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Defending a Coherent Autobiography: When Past Events Appear Incoherent, Mortality Salience Prompts Compensatory Bolstering of the Past's Significance and the Future's Orderliness

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Drawing on terror management theory, we propose that maintaining a coherent autobiography protects the individual from mortality concerns by imbuing experience over time with significance and order. Two studies test whether mortality salience combined with a threat to autobiographical coherence (induced by an alphabetical organization of past events) prompts compensatory bolstering of the significance and orderliness of temporal experience. In Study 1, whereas exclusion-primed participants led to organize past events alphabetically perceived their past as less significant, mortality salient participants showed a compensatory boost in perceptions of their past's significance. In Study 2, mortality salience and an alphabetic event organization led participants high in personal need for structure to parse their future into clearly defined temporal intervals. This research is the first to experimentally assess the role of existential concerns in people's motivation to defend the significance and structure of their temporal experience against threats to autobiographical coherence.

Keywords: *autobiographical coherence; self-narrative; terror management theory; personal need for structure; time*

People are prone to transform their experience over time into a coherent autobiography that explains how their current self came to be and how their future will unfold (Erikson, 1968; Habermas & Bluck, 2000; McAdams, 1985), and they find it aversive when their temporal experience appears fragmented or disordered (as illustrated by Korsakoff patients' struggle with experiential discontinuity; Sacks, 1987). But what psychological functions are served by maintaining a coherent understanding of the self in time? At a pragmatic level, perceiving overarching patterns in experience facilitates self-regulation by providing guides for action and assessments of one's capabilities (Sedikides & Skowronski, 2000). For existentially oriented theorists such as May (1953) and Frankl (1963), a coherent autobiography portrays one's temporal experience as significant and orderly rather than as pointless and

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indeterminate. This suggests that people led to view their autobiography as incoherent would perceive their temporal experience as lacking in significance and stable order.

Although this may be true under some circumstances, the works of Becker (1973) and Lifton (1979) led us to a different hypothesis. These theorists argued that, by imbuing temporal experience with global significance and order, a coherent autobiography ultimately helps protect people from the disturbing awareness that, like all mortal creatures, their time inevitably ends in death (for further discussion, see Landau, Greenberg, & Solomon, 2008). This analysis suggests that reminding people of their mortality will increase their need for the psychological protection provided by a coherent autobiography, leading them to compensate for threats to that structure by bolstering the significance and orderliness of their temporal experience. Using terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986) as a framework, we test this hypothesis in two experiments examining whether people who are asked to contemplate their mortality, and subsequently to organize past events in an autobiographically incoherent manner, would bolster the significance of their past and the temporal orderliness of their future experience.

TMT AND PERCEPTIONS OF TEMPORAL EXPERIENCE

TMT posits that people buffer the potential for anxiety associated with the awareness of death by viewing their lives as having stable meaning and lasting significance in the context of a broad, culturally derived conception of reality (cultural worldview). Empirical support for TMT is provided, in part, by evidence that death reminders (mortality salience; MS) intensify people's efforts to bolster personal bases of self-worth (e.g., appearance, physical strength) and aspects of their cultural worldviews (e.g., nationality, religion, political ideology), and to defend those psychological structures against threats (for an overview of empirical support for TMT, see Greenberg, Solomon, & Arndt, 2008). Additional research has demonstrated that MS effects are not the result of anxiety or negative mood; specifically, MS inductions do not typically engender negative affect or self-reported anxiety, and covarying out self-reported mood does not eliminate MS effects (e.g., Greenberg et al., 1995). Furthermore, MS effects have been obtained using diverse operationalizations of MS (e.g., open-ended death-related questions [Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989], gory automobile accident footage [Nelson, Moore, Olivetti, &

Scott, 1997], subliminal death primes [Arndt, Greenberg, Pyszczynski, & Solomon, 1997]) and are unique to thoughts of death: Asking participants to ponder other topics that are aversive (e.g., pain, paralysis), self-relevant (e.g., social exclusion, failure), or uncertainty arousing (e.g., upcoming events, uncertainty itself, meaninglessness) does not produce the same effects engendered by MS induction (Greenberg et al., 2008; Greenberg, Solomon, & Pyszczynski, 1997).

