" (from 0 = "not at all" to 10 = "very much"), "How important is it for you to prevent pregnancy by using contraceptives?" (from 0 = "not at all" to 10 = "very much"; inverted), and "How likely do you think it is – independent of your desire for children – that you will have at least one child at some point in the future?" (from 0 = "not at all" to 10 = "very much").

At the end of the study, participants were debriefed and thanked for their participation.

Results

None of the participants in the MS condition indicated that he/she had no general desire to have children, whereas in the MNS condition one man and five women out of 44 participants (13.6%) indicated having no general desire for children, $\chi(1) = 7.14$; $p < .01$. The effect remained significant if all 15 men were excluded from the analysis.

We computed a composite measure of desire for offspring by calculating the mean over all respective items excluding the item on use of contraceptives due to a low corrected item-total correlation of $r_{it} = .10$. The reliability of the resulting five-item measure was acceptable, $\alpha = .75$. We then submitted this index to a 2 (MS/MNS) × 2 (male/female) ANOVA. This analysis revealed a main effect of MS, $F(1,90) = 7.80$; $p < .01$, indicating increased desire to have offspring in MS participants compared to MNS participants. No other effects reached significance (for cell means see Table 1).

The results did not change when we excluded participants who reported having children from the analyses.

Discussion

In Study 1, the hypothesis of increased desire to have offspring could be confirmed for both the dichotomous and the continuous measure of desire to have offspring. These findings suggest that having own children might be important to buffer the death threat.

The results of Study 1 replicate previous findings by Wisman and Goldenberg (2005) who found Dutch men to increase the number of children desired following MS. However, whereas these authors did not find any MS effect on desirability of offspring for women, our Study 1 revealed that MS increased the desire to have any children at all in both men and women. This difference in results might be related to the way in which desire for offspring was operationalized in the two (sets of) studies. The Wisman and Goldenberg studies differ from Study 1 regarding the operationalization of procreation strivings. Whereas in Study 1 participants were asked whether they wished to have any children at all, in the Wisman and Goldenberg studies they were asked about how many children they wanted to have. Yet, it might be necessary to differentiate between the desire to have more or less children and the desire to have at least one child (instead of having no child at all). For buffering existential threat, the latter desire might be more important than the former. If it is ensured that one will have at least one child a stream of descendants is possible, if it is not, individuals may face a significant proof of their own demise. Whereas under MS the question of *how many* children individuals intend to have may be subject to conflict with different aspects of their worldview, the desire for at least one child should be significantly less questioned under most conditions.

However, we cannot preclude that cultural differences between the Dutch samples and the sample in Study 1 may also be responsible for the lack of any interaction between MS and gender. Cultural background of the respondents can be assumed to determine the extent to which opposed worldviews, like importance of women's career strivings, might outweigh offspring concerns. Here, the results by Wisman and Goldenberg (2005) may be due to a specific Dutch situation. In Germany, the situation might be quite different, since within the last 5 years a major public debate has developed that stresses (too) low birth rates and the desirability of academic women having children. Hence, in our German sample strong pro-offspring worldviews may have reduced a possible conflict between the desire for offspring and women's career strivings by increasing the relative weight of the former desire.

The result that MS effects on self-reported desire for offspring can be found for participants of both genders highlights the generality of a possible anxiety buffering function of offspring-related thoughts. In Study 2, we therefore wanted to extend Study 1 as well as the Wisman and Goldenberg studies by testing whether offspring buffer processes can also be detected *implicitly* by measuring the accessibility of offspring-related thoughts following MS.

