Age Differences in the Effects of Mortality Reminders on the Correspondence Bias

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Abstract

According to terror management theory, awareness of death affects diverse aspects of human thought and behavior. Studies have shown that older and younger adults differ in how they respond to reminders of their mortality. The present study investigated one hypothesized explanation for these findings: age-related differences in the tendency to make correspondent inferences. The correspondence bias was assessed in younger and older samples after death-related, negative, or neutral primes. Younger adults displayed increased correspondent inferences following mortality primes, whereas older adults' inferences were not affected by the reminder of death. As in prior research, age differences were evident in control conditions; however, age differences were eliminated in the death condition. Results support the existence of age-related differences in responses to mortality, with only younger adults displaying increased reliance on simplistic information structuring after a death reminder.

Key Words: age, correspondence bias, mortality salience

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According to terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986), humankind's desire for continued survival combined with awareness of their own mortality creates the potential for overwhelming anxiety, the behavioral effects of which are far-reaching. People protect themselves from the potential for anxiety that results from awareness of death by viewing themselves as valuable contributors to a meaningful world, rather than as mere animals fated only to obliteration upon death. This suggests that when reminded of death, people should become motivated to bolster their meaning-providing worldview and their self-worth (for a review, see Greenberg & Arndt, 2012). In support of this, substantial research indicates that younger adults reminded of death strive to uphold their self-esteem and faith in the cultural worldviews. For example, among younger adults, mortality salience (MS) amplifies negative reactions to those who violate their worldviews (e.g., Florian & Mikulincer, 1997).

Given older adults' increasing closeness to life's end and greater susceptibility to physical ailments, as well as inevitable experiences with the loss of loved ones, this group is a unique population to investigate behavioral responses to increased awareness of life's finite nature. If, as TMT suggests, amplified awareness of mortality results in increased defensiveness, older adults would be expected to show greater levels of defensive behavior than their younger counterparts. However, older adults generally report lower fear of death than younger adults (e.g., Henrie & Patrick, 2014; Rasmussen & Brems, 1996). Additionally, within older populations, increasing age is associated with greater death acceptance (e.g., Cicirelli, 2003). These findings suggest that older adults may not respond to increased awareness of mortality with the same type of defensiveness typical of younger adults. Though the inclusion of older participants in TMT research is relatively recent, initial findings suggest there are age differences

in response to MS. Following MS, younger adults are more punitive towards moral transgressors, in terms of their ratings of the perceived severity of the transgression and the harshness of an appropriate punishment. This greater harshness among younger adults stands in contrast to older adults' lower punitiveness following a death reminder (Maxfield et al., 2007). This effect is especially prominent among older individuals with greater executive functioning (Maxfield, Pyszczynski, Greenberg, Pepin, & Davis, 2012).

One possible explanation for younger and older adults' contrasting responses to MS is the difference in their attributional styles (e.g., Lachman, 1990). The correspondence bias, which is the tendency to make dispositional attributions for the behavior of others (Gilbert & Malone, 1995), is one such dimension on which younger and older adults differ. In the initial demonstration of this phenomenon (Jones & Harris, 1967), participants read scenarios in which an author is assigned to argue a position (a situational constraint), but results revealed that participants still attributed corresponding beliefs to the author (a dispositional characteristic). Reliance on dispositional inferences is even more common among older adults (e.g., Blanchard-Fields & Horhota, 2005; Stanley & Blanchard-Fields, 2011), suggesting that older adults may be prone to making simplistic attributions. These findings may shed light on the aforementioned studies of responses to moral transgressions.

The simplest explanation for a person violating social norms is that he or she is the sort of person who does such things -- a dispositional deficiency deserving of punishment. Indeed, in control conditions, older adults rated moral transgressions more negatively than younger adults do (e.g., Maxfield et al., 2012; 2007), a finding that could be the result of cohort effects and/or the tendency to make greater correspondent inferences. However, lower punitiveness among older adults reminded of death cannot be explained as characteristic of those already prone to

make dispositional attributions. Therefore, it may be that MS affects young and older adults' attributional styles differently, with MS leading to greater correspondent inferences among younger adults but lower correspondent inferences among older adults.