To date, terror management research on the self has focused on people's efforts to bolster and defend self-esteem, such as by exaggerating their standing in valued performance domains (for a review see Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). We sought to extend the theory by testing whether terror management motivation influences how people perceive their experience over time. Synthesizing insights from the study of identity and self-continuity (Erikson, 1968; McAdams, 1985) with Becker (1973) and Lifton's (1979) accounts of existential motivation, we propose that people obscure the link between the passage of time and their impending death by maintaining an autobiographical self-understanding that transforms past events from isolated, fleeting moments into integral pieces of a significant personal becoming and transforms the uncertain future into an ordered series of well-defined events. This analysis suggests that when mortality is salient, people will be motivated to cling to a coherent identity and defend it against threats. Therefore, we predict that when people are led to view their autobiographies as incoherent, MS will motivate them to compensate for this threat by bolstering the past's global significance and the future's orderliness.

Some prior research suggests that bolstering significant and orderly perceptions of temporal experience facilitates terror management. For example, Routledge, Arndt, Sedikides, and Wildschut (2008) found that, after MS, imbuing the past with significance by means of nostalgic reverie led to increased perceptions of meaning in life. Also, Landau, Greenberg, Sullivan, Routledge, and Arndt (2009) showed that MS led participants to spontaneously describe their recent experience in a more positively valenced manner. Landau et al. also showed that MS increases motivation to perceive experience as unfolding across time in an orderly manner—but only among individuals predisposed to structured knowledge. Specifically, MS led individuals high, but not low, in personal need for structure (PNS; Thompson, Naccarato, Parker, & Moskowitz, 2001) to perceive more cause-and-effect relationships between separate aspects of their recent experience. Whereas these studies show that MS heightens preference for significant and orderly perceptions of temporal experience, research has not yet assessed whether MS leads to

compensatory affirmation of those perceptions when the coherence of one's autobiography is directly threatened. Support for this hypothesis would show that when people perceive their autobiography as incoherent, their motivation to manage mortality concerns leads them to defensively bolster experiential significance and order rather than to accept the inherent pointlessness and indeterminacy of experience over time.

To test this hypothesis, we manipulated MS and then led participants to organize past events in either one of two autobiographically coherent ways—chronologically or clustered around common themes—or, in the autobiographical coherence threat condition, to organize past events alphabetically (by words representing those events; see the Method section for details). Alphabetic organization served as our threat to autobiographical coherence because it forces past events, normally organized according to a personally meaningful autobiographic structure, into a personally arbitrary arrangement.

We then measured efforts to bolster experiential significance and order in two different ways across the studies. In Study 1, participants rated their past's global significance. We expected that, in the absence of MS, the autobiographical coherence threat engendered by the alphabetic event organization would decrease the perceived significance of the past. However, we expected that participants primed with mortality would be motivated to defend a coherent autobiography and would, therefore, compensate for the autobiographical coherence threat by bolstering the past's global significance.

Complementing the use of self-reported significance of experience, in Study 2 we examined people's efforts to impose order onto their temporal experience—in this case, the near future. Specifically, we looked at the extent to which people parse future time into discrete, clearly identifiable intervals (e.g., through scheduling the self's future activity in the segmented hour sections of daily planners). Insofar as terror management motivation drives people to defend a coherent autobiography that imbues the future with order, individuals primed with mortality would be more likely to compensate for the autobiographical coherence threat by parsing their future into definite intervals.

As mentioned above, a large body of evidence supports the unique role of death concerns in MS effects (Greenberg et al., 1997; Greenberg et al., 2008). To further test the specificity of death in our hypothesized effects, we compared MS to the salience of social exclusion (Study 1) and personal uncertainty (Study 2), both of which have been offered as alternative explanations for MS effects. Also, in both studies we assessed whether MS influenced self-reported affect and whether affect played any mediating role in the hypothesized effects.

PNS AS AN INDIVIDUAL DIFFERENCE MODERATOR

Recall that Landau et al. (2009) found that MS heightened preference for orderly perceptions of experience only among high-PNS individuals, who are predisposed to prefer structured knowledge. This finding suggests that high-PNS individuals are more likely than low-PNS individuals to defend against mortality concerns by seeking clearly ordered perceptions of their temporal experience.¹ Therefore, in Study 2, we expected that MS would make high-PNS participants more likely than low-PNS participants to compensate for an autobiographical coherence threat by parsing their future in an orderly manner.