Table 1
Desire for offspring: means, standard deviations and sub-sample sizes for MS and gender (Study 1)

	Mortality salience condition			
	Mortality salient (MS)		Mortality not salient (MNS)	
	M	*SD* (*n*)	*M*	*SD* (*n*)
Women	6.21	1.61 (43)	4.26	1.95 (36)
Men	5.20	0.42 (6)	4.38	1.86 (9)

Study 2

In Study 2, we wanted to investigate the anxiety buffering function of anticipated offspring more closely. TMT research has shown that increased WD following MS is accompanied by increased accessibility of death-related thoughts (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994; Arndt et al., 1997). Moreover,

Arndt, Greenberg, and Cook (2002) have also found that the accessibility of worldview-related concepts increases following MS. They infer that MS automatically increases the activation of those concepts that are functional for buffering death anxiety. Based on this research we assume that if having or anticipating children acts as an anxiety buffer, offspring-related thoughts should be increased in the MS compared to the MNS condition. We tested this hypothesis in Study 2.

Method

Participants and design

For this study, we merged the data sets of two samples, one recruited at the Universities of Jena and Magdeburg and the other at the University of Munich. In Jena and Magdeburg we approached 99 female and 15 male students with a mean age of $M = 21.4$ ($SD = 3.3$) to fill out a questionnaire on motivation research. For some of the students participation was recognized as fulfilling part of a course requirement. We excluded two participants who reported a suspicion about the purpose of the dependent measure in the post-experimental questionnaire from the sample, leaving us with a sample of 112 participants (97 women, 15 men) with a mean age of $M = 21.4$ ($SD = 3.3$). In the Munich sample 73 students (44 women, 28 men, one missing value) with a mean age of $M = 27.9$ ($SD = 11.7$) were asked to take part in a set of diverse psychological studies in which they would have to fill out some questionnaires about different aspects of their lives. We excluded three participants who failed to comply with the instructions, hence, the resulting sample consisted of 43 women and 26 men (one missing value) with a mean age of $M = 28$ ($SD = 11.9$). Merging the two data sets resulted in a final sample of 140 women, 41 men and one person of unspecified gender with a mean age of $M = 24$ ($SD = 8.4$).

The study was based on a one factor (MS/MNS) design.

Procedure and materials

The participants received a packet of questionnaires, introduced by a brief general instruction and followed by a warm-up questionnaire.[2] We then manipulated MS by randomly assigning each participant to one of two different tasks. Both tasks were framed as a projective personality inventory and consisted of similar questions that had been adapted from the classical MS-treatment used by Greenberg and colleagues (e.g., Rosenblatt et al., 1989). In the MS condition, participants were asked to imagine that they would die of an infectious disease.[3] Following that, they were asked two questions: (1) Please briefly describe the emotions that the thought of your own death arouses in you. (2) Please jot down as specifically as you can the thoughts that occur to you about what happens as you die of the disease and once you are physically dead. In the MNS condition the participants were asked to write about having dental pain. This was followed by filler questionnaires in order to distract the participants from actively thinking about the treatments. As fillers we used the German version of the PANAS (Krohne et al., 1996) for both sub-samples and in the Jena and Magdeburg sample we also added a questionnaire on sleeping and wakening patterns.

A word completion task served as the dependent measure of offspring- and death-related thoughts. In this task participants were asked to complete 24 word fragments to give the first word that came into their mind. Among 17 filler fragments, six fragments could be completed to yield the death-related words *grave* ("Gra*b*"),[4] *corpse* ("*Lei*che"), *gravestone* ("*Grab*stein"), *coffin* ("Sa*rg*"), *obituary* ("*Todes*anzeige"), and *death* or *dead* ("T*od*/t*ot*"). We computed an accessibility score for death-related words by summing up all fragments that were completed to give death-related words. Offspring accessibility was measured by a single word fragment that could be completed to *children* ("*K*inder"). Alternatively, this latter word-fragment could have also been completed as *cows* ("*R*inder"), *finder* ("*F*inder"), or *less* ("*m*inder").

After filling out a further questionnaire, not relevant to the present study, participants were checked for suspicion, debriefed and thanked for their participation.