Research with younger adults reveals that MS leads to more simplistic structuring of social information (e.g., holding onto initial impressions of people and preferring them to be behaviorally consistent; Landau et al., 2004). This effect is especially prominent among individuals with preference for structured information and experience. Landau and colleagues interpreted their findings as indicative of an increased need for the comfort associated with structure and consistency when confronted with increased awareness of one's own mortality. This work suggests that older adults may make even greater dispositional attributions following reminders of death. However, the fact that MS makes older adults less punitive toward a moral transgressor suggests otherwise. Indeed, this reduction in punitiveness suggests that MS either does not affect older adults' attributions or makes them less dispositional.

To test this potential age difference in response to MS, we examined older and younger adults' tendencies to make correspondent inferences following either death or non-death related primes. Age differences in the correspondence bias were expected, especially in the control condition, as observed in previous studies (e.g., Blanchard-Fields & Horhota, 2005; Stanley & Blanchard-Fields, 2011). As the first known study of TMT and the correspondence bias, we predicted that younger adults would display increased correspondent inferences when reminded of mortality, based on previous research indicating a preference in younger adults for more simplistic structuring following MS (Landau et al., 2004). Because older adults are generally more prone to the correspondence bias and similar constructs have not been examined with this population in TMT research, predictions about older individuals were generally more tentative.

Maxfield et al. (2007) suggested that older adults might respond to MS with a broader perspective, acknowledging the complexity of causation of events. Perhaps then MS would not increase the correspondence bias in older individuals, and may even reverse this trend.

Additionally, as in previous research concerning the correspondence bias (e.g., Blanchard-Fields & Horhota, 2005; Mienaltowski & Blanchard-Fields, 2005), we included confidence ratings, wherein participants indicated how confident they were about their attributions. Based on the aforementioned studies, we expected older adults to report greater confidence in their attributions; further, to the extent that MS impacts correspondent inferences, it may also similarly impact confidence in those inferences. Finally, positive and negative affect were assessed. Younger participants rarely report a change in affect following MS, but there is little data concerning older adults' affective responses to MS, and we deemed it important to gather further information about the potential impact of death-related primes on older adults' affect, especially given the role of affect in older adults' correspondent inferences as reported by Mienaltowski and Blanchard-Fields (2005).

Method

Participants

Eight-eight younger adults and 76 older adults participated in exchange for course credit or \$10. Nine younger participants were excluded from reported analyses: five based on awareness of TMT and hypotheses, as reported during the debriefing process, three based on age (over 30 and no longer considered younger adult), and one based on lack of engagement in the task, as reflected by finishing the questionnaire packet in less than 10 minutes with multiple pages left blank. Six older participants were also excluded from analyses: three were excluded based on failure to pass the cognitive screen, two were excluded because they talked about death

before the study, nullifying the randomization of the task, and one individual was excluded when it was discovered that she had not completed the priming manipulation, an essential part of the experiment. Participants in the final sample used for analyses included 79 younger adults (17-28 years, $M = 19.66$, $SD = 2.25$; 73% female) and 70 older adults (60-91 years, $M = 73.60$, $SD = 6.51$; 70% female). Experimenters were blind to condition, which was randomly assigned.

Procedure and Measures

All procedures were approved by the Institutional Review Board. After providing informed consent, participants completed a well-validated 16-item version of the Need for Closure scale (NFC; Webster & Kruglanski, 1994). This measure was included based on the potential relationship between NFC and the correspondence bias. Individuals with high trait levels of NFC typically favor definitive reasons for behavior and avoid ambiguity, whereas people with low levels of NFC are more comfortable with uncertainty. It may be then that individuals with high levels of NFC would respond with even greater reliance on correspondent inferences, particularly following death-related reminders. The short version has been used previously (e.g., Critcher, Huber, Ho, & Koleva, 2009), and following precedent, two foil items were excluded from calculations of mean scores, for a final 14-item version ($\alpha = .78$). As an assessment of cognitive style, this questionnaire included items such as, “When I am uncertain, I prefer to make an immediate decision, whatever it may be.” Participants indicate the extent to which they agree (1 = *strongly disagree* to 6 = *strongly agree*); mean scores were calculated, with higher numbers indicating greater NFC.