It is less clear, however, whether in Study 1 PNS will similarly moderate the combined effect of MS and an autobiographical coherence threat on defensive bolstering of the past's global significance. In the aforementioned studies showing that MS exaggerated nostalgia-induced perceptions of meaning (Routledge et al., 2008) and positively valenced interpretations of recent experience (Landau et al., 2009), there were no signs of PNS moderation, and we know of no evidence that either high- or low-PNS individuals are particularly invested in global value or significance as a terror management defense. Therefore, in Study 1, we expected that MS would lead high- and low-PNS participants alike to defend against an autobiographical coherence threat by bolstering the global significance of their personal past.

STUDY 1

Study 1 tests the hypothesis that participants primed with mortality would respond to an autobiographical coherence threat with heightened perceptions of the past's global significance. Participants recalled 20 events from their personal past, wrote about death or another aversive topic (social exclusion), and then organized their events in one of three ways: chronologically, clustered around common themes, or arranged alphabetically by representative keywords. Finally, participants rated their past's global significance (importance, value, satisfaction, purpose, meaning). We predicted that the alphabetic event organization would threaten the past's coherence, leading participants to perceive their past as less significant in the social exclusion condition, but prompting compensatory bolstering of the past's significance under MS.

We chose social exclusion as the control induction because Leary and Baumeister (2000) suggested that death reminders threaten individuals with feelings of

social exclusion rather than with specific concerns about mortality. Although prior research has shown different effects for the salience of mortality and social exclusion (e.g., Landau et al., 2006), it's conceivable that the currently hypothesized results are due to an MS-induced concern with the incoherent organization of remembered events pertaining to close or influential relationships. Therefore, we primed control participants with social exclusion to control for the possibility that the effect of the MS manipulation was due to concerns with feeling socially disconnected rather than with mortality per se.

Furthermore, we assessed whether PNS moderates the hypothesized interaction between MS and an autobiographical coherence threat. As discussed above, we did not make a strong prediction regarding PNS in Study 1 because there is no evidence that high-PNS individuals are more likely than low-PNS individuals to defend against mortality concerns by perceiving their experience as globally significant.

Method

Participants were 125 undergraduates (59 males and 66 females²) who received course credit for taking part in an alleged study of personality and memories. They were first asked to recall 10 positive and 10 negative events ranging from when they were very young up until their first 2 years of high school (because most participants were college freshman, we asked for events before their final 2 high school years to encourage them to retrieve events from a broad range of ages). Having participants recall an equal number of positive and negative events controlled for the possibility that any observed effect of our coherence threat manipulation was simply the result of threatening the coherence of positive events. For each recalled event, participants wrote a keyword representing that event on an index card and indicated whether it was generally positive or negative in valence.

PNS. The experimenter then administered a packet of personality-gauging questionnaires. Thompson et al.'s (2001) PNS-Scale followed two filler questionnaires (experimenter-fabricated scales of media preferences and morningness–eveningness) included to support the cover story. Participants indicated their agreement with 12 statements (e.g., “I like having a clear and structured mode of life.”) using 6-point scales (1 = *strongly disagree* and 6 = *strongly agree*). The PNS-Scale showed high internal reliability in this ($\alpha = .87$) and the following study ($\alpha = .92$).

MS and affect. The next questionnaire was the MS manipulation. Participants in the MS condition responded to two open-ended questions about their death: “Please

briefly describe the emotions that the thought of your own death arouses in you” and “Jot down, as specifically as you can, what you think will happen to you physically as you die and once you are physically dead.” Participants in the control condition responded to parallel questions about experiencing social exclusion: “Please describe the emotions that the thought of being excluded by your friends arouses in you” and “Jot down, as specifically as you can, what you think happens to you as you (against your desires) physically are excluded and once you have been excluded from your circle of friends.” The 60-item Positive and Negative Affect Schedule–Expanded Form (PANAS-X; Watson, Clark, & Tellegen, 1988) followed the MS manipulation and was intended to assess any possible immediate affective reactions to MS.