Results and discussion

First, we checked whether the findings from terror management research concerning increased accessibility of death-related words following MS could be replicated. A *t*-test revealed significantly increased accessibility rates for death-related words in the MS ($M = 0.78$; $SD = 0.88$) compared to the MNS ($M = 0.55$; $SD = 0.78$) condition, $t(142) = 1.63$; $p = .05$ (one-tailed). Then, we tested our main hypothesis regarding children-related completions by calculating a 2(MS/MNS) × 2(male/female) ANOVA.[5] As predicted, the only effect we found was a main effect for

[2] Please note that the questionnaire used in Jena and Magdeburg differed from the one used in Munich with regard to the warm-up questions. In Jena and Magdeburg we asked participants to fill out the Desirability of Control Scale (Burger & Cooper, 1979). In Munich we asked them to write a short essay about different aspects of life, such as, for example, their thoughts about trees or life in Munich. However, as the tests of the hypothesis were not influenced by the sub-sample, we make no further reference to this difference.

[3] In contrast to classic manipulations of MS we introduced an infectious disease as the cause of death. That was in order to make this condition comparable to a second experimental condition involving an infectious disease which we ran in the Magdeburg sub-sample. As this additional condition has no bearing on this paper, it is not considered any further.

[4] Letters that had been left out in the task material are printed in italics.

[5] Although our dependent variable is dichotomous (1, children-related completion; 0, other completion), according to Cox (1970, p. 16) analysis of variance is justified if the means are approximately within the range of .20 and .90, which is the case for our data. Separate χ^2-tests confirmed the effect of MS on children-related word-completions for both women, $\chi^2(1) = 5.68$; $p < .05$, and men, $\chi^2(1) = 2.94$; $p < .09$.

MS, $F(1,139) = 4.87$; $p < .05$, indicating increased children-related word completions in the MS ($M = 0.85$; $SD = 0.36$) compared to the MNS condition ($M = 0.68$; $SD = 0.47$).

The finding that MS increases the accessibility of offspring-related thoughts supplements the results of Study 1 suggesting that offspring-related thoughts function as a buffer against MS effects. Thus our findings extend the results of Arndt et al. (2002) who found that MS increased the accessibility of thoughts related to nationalism for men as well as the accessibility of thoughts related to romantic commitment for women. In our study, however, we found the MS effect on the accessibility of offspring-related thoughts for both men and women. Although future research using a multiple- instead of a one-item measure of accessibility of offspring-related thoughts is advisable, our results are a first step suggesting that anticipating or thinking about own children might work as an anxiety buffer for both women and men.

If having children plays a role in buffering death anxiety one can further assume that the salience of own children might reduce MS effects on an alternative anxiety buffer such as cultural WD. We investigated this notion in Study 3.

Study 3

In Study 3, we tested the hypothesis that MS effects on WD disappear under conditions of salient offspring. We manipulated offspring salience by asking the participants to write about what it would be like if they had children of their own one day. We did not directly manipulate whether offspring is anticipated or not as two pre-studies had indicated the difficulty in manipulating the perceived likelihood of having offspring in the student population. In these pre-studies, a direct manipulation did not succeed, maybe due to relatively strong preexisting beliefs about the likelihood of offspring or the work of a ceiling effect. That is, after reading a text on either high or low likelihood of having children, students rated the likelihood of having own children one day on a 10-point scale as $M = 8.47$ ($SD = 1.85$) and $M = 8.62$ ($SD = 1.66$). In a control group that did not involve any prior thought about the likelihood of having offspring, students even estimated the likelihood at $M = 9.10$ ($SD = 1.20$). As students are obviously very optimistic about becoming parents at some time in the future, the salience of offspring might be sufficient to buffer death anxiety in this population.

Method

Participants and design

In the entrance hall of the University of Jena, we asked 70 students (33 women and 37 men) with an average age of 23.4 years to fill out a questionnaire on personality and social perception. We offered a payment of 2 Euros for participating in the 20-min study. Due to the nature of our dependent measure, which referred to the evaluation of East and West Germans by East Germans we only included those participants who indicated that they had been born in East Germany and that their lives were still centred in East Germany. This left 58 participants in our sample (26 women and 32 men).

The study used a 2 (MS/MNS) × 2 (offspring salient/not salient) × 2 (evaluation of East/West Germans) design with repeated measurement on the last factor.