Priming condition. Participants next completed a word puzzle, in which they were instructed to search for neutral words (e.g., computer, build). Embedded within the puzzle were additional words that differed according to priming condition; these additional words acted as a

death prime (MS) or a non-death prime, either a negative or neutral prime. The MS puzzle contained five additional mortality-related words (e.g., funeral, dead), the negative puzzle contained five additional words associated with negative experience (e.g., fail, dismay), and the neutral puzzle contained five additional neutral words (e.g., dinner, river). This brief task allowed us to compare the effects of the subtle priming of death-related words with that of non-death related negative or neutral words; previous studies have shown that the death word primes have a significant impact on both younger and older adults relative to negative or neutral primes (e.g., Maxfield et al., 2012; 2007).

Affect. Next, participants completed the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), indicating on a 5-point scale the extent to which they feel positive ($\alpha = .90$) and negative affect ($\alpha = .82$) “at the present moment.” Aside from gathering affective data, inclusion of the PANAS provided the necessary delay between MS inductions and dependent variables, which allows thoughts of mortality to leave conscious awareness, at which point, MS effects are observed (Pyszczynski, Greenberg, & Solomon, 1999).

Correspondence bias. Participants then read two essays ostensibly written by debate team members. The essays offered opposing assessments of the U.S. President’s job performance. Essay order was counterbalanced. Participants were explicitly reminded that the authors were assigned a position and that they would therefore need to use their “skills and intuitions as a person perceiver to figure out what he really believes” (Gilbert, Pelham, & Krull, 1988, p. 737). Participants indicated on 10-point scales the degree to which each essay reflects the authors’ true opinions. Of importance, we kept the scales about the authors’ own opinions in the same direction; in other words, for both essays, a score of 1 indicated that the author was very much opposed to the President, and a score of 10 indicated that the author was very much in support of

the President. This approach was chosen based on participants' expressed confusion about the scale anchors during debriefing of a related pilot study. In order to create a mean score of responses to the two essays, responses to the essay that was critical of the President were reverse scored, thus making all high scores indicative of correspondent inferences.

Confidence ratings. Confidence in correspondent inferences is considered a useful variable to be assessed in conjunction with the correspondence bias because of the demand characteristics associated with the task (Devine, 1989; Mienaltowski & Blanchard-Fields, 2005). Therefore, after each essay and indication of correspondent inferences, participants were asked "How certain are you in your rating of the author's personal opinion?" on a scale of 1 (*not at all certain*) to 10 (*extremely certain*).

Demographic information. Finally, participants provided demographic information and completed a vocabulary task (Shipley, 1940). Older adults completed a brief cognitive screen, the Mini-Mental State Exam (Folstein, Folstein, & McHugh, 1975). By excluding older adults with compromised cognitive abilities, likelihood of perceiving and recalling the priming manipulation was increased. Based on Folstein et al.'s recommended cut-off for intact functioning, a score of at least 27 (out of 30) was required for inclusion. As noted previously, this resulted in the exclusion of three older participants.

After completion of the study, participants were thoroughly debriefed. During debriefing, participants were asked if they saw any extra words in the word search puzzle and to list the extra words they could recall. The majority of participants were able to recall two or three words. Exclusion of the 10 participants (five younger, five older) who could not recall extra words did not alter the reported results.

Results

Preliminary Analyses

Preliminary analyses indicate that order of essay and gender did not significantly influence results; thus, these variables were not included in reported analyses. Additionally, because we neither predicted nor found any significant differences between the negative and neutral control conditions, the two groups were combined into one control condition.¹ For younger and older adults respectively, this resulted in cell sizes of 25 and 26 for the MS condition and 53 and 45 for the control condition.