Autobiographical coherence threat manipulation. Participants were then given a second packet containing instructions for organizing their 20 events (represented as keywords). In all conditions, participants were given a legal-sized sheet with six horizontal columns and were instructed to write the keyword for each event in the appropriate column. In the no threat–chronological condition, the columns were labeled with age ranges (e.g., 13 to 15; increasing from left to right). In the no threat–thematic condition, the columns were labeled with themes balanced in overall valence: embarrassment and fear, closeness and relationships, accomplishments, pain and loss, facing obstacles, growth and learning. In the coherence threat condition, the columns were labeled with ranges of letters (e.g., A through D). This condition was meant to impose an autobiographically incoherent organization onto the past such that, for example, events that are intimately related (e.g., sharing Christmas [“C”] and New Year’s Eve [“N”] with the same romantic partner) would be arbitrarily divided into separate columns.³

Past significance measure. Finally, participants completed a questionnaire assessing their past’s significance. They were presented with five pairs of words arranged in semantic differentials and instructed to indicate how they generally view the past by circling a number along each continuum (scale range: 1–9). The word pairs were: *unimportant/important*; *useless/valuable*; *unsatisfying/satisfying*; *pointless/worthwhile*; *meaningless/meaningful*. Scores on these items demonstrated good internal reliability ($\alpha = .87$) so they were averaged to form past significance composite scores (actual scores ranged from 2.6 to 9).

Results and Discussion

Past significance. Submitting past significance scores to a 2 (MS vs. social exclusion) \times 3 (no threat–thematic vs. no

TABLE 1: Significance Ascribed to the Past as a Function of Mortality Salience and Autobiographical Coherence Threat Manipulation

	<i>No Threat: Thematic</i>		<i>No Threat: Chronological</i>		<i>Threat: Alphabetic</i>	
	M	SD	M	SD	M	SD
Mortality salience	7.64 _a	1.30	7.40 _a	0.91	8.30 _b	0.66
Social exclusion	7.70 _a	1.09	7.77 _a	1.20	6.96 _c	1.50

NOTE: Scores ranged from 1 to 9. Higher scores indicate more perceived significance. Means with different subscripts differ at $p < .05$.

threat–chronological vs. coherence threat–alphabetical) ANOVA revealed the predicted interaction, $F(2, 119) = 6.13, p = .003, \eta^2_p = .09$. Pairwise comparisons (least significant difference) and the means presented in Table 1 revealed that, among participants in the social exclusion control condition, those who organized events alphabetically saw their past as less significant than did those who organized events thematically ($p = .05$) and chronologically ($p = .02$). More importantly, mortality salient participants who organized events alphabetically rated their past as more significant than those who organized events thematically ($p = .05$) and chronologically ($p = .03$). Mortality salient and exclusion salient participants differed in the perceived significance of the past only in the coherence threat condition, $p < .001$ (for all other comparisons, $p > .35$).

To examine the possible moderating role of PNS, we regressed past significance ratings onto MS and the coherence threat manipulation (both dummy coded), PNS (continuous), and their interactions. Although the $MS \times$ Coherence Threat interaction tended to be stronger for high-PNS participants, the three-way interaction did not reach significance, $p = .20$. We did find, however, that the $MS \times$ Coherence Threat interaction attained significance only among high-PNS participants (as determined by median split), $n = 62; F(2, 56) = 4.81, p = .01$, and not among low-PNS participants, $n = 63, F(2, 57) = 1.46, p = .24$. Indeed, the compensatory boost was found exclusively among high-PNS participants. Whereas within the social exclusion condition both low- and high-PNS participants responded to the alphabetic organization with decreased perceptions of the past's significance relative to the thematic and chronological organizations (both $ps < .05$), within the MS condition only high-PNS participants responded to the alphabetic organization with heightened significance ratings compared to those in the thematic ($p = .04$) and chronological ($p = .02$) conditions (for low-PNS participants, both $ps > .40$).