Procedure and materials

The participants were seated in an area separated off from the entrance hall where they received a packet of questionnaires. Following a general instruction, we first manipulated the salience of offspring by either asking the participants to answer two questions about having own children or about watching television. After that, the participants were asked to respond to two similar questions that either concerned their own death or suffering dental pain. These two questions served as the manipulation of MS. For each manipulation, participants were randomly assigned to one of the two conditions. Similar to the MS manipulation in Studies 1 and 2, both tasks were framed as a projective personality inventory and consisted of similar questions. The questions were, "1. Please briefly describe the emotions that the thought of (having own children/watching television; your own death/dental pain) arouses in you", and "2. Please jot down spontaneously and as specifically as you can the thoughts that occur to you about (what it will be like when you have own children/what it is like when you are watching television; what happens as you die and once you are physically dead/what happens as you suffer dental pain and after you have had dental pain)".

Then the participants filled out the German PANAS (Krohne et al., 1996) and a lengthy questionnaire about sleeping and wakening patterns that both served as filler questionnaires distracting the participants from the experimental treatments. In the next block of the questionnaire the participants were told that we were now interested in their personal judgments and perceptions in different areas. To introduce the idea of judging social groups on certain attributes, we first inserted a further filler questionnaire about the evaluation of four different professional groups to be rated on both four positive and four negative adjectives. After that, the task changed to the evaluation of East and West Germans, presented in counterbalanced order. For each target group, the participants rated the degree to which 16 positive and 16 negative adjectives appropriately described the group on 10-point scales from 1 = "not at all" to 10 = "very much". The adjectives had been chosen to represent attributes that are stereotypical for one of the two groups or for neither of them, for example, adjectives such as *helpful*, *uncertain* (stereotypic for East Germans), *eloquent*, *know-all* (stereotypic for West Germans), *appreciative* and *stupid* (not relevant to either stereotype). The selection was taken from a pool of pre-tested adjectives.

To check the effectiveness of the offspring salience manipulation, we included an open question on the last

page of the questionnaire. Participants were asked to imagine that they would, at some point in the future, be able to give some money to somebody, and to indicate which potential beneficiary they would consider first. The answers were coded regarding whether the participants mentioned own children and own family or others (parents, charities, unidentified others). After answering some final sociodemographic questions, participants were debriefed, paid, and thanked for their participation.

Results

We computed composite scores for the evaluation of East (ingroup) and West Germans (outgroup) by subtracting the negative attribute values from the positive ones. For both the evaluation of the East Germans ($\alpha = .85$) and that of the West Germans ($\alpha = .88$) we obtained satisfactory scale reliabilities. The manipulation check indicates a successful manipulation of offspring salience as the relative magnitude of selecting children and family as the beneficiary was increased in the offspring salient conditions (66%) compared to the TV salient conditions (37%), $\chi^2(1) = 4.54$; $p < .05$.

We submitted the composite scores for target group evaluations to a 2 (MS/MNS) × 2 (offspring salient/offspring not salient) × 2 (male/female) × 2 (ingroup/outgroup target) ANOVA with repeated measures on the last factor. A main effect was identified for the target factor, $F(1,50) = 20.87$; $p < .001$, indicating more positive evaluation of the ingroup than the outgroup. No other main effect was found. An unexpected two-way interaction effect occurred for target group and offspring salience, $F(1,50) = 5.13$; $p < .05$, reflecting ingroup bias in the television salient condition only, $F(1,50) = 22.83$; $p < .001$. Furthermore, a marginal target–gender interaction occurred, $F(1,50) = 3.15$; $p < .09$, that resulted from the fact that ingroup bias was significant in men, $F(1,50) = 22.48$; $p < .001$, but only marginally significant in women, $F(1,50) = 3.53$; $p < .07$. There was also a marginal two-way interaction of MS and offspring salience, $F(1,50) = 3.44$; $p < .07$, indicating marginally increased group evaluations in the offspring salient vs. non-salient condition for MS participants, $F(1,50) = 3.58$; $p < .07$. However, most importantly, the analysis revealed the predicted three-way interaction, $F(1,50) = 5.94$; $p < .05$ (for cell means see Table 2). No other effects reached significance.