Analysis of variance (ANOVA) was used to test for differences between age groups. Older adults ($M = 3.19$, $SE = .08$) tended to indicate greater NFC than younger adults ($M = 3.02$, $SE = .08$), but this difference did not reach significance, $F(1, 147) = 2.29$, $p = .13$, $\eta_p^2 = .02$. On a 1-item measure of self-reported health (1 = *very poor* to 7 = *excellent health*), younger adults rated themselves as healthier ($M = 5.84$, $SE = .15$) than older adults ($M = 5.06$, $SE = .16$), $F(1, 147) = 12.78$, $p < .01$, $\eta_p^2 = .08$. Younger adults had fewer years of education ($M = 13.43$, $SE = .26$) than older adults ($M = 14.48$, $SE = .28$), $F(1, 142) = 7.54$, $p = .01$, $\eta_p^2 = .05$.² Older adults scored higher on the vocabulary task ($M = 33.84$, $SE = .49$) than younger participants ($M = 28.76$, $SE = .46$), $F(1, 147) = 56.58$, $p < .01$, $\eta_p^2 = .28$. Accounting for the variance of NFC, self-reported health, education, and vocabulary scores via inclusion as covariates in ANCOVAs did not significantly impact reported analyses involving the correspondence bias or confidence ratings as the dependent variable.

Affect

Two-way age by prime ANOVAs were conducted on measures of affect. For positive affect, there was a main effect for age, $F(1, 145) = 21.92$, $p < .01$, $\eta_p^2 = .13$; older adults reported higher positive affect ($M = 3.61$, $SE = .09$) than younger adults ($M = 3.00$, $SE = .09$). There was

no effect of prime, $F(1, 145) = .50, p = .48, \eta_p^2 < .01$, and no age x prime interaction, $F(1, 145) = .17, p = .68, \eta_p^2 < .01$.

For negative affect, there was also a main effect of age, $F(1, 145) = 26.71, p < .01, \eta_p^2 = .16$. Older participants reported lower negative affect ($M = 1.17, SE = .06$) than younger adults ($M = 1.58, SE = .06$). There was no effect of prime, $F(1, 145) = .89, p = .35, \eta_p^2 < .01$, nor an age x prime interaction, $F(1, 145) = 1.56, p = .21, \eta_p^2 = .01$.

Inclusion of positive and negative affect as covariates in ANCOVAs did not significantly impact reported analyses involving the correspondence bias or confidence ratings as the dependent variables.

Correspondence Bias³

A two-way age x prime ANOVA revealed that there were no main effects of age, $F(1, 145) = 2.48, p = .12, \eta_p^2 = .02$, or prime, $F(1, 145) = 2.30, p = .13, \eta_p^2 = .02$. However, the age x prime interaction was significant, $F(1, 145) = 5.36, p < .05, \eta_p^2 = .04$. Least significant difference (LSD) adjusted post-hoc comparisons were used to investigate interaction effects. Younger adults in the MS condition were more prone to the correspondence bias than younger adults in the control condition, $p < .01$. Older adults' inferences were not affected by the priming condition, $p = .58$. Looked at differently, older adults displayed greater correspondence bias than younger adults in the control conditions, $p < .01$, as in prior research (e.g., Blanchard-Fields & Horhota, 2005; Stanley & Blanchard-Fields, 2011). However, there were no differences between younger and older adults in the MS condition, $p = .65$. See Table 1 for means and standard errors.

Confidence Ratings

A two-way age x prime ANOVA revealed that there were no main effects of age, $F(1, 145) = 0.01, p = .98$, or prime, $F(1, 145) = 0.16, p = .69$. The age x prime interaction was nearly significant, $F(1, 145) = 3.50, p = .06, \eta_p^2 = .02$. Examination of the LSD adjusted post-hoc comparisons revealed that none reached significance, $ps > .10$. Though not statistically significant, the interaction effect reflects the tendency for MS to increase attributional confidence in young adults, $p = .29$, but reduce it in older adults, $p = .12$. See Table 1 for means and standard errors.