Affect. We performed MANOVAs and ANOVAs on the PANAS-X subscales using our primary predictor variables. Consistent with previous TMT research demonstrating that MS does not engender self-reported affect, these analyses revealed no effects. Furthermore,

including affect scores as covariates did not significantly change our primary pattern of predicted results.

The results of Study 1 confirm our hypothesis that an autobiographically incoherent organization of past events would decrease perceptions of the past's global significance in the social exclusion condition but prompt compensatory bolstering of the past's significance when mortality was salient. Most importantly, mortality salient participants ascribed more significance to their past following an autobiographical coherence threat compared to mortality salient participants who organized past events in a manner that did not threaten coherence (thematically or chronologically). These results suggest that when mortality concerns are active, a threat to autobiographical coherence prompts defensive efforts to affirm the past's global significance. This defensive tendency was not observed, however, among participants who contemplated social exclusion, providing additional evidence against Leary and Baumeister's (2000) suggestion that MS effects result from social exclusion concerns accompanying thoughts of death.⁴

We also found suggestive but statistically unreliable evidence that high-PNS participants are more likely than low-PNS participants to affirm the past's significance following MS and an autobiographical coherence threat. Again, in Study 1 we did not make a strong prediction regarding PNS moderation because we hypothesized that an incoherent past would be equally threatening to low- and high-PNS participants and, as importantly, because no prior research suggests that high-PNS individuals are particularly invested in defending global significance or value. Indeed, although high-PNS individuals appear more committed to structured conceptions of experience (Landau et al., 2009), a TMT perspective would hold that all individuals should be invested in an understanding of the self—and the self's history—as significant regardless of PNS level.

Past work (e.g., Landau et al., 2009) does suggest, however, that MS heightens preference for orderly perceptions of temporal experience particularly among high-PNS individuals. Therefore, we hypothesized that mortality-salient high-PNS individuals would be particularly likely to defend against an autobiographical coherence threat by bolstering the orderliness of their future experience. Given that low-PNS individuals are,

by definition, not highly invested in clearly structured knowledge (Thompson et al., 2001), we did not expect that imposing order onto the future would be a compelling solution for these individuals as a defense against an autobiographical coherence threat. Study 2 was designed to assess these hypotheses.

STUDY 2

Study 1 shows that when people think about their death and subsequently organize events from their personal history in an incoherent manner, they show compensatory bolstering of their past's global significance. In Study 2 we examined whether MS would lead people to defend against an autobiographical coherence threat by bolstering the orderliness of their temporal experience. Specifically, we hypothesized that participants led to contemplate death and then organize past events in an incoherent manner would subsequently parse their future experience into clearly defined intervals. Also, as previously discussed, we expected that this effect would be specific to high-PNS individuals because they are more likely than low-PNS individuals to manage mortality concerns by seeking orderly perceptions of experience. To test these hypotheses, we measured PNS, manipulated MS, and had participants organize past events thematically (no threat) or alphabetically (coherence threat). Finally, we measured future parsing using a scheduling task in which participants scheduled events in an upcoming, hypothetical vacation using shapes that represent those events as either definitely or loosely delimited in time (see details below). We predicted that MS and an alphabetic event organization would lead high (but not low) PNS participants to schedule their hypothetical vacations using a higher percentage of definite intervals.

Method

Participants were 101 undergraduates (64 females and 37 males) who received course credit for taking part in an alleged personality and memory study. They were first administered the same materials and instructions used in Study 1 for generating 10 positive and 10 negative events from a range of times and for assigning each remembered event a keyword and a valence. Then, ostensibly to assess personality, participants completed a packet of questionnaires including two fillers, the PNS-Scale, the MS manipulation, and the PANAS-X. The contents and order were identical to the packet used in Study 1 with the exception that the control induction asked participants to write about feelings of personal uncertainty. Specifically, we used van den Bos's (2001) uncertainty salience induction, wherein participants respond to the

following open-ended questions: "Please briefly describe the emotions that the thought of your being uncertain arouse in you" and "Please write down, as specifically as you can, what you think physically will happen to you as you feel uncertain." Use of this control induction (and the future-uncertainty induction in our replication of Study 1; see Note 4) allowed us to further control for the possibility proposed by van den Bos (2001) and McGregor et al. (2001) that MS effects are due to thinking about generally uncertain outcomes rather than death per se. Participants were then assigned a separate packet containing the same materials and instructions used in Study 1 for organizing events (represented as keywords) either thematically or alphabetically.