To explore the nature of the observed three-way interaction between target group, MS and offspring salience in more detail we calculated separate 2 (MS/MNS) × 2 (male/female) × 2 (ingroup/outgroup target) analyses for offspring salient and offspring not salient participants. As predicted, a marginally significant interaction of MS and target group was found for offspring not salient participants, $F(1,24) = 3.42$; $p < .08$, but not for those in the offspring salient group. Simple effect analyses for offspring not salient participants showed that outgroup evaluation was decreased following MS vs. MNS, $F(1,24) = 4.68$; $p < .05$. For ingroup evaluation no effect occurred. Looked at differently, relative favoritism towards the ingroup over the outgroup was more pronounced in the MS condition, $F(1,24) = 19.75$; $p < .001$, than in the MNS condition, $F(1,24) = 4.01$; $p < .06$.

Conducting simple effect analyses for offspring salient participants led to the unexpected result that here MS vs. MNS was followed by a significant increase in outgroup evaluation, $F(1,26) = 5.68$; $p < .05$. Analyzed from a different angle, ingroup favoritism occurred in the MNS condition, $F(1,26) = 4.67$; $p < .05$, but was non-existent in the MS condition.

The results did not change when we excluded one participant who reported having children from the analyses.

Discussion

In line with our hypothesis, we found that offspring salience moderates the MS effect on outgroup evaluation. This supports the notion that the salience of offspring acts as an anxiety buffer helping people to cope with existential threat.

For ingroup evaluations, we did not find any MS effect, indicating that defending the cultural worldview from threats had priority over supporting validators of the cultural worldview. A complicating factor, however, was that in the offspring salient condition not only was the MS effect on evaluations of the outgroup eliminated, we even found a trend for its reversal. That is, in the MS and offspring salient condition the outgroup was evaluated as positively as the ingroup. An explanation for this unexpected pattern could be that anticipated offspring might only become psychologically significant in the MS condition. Here, anticipated offspring might signal symbolic safety from all subsequent threats to one's individual existence, including those that might be chronically salient even in the MNS conditions. As a conse-

Table 2
Group evalutations: means, standard deviations and sub-sample sizes for MS, offspring salience and target group conditions (Study 3)

	Mortality salience condition							
	Offspring salient				Offspring not salient			
	Mortality salient (MS)		Mortality not salient (MNS)		Mortality salient (MS)		Mortality not salient (MNS)	
	M	*SD*/*n*	*M*	*SD*/*n*	*M*	*SD*/*n*	*M*	*SD*/*n*
Ingroup evaluation	1.65	1.33/17	1.80	1.12/13	2.30	1.44/13	2.08	2.06/15
Outgroup evaluation	1.63	1.43/17	0.42	0.98/13	−0.39	1.44/13	0.71	1.63/15

quence, ingroup bias is reduced to zero. In addition, one may speculate that, if raising offspring becomes more important following MS, evaluating West Germans more positively may serve to mitigate possible future intergroup conflicts which, in turn, might be beneficial for own children who would have to grow up in a unified country.

General discussion

In three studies we found evidence that anticipated offspring is important for buffering MS effects on WD. Whereas in Study 1 MS participants exhibited increased desire for offspring, in Study 2 we found that MS increased not only death-related but also children-related thoughts. In Study 3, the salience of having own offspring eliminated the MS effect of increasing WD. These findings highlight the importance of offspring-related thoughts in coping with existential threats. Our findings not only show that children are important in coping with existential anxiety but, furthermore, they may also contribute to a better understanding of why having children is so important for life-satisfaction and well-being.

