

# Exploring Individual Differences in Reactions to Mortality Salience: Does Attachment Style Regulate Terror Management Mechanisms?

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Five studies examined the contribution of attachment style to mortality salience effects. In Study 1, mortality salience led to more severe judgments of transgressions only among anxious–ambivalent and avoidant persons but not among secure persons. In addition, whereas anxious–ambivalent persons showed immediate and delayed increases in severity judgments, avoidant persons showed this response only after a delay period. In Study 2, anxious–ambivalent persons showed immediate and delayed increases in death-thought accessibility after death reminders. Avoidant and secure persons showed this effect only after a delay period. Study 3 revealed that worldview defense in response to mortality salience reduced death-thought accessibility only among avoidant persons. Studies 4–5 revealed that mortality salience led to an increase in the sense of symbolic immortality as well as in the desire of intimacy only among secure persons, but not among avoidant and anxious–ambivalent persons.

In recent years, Terror Management Theory (TMT; Greenberg, Pyszczynski, & Solomon, 1997; Solomon, Greenberg, & Pyszczynski, 1991) seems to be a promising framework for explaining human behavior in terms of defensive motivations related to death awareness. Research has shown that death reminders lead people to embrace cultural worldviews and that certain individual difference factors, such as self-esteem, depression, and authoritarianism, may moderate this reaction (e.g., Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1992; Harmon-Jones et al., 1997). Following TMT research, we focus on the moderating role of a yet unexplored but theoretically relevant individual difference factor: attachment style. This factor seems to affect the way people emotionally react to stressful situations as well as to the terror of death awareness (Mikulincer & Florian, 1998).

## TMT

TMT (Greenberg et al., 1997) assumes that death awareness is a major source of anxiety and that the management of the impending terror seems to be achieved by two psychological mechanisms. The first mechanism consists of the validation of one's cultural worldview. According to TMT, cultural worldview validation imbues the world with order and meaning and provides both a set of standards of value and behavior and the promise of death transcendence (Solomon et al., 1991). The second mechanism consists of efforts aimed at increasing self-esteem by living up to those standards of value prescribed by the culture. Along this reasoning, the mortality salience hypothesis has been formulated (e.g., Solomon et al., 1991), by which people exposed to death reminders would react positively to ideas and people that validate the cultural worldview and negatively to ideas and people that deviate from

this worldview. Moreover, mortality salience would lead people to attempt to maintain or enhance self-esteem.

The mortality salience hypothesis has been validated in several studies. Death reminders have been found to lead to more negative evaluations of out-group members (e.g., Florian & Mikulincer, 1998b; Greenberg et al., 1990), harsher punishment for social transgressors (Florian & Mikulincer, 1997; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989), and heightened estimates of social consensus for one's beliefs (Pyszczynski et al., 1996; Simon, Greenberg, Arndt et al., 1997). In addition, mortality salience increased self-esteem strivings (Taubman Ben-Ari, Florian, & Mikulincer, 1999).

Studies have documented the processes that underlie the activation of worldview defenses. Greenberg et al. (1997) argued that this activation depends on the accessibility of death-related thoughts. Indeed, several studies (Arndt, Greenberg, Pyszczynski, Solomon, & Simon, 1997; Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994; Harmon-Jones et al., 1997; Simon, Greenberg, Harmon-Jones et al., 1997) have shown that the same conditions that increase death-thought accessibility after death reminders also lead to the activation of worldview defenses. Accordingly, the same conditions that prevent an increase in death-thought accessibility also inhibit the activation of worldview defenses.

TMT also hypothesized a temporal sequence of defenses against death reminders (Pyszczynski, Greenberg, & Solomon, 1999). Immediately after death reminders, people tend to maintain death-related thoughts outside of conscious awareness by means of a process of mental suppression. At this point, people have low death-thought accessibility and, therefore, weak activation of worldview defenses. With the passage of time and/or cognitive distraction, death-related thoughts may become more accessible outside of consciousness and, subsequently, may activate worldview defenses. This sequence has received strong empirical support. First, Greenberg et al. (1994) found heightened death-thought accessibility and worldview defenses only when a delay task was introduced after the mortality salience induction. Moreover, they found that mortality salience had weak effects on worldview

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defenses when people kept death-related thoughts in focal attention. Second, Arndt et al. (1997) provided evidence for the action of mental suppression: The addition of cognitive load, which seems to interfere with mental suppression (Wegner, 1994), increased death-thought accessibility and worldview defenses immediately when mortality was made salient. Third, Greenberg, Arndt, Simon, Pyszczynski, and Solomon (2000) found that whereas suppression of death thoughts (denial of one's vulnerability to early death) emerged immediately after death reminders but not after a delay or distraction, worldview defenses occurred only after such a delay.