Table 1

Mean correspondence bias and confidence ratings in young and older adults in MS and control conditions

	Correspondence Bias		Confidence	
	MS	Control	MS	Control
	M (SE)	M (SE)	M (SE)	M (SE)
Younger	8.19 (.36) _a	6.99 (.25) _b	7.14 (.42)	6.59 (.29)
Older	7.96 (.36) _a	8.21 (.27) _a	6.46 (.42)	7.29 (.32)

Note: Means with different subscripts differ at $p < .01$. Both mean correspondence bias and mean confidence ratings could range from 1 to 10, with higher numbers indicating greater correspondence bias and greater confidence in one's ratings.

Discussion

Past research suggests that younger individuals are motivated to imbue social information with structure and consistency and that being reminded of death increases this tendency (Landau et al., 2004). The present study offers additional support for this, providing the novel finding that MS increases correspondent inferences among younger adults. Results suggest that when

death concerns are elevated, younger adults are especially likely to make social inferences that give insufficient weight to situational factors, a tendency that has been linked to interpersonal problems of various sorts (e.g., Gilbert & Malone, 1995). As in past research, older participants were more prone to the correspondence bias in the control condition, and this difference was of similar magnitude to that of prior research (e.g., Blanchard-Fields & Horhota, 2005; Mienaltowski & Blanchard-Fields, 2005; Stanley & Blanchard-Fields, 2011). However, older adults' inferences were not significantly impacted by reminders of mortality.

Previous research suggests that older adults' tendency to provide correspondent inferences is increased by negative mood inductions (Mienaltowski & Blanchard-Fields, 2005), which was interpreted as their prioritization of regulating the negative emotional experience over the evaluative component of this inferential task. Although one might suspect that increased awareness of mortality could lead people to experience negative affect, thus resulting in an increased correspondent bias among older adults, there were no differences in older adults' reported affect following a mortality prime. Further, older participants reported less negative affect and greater positive affect compared to younger participants. And contrary to what would be expected if the observed correspondence bias were driven by negative affect, older adults did not display greater correspondence bias after mortality was made salient. This suggests that negative mood is not being increased by MS and that the effect of MS is different from that of negative affect.

Compared to younger adults' increased reliance on cognitively simplistic information following death-related reminders, older adults' attributions were not affected by this prime. This raises the question of whether the manipulation was processed by older participants. Although this is an important possibility to consider, we are confident that older participants

perceived the death-related words included in the manipulation based on the effectiveness of this exact prime in previous studies with older adults (e.g., Maxfield et al., 2014; 2012; 2007). The present findings suggest that in contrast to younger adults, increasing the simplicity of one's attributions is not a response to reminders of mortality for older adults. However, older adults did not reduce the simplicity of their attributions either. Therefore, reduced correspondent inferences cannot account for the increased leniency older adults show toward moral transgressors after MS.

We also looked at confidence ratings, which are frequently used in conjunction with attributional assessments because they are presumably less susceptible to experimental demands (Devine, 1989). Mienaltowski and Blanchard-Fields (2005) found that older adults were more confident in their attributional assessments than younger adults in a neutral mood condition, and this age difference was greater following a negative mood induction and eliminated following a positive mood induction. In spite of a significant interaction of age and prime, the present findings revealed non-significant pairwise comparisons and therefore did not align with previous work. If anything, the tendency was for older adults to have slightly lower confidence ratings after MS.

Limitations and Conclusions

The present study provides an initial look at older and younger adults' attributional style in response to increased awareness of mortality. As with most initial studies, there are limitations to consider. Because the study was cross-sectional in nature, it remains unclear whether differences observed are due to cohort effects or developmental differences. Although there was no evidence that age-group differences in self-reported health, education, and vocabulary knowledge mediated the reported age x MS interactions, there is of course the

possibility that other, unmeasured characteristics contributed to the differences observed between younger and older adults' correspondent inferences and confidence ratings.