The offspring buffer in context

In pointing to the important role of offspring in managing existential terror our findings conceptually replicate prior research by Wisman and Goldenberg (2005). However, our results also extend this research as (a) we measured desire for offspring in Study 1 by asking for the desire to have any children at all instead of asking for the *number* of children desired. This difference in measures may explain why we received MS effects for both men and women. Further, (b) in Study 2 we used an implicit measure of offspring concerns which is also thought to represent whether or not children concerns are activated and not whether concerns about having *many* children are activated. This measure also proved to be sensitive for detecting MS effects for both genders. Finally, (c) Study 3 provides direct evidence for an anxiety buffering function of thinking about anticipated or actual offspring as thoughts related to own children eliminated the WD reaction which otherwise followed MS. This finding adds to other TMT research showing that activation of one anxiety buffer eliminates the use of another. For example, this has been shown for self-esteem (Harmon-Jones et al., 1997), where boosts in self-esteem prevented MS from increasing defensive reactions towards a pro- and an anti-American essay. A similar reduction of MS effects on WD has also been found for thoughts about romantic relationship commitment (Florian et al., 2002), affirmation of personal values (Schmeichel & Martens, 2005) and affirmation of religious beliefs (Jonas & Fischer, 2006).

Although at first glance, our results are incompatible with Wisman and Goldenberg's (2005) finding that gender moderates MS effects on procreation strivings, we in fact believe that our findings are perfectly consistent with the results and theorizing by Wisman and Goldenberg. A possible explanation for the missing impact of gender in our results focuses on the different ways in which offspring concerns were operationalized in our studies compared to those by Wisman and Goldenberg (2005). In our studies we had a dichotomous understanding of desiring and having offspring (or not) which is expressed in the Study 1 measure in which we asked about the desire to have *at least one* child. This is in contrast to the latter authors who asked about the *number* of children people desired. We think that increasing the subjective likelihood of having any offspring at all should be a highly preferential buffer against existential fears as it suggests immortality in both a literal as well as in a symbolic way. In addition, never having children seems to be perceived as the lack of an essential element of life in most cultures. Therefore, conflicting worldviews would have to be extremely strong to interfere with the offspring buffer's utility. This may be different for the question of how *many* own children one wishes to have. As soon as a minimal number of children is secured, having more or less children becomes a question of coming more or less close to the demands of the cultural worldview. Only at this stage conflicting worldviews may be taken into consideration which may decrease the number of children desired under MS. This may explain why females' perceptions of incompatibility of motherhood and career concerns have decreased the number of desired children in the Wisman and Goldenberg studies: In none of their studies, not even in the MS-conditions, was the mean number of desired children below 2 for females (Study 1: $M = 2.3$; $SD = 1.00$; Study 2: $M = 2.37$; $SD = 1.23$; Study 3: $M = 2.03$; $SD = 1.19$; Study 4: $M = 2.38$; $SD = 0.76$; $M = 2.75$; $SD = 1.43$) and the respective standard deviations suggest that in each of the experimental groups only a small proportion of women can have indicated a number of desired children below 1. Hence, the lack of MS effects for women might be traced back to the fact that by indicating a number of desired children higher than zero the female participants in these studies had already stated their wish to have descendents which should secure offspring. Therefore, conflict between different ways of worldview confirmation (having many children vs. having a career) had the potential to block the striving for more children under MS for women. For men, higher perceived compatibility of procreation and career concerns may have prevented such a conflict from ever having occurred.

As a possible additional explanation for the lack of any interaction effect involving gender in our data we also have to consider a possible difference in motherhood-related cultural worldview between the Netherlands and Germany. In 2003, the year our studies took place, Germany had the lowest birth rate in the European Union (EU; 8.7 births per 1000 inhabitants) while the Netherlands was among the three countries with the highest birth rate in the EU (12.4 births per 1000 inhabitants; Bundeszentrale für politische Aufklärung, 2004). In Germany these data and the anticipation of dramatic demographic changes gave rise to a broad public debate on how to increase the birth rate and how to encourage young people to have children. This public climate should have led to an explicit pro-parenthood norm in society which, in turn,

may have fostered increased pro-motherhood attitudes in German compared to Dutch women. As Wisman and Goldenberg (2005) have shown, the relative value of children vs. career concerns might be assumed to moderate the effect of MS on number of desired children. Consequently, for German in contrast to Dutch women, the anxiety buffering function of desire for offspring may have been less restricted by the competing cultural worldview of valuing a career.