Future parsing measure. The measure of future parsing came last and was presented as a personality assessment. Participants were instructed to imagine a 3-day, 3-night vacation in Hawaii. They were given a list of 15 activities (e.g., snorkeling, hike to a waterfall, lunch each day) and told to imagine that they wanted to do all of these activities. On the next page were three parallel lines across the length of the page, labeled Day 1, Day 2, and Day 3, and anchored on the ends with the words "BEGIN" and "END" (see Figure 1). Participants were told that these lines represent their three days and nights and that they were to envision their vacation and schedule all of the listed activities (and each one only once, with the exception of meals, which were represented three times each) by indicating on the lines when each would occur. They were additionally instructed to represent an activity with an oval if they were not certain when it would start and stop but to use a rectangle if they were fairly certain about the start and stop times. Future parsing scores were computed as the percentage of rectangles used to schedule the vacations. Preliminary inspection revealed that scores on this measure were normally distributed (*Skewness statistic* = .13, $SE_{skewness}$ = .33), and no participant reported a statistically extreme score. Figure 1 depicts prototypical examples of definitely and loosely parsed days.

Results and Discussion

Regressing future parsing scores onto MS (dummy coded), autobiographical coherence threat (dummy coded), PNS (continuous and centered), and their interactions revealed a significant PNS main effect, $\beta = .23$, $t(97) = 2.37$, $p = .02$, and a marginal MS \times PNS interaction, $\beta = .31$, $t(94) = 1.92$, $p = .06$, which were qualified by the predicted three-way interaction, $\beta = .45$, $t(93) = 2.61$, $p = .01$, $\eta_p^2 = .08$ (all other $ps > .33$). We plotted the slopes for PNS in all conditions in Figure 2 using 1 SD below (low PNS) and above (high PNS) the sample PNS mean (Aiken & West, 1991). Simple slopes analyses

Example of a definitely parsed day:



Example of a loosely parsed day:

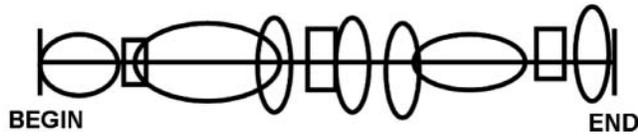


Figure 1 Illustration of the future parsing measure used in Study 2.

indicate that, as we predicted, PNS was positively and significantly associated with definite future parsing in the MS and coherence threat condition, $\beta = .83$, $t(93) = 3.97$, $p < .001$. Simple slopes between PNS and future parsing did not attain significance in the other conditions and are as follows: MS/no threat, $\beta = .02$, $p = .92$; uncertainty salience/coherence threat, $\beta = .02$, $p = .91$; uncertainty salience/no threat, $\beta = .27$, $p = .23$.

Also supporting predictions, a comparison of the predicted means recentered at 1 *SD* above the PNS mean shows that participants in the MS/coherence threat condition preferred a more definite future parsing than did those in the MS/no threat condition, $\beta = .52$, $t(93) = 2.47$, $p = .02$, and the uncertainty salience/coherence threat condition, $\beta = .52$, $t(93) = 2.78$, $p = .01$. A similar comparison of predicted means formed at 1 *SD* below the PNS mean revealed no significant differences in future parsing between participants in the MS/coherence threat condition and those in the MS/no threat condition ($p = .16$) and the uncertainty salience/coherence threat condition ($p = .13$).