It is also conceivable that something other than death-related thought accounted for the primary interaction reported. No single study can conclusively consider all possibilities. Authors have suggested that death primes could have effects because they arouse uncertainty, general negativity, or meaninglessness (see Pyszczynski, Greenberg, Koole, & Solomon, 2010). Perhaps such factors could have played a role. However, the inclusion of negative word primes and the lack of influence of the prime manipulation on affect make these possibilities less likely. In addition, the evidence for MS increasing simple structuring in younger adults has shown this effect relative to explicit inductions making participants think of physical pain, uncertainty, and meaninglessness (e.g., Landau, et al., 2004; Landau, Greenberg, Solomon, Pyszczynski, & Martens, 2006). Moreover, evidence shows that threats to simple structuring increase the accessibility of death-related thought (e.g., Landau et al., 2004). However, the initial caveat still holds; we cannot eliminate all other possible explanations for these results with certainty.

Nevertheless, the present findings converge with other support for the existence of significant age differences in responses to reminders of one's mortal nature. This research warrants further inquiry for at least two reasons. First, it suggests that older adults may not respond to reminders of mortality in more rigid and inflexible ways as younger adults do. If this is the case, there may be something about aging that could provide insights into how to prevent extreme responses in younger adults. Second, an increased understanding of older adults' responses to mortality may be informative regarding the maintenance of psychological health in later life when reminders of death become more frequent and personally salient. This may also

be useful in real world decision-making processes with inherent mortality reminders, such as end-of-life planning.

Because older adults experience increased exposure to death-related events, such as increasing health problems, the deaths of their contemporaries, and their own undeniable increased proximity to the outer reaches of the human life expectancy, some may question whether the problem of death influences older adults, or whether they have somehow transcended this basic human fear. However, the emerging literature on terror management processes in later life suggests that death-related reminders do indeed evoke responses, in older adults, but ones quite different than those evoked in younger adults. MS has been shown to increase generativity strivings (Maxfield et al., 2014), affect life expectancy estimates (Maxfield, Solomon, Pyszczynski, & Greenberg, 2010), and produce more lenient judgments of moral transgressors (Maxfield et al., 2012, 2007). The present finding that MS does not increase correspondence among older adults as it does among younger ones is consistent with the view that many older adults go through a developmental transition in their relationship with the problem of death and how they cope with it. Furthering our understanding of this transition is an important priority for future research on socio-emotional processes in later life.

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Footnotes

¹ If we examined the two control primes as separate conditions, the tenor of the results remains the same. A 2 (age) x 3 (MS, negative, neutral) analysis of variance (ANOVA) revealed that there was no main effect of prime, $F(2, 145) = 1.71, p = .18, \eta_p^2 = .02$. There was a main effect of age, $F(1, 145) = 5.95, p = .02, \eta_p^2 = .04$; older adults displayed greater correspondent inferences ($M = 8.12, SE = .22$) than younger adults ($M = 7.39, SE = .21$). The age x prime interaction was nearly significant, $F(2, 145) = 2.63, p = .08, \eta_p^2 = .04$, and the same pairwise comparisons were significant. Younger adults in the MS condition were more prone to the correspondence bias than younger adults in the negative, $p < .05$, and neutral conditions, $p < .01$. Older adults' inferences were not affected by the priming condition, $ps > .40$. Looked at differently, older adults displayed greater correspondence bias than younger adults in both control conditions (negative, $p < .05$; neutral, $p < .05$) as in prior research (e.g., Blanchard-Fields & Horhota, 2005; Mienaltowski & Blanchard-Fields, 2005; Stanley & Blanchard-Fields, 2011). However, there were no age differences in the MS condition, $p = .65$.

² The degrees of freedom for years of education analysis differ because five participants did not provide a response to this item.

³ Because NFC has been found in previous research to moderate responses to MS on structure-seeking (e.g., Landau et al., 2004), we conducted additional analyses including NFC as a continuous variable in Age x MS x NFC multiple regression analyses. MS and age groups were dummy coded, and NFC was centered at the mean. The results were unchanged from those reported in the results section. Greater NFC was associated with greater correspondence bias, but the effect was not significant, $\beta = .14, t = 1.73, p = .09, r_p^2 = .02$; NFC did not interact with age or priming condition.