Offspring and self-preservation

According to TMT, people are most fundamentally motivated to preserve their individual existence. Thus, the awareness of one's own mortality has the potential to create existential terror. The stability of cultural ingroups is assumed to work as an anxiety buffer because the prolonged existence of social aggregates to which the individual belongs contributes to a sense of symbolic immortality of the individual (e.g., Castano & Dechesne, 2005). Likewise, the prolonged existence of one's own children might similarly act as a buffer against death anxiety. That is, offspring may be perceived as an accessible means of attaining symbolic immortality, as the self is extended to a generative organism. In addition, this organism is perceived as being physiologically and psychologically similar to the individual self, thus being a good symbolic representative of the individual self. Our results support the notion of anticipated offspring acting as a buffer against existential anxiety, as in Study 1 and Study 2 increased reproduction-related intentions and increased activation of children-related thoughts may have been welcome to buffer death anxiety. Additionally, and similar to other anxiety buffer studies (Harmon-Jones et al., 1997; Florian et al., 2002), in Study 3 the salience of anticipating offspring might have made further increased anxiety buffering by WD unnecessary and thus might have eliminated the MS effect on WD.

Evolutionary theory might suggest a slightly different interpretation. In contrast to TMT, the preservation of own *characteristics* rather than the preservation of an *individual's* existence is assumed to be the master principle guiding behavior and perhaps also humans' motivational preferences. This means that if own death is salient, this may ultimately pose a threat to perceived capabilities of individual reproduction. Hence, strengthening the intention to have own children (Study 1) as well as increasing the activation of offspring-related thoughts (Study 2) may follow in order to counteract the perceived danger of failing to reproduce because of prior individual extinction. In turn, in situations in which the anticipation or actual realization of own offspring is salient death might lose some of its threatening quality resulting from reproduction being endangered and therefore, effects of MS disappear (Study 3).[6]

[6] Of course, it is not only necessary to reproduce but also to raise children for own genes to be transmitted into the future. However, as – at least for people in highly industrialized countries – raising offspring is usually not endangered by lack of basic resources, individuals might anticipate that having children is synonymous with seeing them grow up.

It might be too early to choose between these two interpretations. In a response to comments on TMT, criticizing its missing link to modern evolutionary theory, Solomon et al. (1997) state that although the successful transmission of genes by raising one's own children might be the selecting principle in the background, it is not clear whether the transmission of genes is also *psychologically* represented as a desired end state. Generally accepting evolutionary theory, the authors suggest that self-preservation has been selected as a guiding principle of human motivation due to its high value for reproductive fitness. The question of whether reproduction concerns are manifested as a psychological structure warrants future research.

However, taking both TMT and the evolutionary notion seriously may lead to a refinement of the motivational propositions underlying TMT. What may be concluded from our findings is that having offspring is strongly related to the preservation of aspects of the human self. Whether *individual* self-preservation or reproduction of own characteristics is the driving motive might be reduced to the question "what aspects of the self are included when one speaks of self-preservation?". Psychologically, there may be no sharp difference between the self as a biological entity and the self as a collection of an individual's characteristics and belongings. Instead, these different aspects of the self might converge in a psychological concept of the self. Such a concept of the self implies both an individual self as well as a social self that is derived from individual characteristics and attachments. Such a construct of self is complex, highly flexible to situational demands and might include others in the definition of the self (e.g. Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). One's own children may be a part of most social selves that one has. This might be due to a high degree of identification (Bischof, 1989) with and a great amount of perceived – or anticipated – similarities with one's own children. In addition to this centrality of children for the self, children may themselves reproduce and have own children. Thus, having children might start – or rather continue – the transmission of the self into the future. There may be different ways of doing this, but offspring can be one path to – more or less symbolic – immortality.

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