As in Study 1, analyses of the PANAS-X subscales revealed no effects of our primary predictors on self-reported affect and no mediating role of affect in our primary predicted results. Thus, we are quite confident that as in past research (Greenberg et al., 1995) the findings reported in these studies are not mediated by self-reported affect.⁵

The results of Study 2 confirm the hypothesis that MS combined with an autobiographically incoherent organization of past events would result in heightened preference for clearly ordered perceptions of the future and that this effect would be moderated by individual differences in PNS. Specifically, when participants were primed with death and subsequently led to organize past events alphabetically, those high in PNS were more likely to parse their future experience into clearly defined temporal

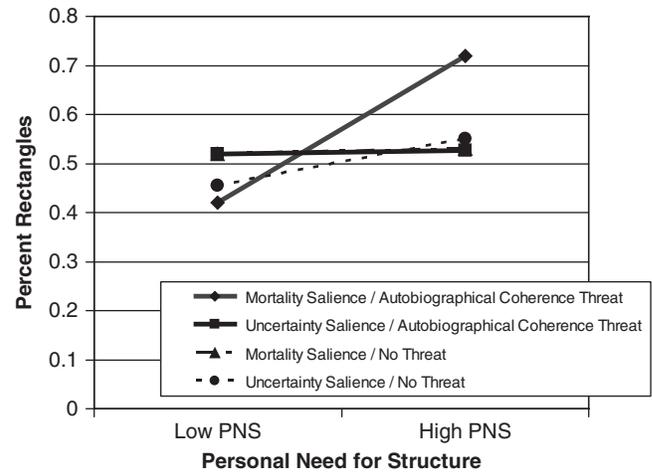


Figure 2 Future parsing as a function of mortality salience, autobiographical coherence threat, and personal need for structure.

intervals. This finding suggests that when one is led to view their past as incoherent, MS prompts a defensive imposition of structure onto future experience among those predisposed to structured knowledge. Because this effect was observed using a control condition that primed personal uncertainty, we are confident that it is not the result of priming generally uncertain outcomes.

GENERAL DISCUSSION

Theorists such as Becker (1973) and Lifton (1979) proposed that maintaining a coherent autobiography protects the individual from existential concerns surrounding the awareness of personal mortality by imbuing experience over time with significance and order, but this idea had not yet been experimentally assessed. Using TMT as a framework, we hypothesized that when people were led to view their autobiography as incoherent, MS would motivate them to defend against this threat by bolstering the past's significance and, at least among those predisposed to structured knowledge, the future's orderliness. Accordingly, participants in Study 1 who were led to organize past events in an autobiographically incoherent manner perceived less global significance in their pasts after thinking about social exclusion, but they exhibited a compensatory bolstering of their past's significance after MS. In Study 2, MS combined with an autobiographical coherence threat increased preference for a definite parsing of the near future, but only among those high in PNS. These effects did not emerge among participants primed with social exclusion and general uncertainty feelings (as well as future uncertainties, see

Note 4), suggesting that the motivation to deny one's mortality plays a unique role in the observed effects.

Taken together, these studies provide converging support for our general theoretical claim that a coherent autobiography protects the individual from mortality concerns by imbuing temporal experience with significance and order. Thus, when the past appears incoherent, those who dwell on their mortality resist viewing their temporal experience as pointless and indeterminate; rather, they defensively bolster the past's significance and, if they are predisposed to structured knowledge, impose definite order onto the future.

Future Directions

These studies used one particular way in which the perceived coherence of one's past can be threatened. We believe the method we used afforded good control, but it might be useful to explore other ways this might occur using methods with more ecological validity. Clear examples include cases in which an individual experiences gaps in his or her memory resulting from accidents or traumatic experiences. Interestingly, these cases often involve the threat of death as well as disruptions in memory. But autobiographical coherence could also be threatened in less dramatic ways in which events in one's past may seem chaotic or random.

These studies tapped two ways people may combat the threat of autobiographical incoherence—affirming significance and imposing order—but there are undoubtedly others as well. Perhaps one of the benefits of extensive writing about traumas is to provide a coherent structure for such impactful life events (Pennebaker, 1989). Reconnecting to people, places, and activities from one's past may be another way to restore autobiographical coherence to one's life. We see this prototypically represented in Bergman's film *Wild Strawberries* (1957), in which an old doctor, haunted by dreams of encroaching death and a sense of autobiographical insignificance, regains satisfying coherence by traveling to all the important places of his youth on his way to receiving a lifetime achievement award.

Maybe in some cases, when the past is inaccessible or too difficult or painful to restore sense to, the opposite approach would work: starting fresh and building a new identity and a new set of memories that lend a more secure sense of coherence and significance to one's life. Perhaps this motivation plays a role in dramatic cases of dissociative identity disorder, in which the development of a separate sense of self with its own coherent history is often triggered by (and may therefore be an attempt to cope with) sexual or physical abuse during childhood (Humphrey & Dennett, 1989). Discussing a more common example of this phenomenon, Becker (1969), Erikson (1968), and others viewed the midlife crisis as a

period when doubts about the coherence and significance of one's life course combine with a sense of moving closer to one's inevitable death, a threat resolved either through pursuit of a new identity, rigid adherence to old sources of identity, or renewed efforts to experience a sense of generativity.

In general, individual differences may play a substantial role in determining how people address threats to autobiographical coherence. Study 2 shows that PNS is one such variable, but others deserving attention readily come to mind. For example, individuals who score highly on the past-positive factor of Zimbardo and Boyd's (1999) time perspective scale would probably draw great significance from maintaining an integrated understanding of their personal history, whereas those high on the present-hedonistic factor might be more concerned with living freely in the present and not be as invested in a clear sense of the past.

Along these lines, one might speculate that it is possible and even healthy to face up to a lack of coherence in one's autobiographical self-understanding. Clearly people don't always respond defensively when they perceive their temporal experience as lacking in coherence. Indeed, experience in time is irregular, subjective, and fleeting, and some perspectives on optimal growth and well-being prescribe an unflinching confrontation with these unsettling facts (Olson, 1962, reviewed existential perspectives on this notion). Indeed, constantly tending to the coherence of one's self-narrative could be quite draining. Future research could examine when and why people relax defensive efforts to affirm the significance and order of their temporal experience in the face of threats, as well as the extent to which a more realistic assessment might be a sign of maturity or wisdom and a basis for enhanced well-being.

NOTES

1. Initial support for the idea that high-PNS individuals are relatively more invested in clearly structured perceptions of experience over time was provided by a pilot study in which 75 psychology undergraduates completed Thompson, Naccarato, Parker, & Moskowitz's (2001) PNS-Scale and a temporal structure measure, created by the authors, on which participants indicated their agreement with 12 statements associated with a preference for temporal structure (e.g., "I like to always have with me a way to tell what time it is" and "When I have a day off, I prefer not to plan out my time" [reverse scored]) on a 7-point scale (1 = *strongly disagree*; 7 = *strongly agree*). The items on both scales were internally consistent (α for PNS-Scale = .89; α for temporal structure scale = .75), so we formed composite scores after appropriate reverse scoring. Consistent with our assumption that high-PNS individuals are especially concerned with clear temporal structure, there was a strong positive correlation between the two scales, $r(75) = .51, p < .001$.

2. In this and the following study, preliminary analyses revealed no significant main effects or interactions involving gender, so we report our primary analyses without gender to simplify presentation.

3. Because a given event might fit under more than one theme, participants in the no threat-thematic condition received further instructions to write the keyword for an event under as many columns as

they felt appropriate. Because the thematic organization allowed for an event to be placed in multiple columns, we needed to ensure that participants were spending roughly equal amounts of time considering their events across conditions. Therefore, after they organized their events, participants in the chronological and alphabetic organization conditions were given further instructions: "Now that you have ordered your memories, go back down each column and imagine each memory in your head for a few moments. That is, for a few moments visualize each specific memory in your mind's eye."

4. It is important to note that the essential finding of Study 1—that mortality salience (MS) leads individuals to defensively resist an autobiographical coherence threat by affirming their past's significance—was replicated using a very similar methodology but with an alternate control induction that simultaneously controls for aversive, uncertain, and highly likely future outcomes, namely, concerns about finding a job and maintaining relationships after college graduation (details available from the first author). Furthermore, prior evidence shows that uncertainty and social exclusion inductions have similar effects to reminders of highly aversive but non-self-relevant outcomes such as intense physical pain (e.g., Landau & Greenberg, 2006). This evidence strengthens our claim that mortality thoughts play a unique role in the need to defend experiential significance and order against a threat to autobiographical coherence.

5. In these two studies, we only measured affect immediately after the MS manipulation, so we can't rule out some role of a delayed affective reaction. However, prior research has found that the MS induction used in these studies does not increase negative affect either immediately or after a delay (e.g., Greenberg et al., 1994).

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