Research has also indicated that the above reviewed effects of mortality salience are moderated by individual difference factors. For example, mortality salience effects have been found to be moderated by authoritarianism (Greenberg et al., 1990), liberalism (Greenberg et al., 1992), self-esteem (Harmon-Jones et al., 1997), depression (Simon, Arndt, Greenberg, Pyszczynski, & Solomon, 1998; Simon, Harmon-Jones, Greenberg, Solomon, & Pyszczynski, 1996), and distinctiveness needs (Simon, Greenberg, Arndt et al., 1997). The meaning people attribute to death and their sense of symbolic immortality seem to be additional moderators of mortality salience effects (Florian & Mikulincer, 1997, 1998a).

Following the above line of research, we examine the moderating role that one basic individual difference factor may play in terror management processes: attachment style. This personal factor is associated with affect regulation and reactions to anxiety-eliciting situations (Mikulincer & Florian, 1998). It is also related to mental suppression and the accessibility of distressing thoughts (Fraley & Shaver, 1997; Mikulincer & Orbach, 1995), the cognitive processes that underlie the mortality salience effects. More important, attachment style is related to fear of death (Florian & Mikulincer, 1998a; Mikulincer, Florian, & Tolmacz, 1990) as well as to other factors that have been found to moderate terror management processes, such as self-esteem, depression, and authoritarianism (e.g., Bartholomew & Horowitz, 1991; Mikulincer, 1997).

#### Attachment Style, Affect Regulation, and Fear of Death

The role of the attachment system as an important inner resource has been previously recognized in Bowlby's (1969, 1973, 1980) classic trilogy. In his terms, the attachment system functions as an inner resource during the encounter with stressful events, leading people to maintain or restore proximity to significant others who can provide support in managing distress. In a smooth course of events, proximity maintenance may alleviate distress and facilitate the development of positive beliefs about the self and the world, the reliance on support seeking when coping with stress, and the formation of an internalized "secure base" from which the person can develop his or her personality (Bowlby, 1988). However, when significant others are unavailable in times of need or nonresponsive to one's attachment needs, proximity maintenance may elicit distress and encourage the development of other defensive strategies rather than support seeking (Bowlby, 1988).

In examining Bowlby's ideas in adulthood, most of the studies have focused on a person's attachment style—stable patterns of relational cognitions and behaviors reflecting a person's attachment history (Shaver & Hazan, 1993). This line of research has been based on Hazan and Shaver's (1987) definition of three styles in adulthood: secure, avoidant, and anxious-ambivalent. Secure

persons are more confident in others' availability in times of need, feel more comfort with closeness, and have a more positive attachment history than insecure persons, either avoidant or anxious-ambivalent. The avoidant style is also defined by preference for emotional distance, and the anxious-ambivalent style by a desire for enmeshed relationships and fear of rejection. A wealth of studies have shown that self-reported attachment styles are associated with several interpersonal and intrapersonal phenomena (for a review, see Shaver & Hazan, 1993).

Research has supported the hypothesis that adult attachment style is related to distress regulation. Secure persons have been found to appraise stressful events in benign terms and themselves as capable of effectively coping with it (e.g., Collins & Read, 1990; Mikulincer & Florian, 1995). Moreover, they tend to rely on support seeking (e.g., Mikulincer, Florian, & Weller, 1993) and to cope with stress without defensively distorting their views of the self and the world (Mikulincer, 1998; Mikulincer, Orbach, & Iavnieli, 1998). In contrast, avoidant and anxious-ambivalent persons tend to appraise stressful events in threatening terms, to report doubts about their coping abilities, to defensively distort their views of the self and the world, and to suffer from high levels of distress (for a review, see Mikulincer & Florian, 1998). However, these two groups seem to differ in their methods of coping (e.g., Collins & Read, 1994; Mikulincer & Florian, 1998; Kobak, Cole, Ferenz, & Fleming, 1993). Whereas anxious-ambivalent persons tend to hyperactivate distress-related cues and mentally ruminate on negative thoughts, avoidant persons inhibit proximity-seeking behaviors, divert attention from distress-related cues, and emphasize their sense of self-reliance (for a review, see Mikulincer & Florian, 1998).

Studies have also shown attachment-style differences in the use of mental suppression and accessibility of distressing thoughts. Mikulincer and Orbach (1995) found that avoidant persons scored higher in repression than secure and anxious-ambivalent persons and had low accessibility to distressing memories. In addition, whereas secure persons' accessible memories were encapsulated and accompanied by moderate levels of negative emotions, anxious-ambivalent persons' memories were accompanied by overwhelming distress that spread over irrelevant emotional themes. Overall, whereas avoidant persons suppress distressing thoughts, anxious-ambivalent persons show an automatic hyperactivation of these thoughts, and secure persons tend to acknowledge these thoughts without succumbing to distress or maladaptive defenses.

Attachment research has also documented the association between attachment style and fear of death. Mikulincer et al. (1990) found that secure persons reported less fear of death than avoidant and anxious-ambivalent persons. Moreover, whereas anxious-ambivalent persons exhibited high fear of death at both conscious and below-conscious levels of awareness, avoidant persons maintained this fear outside of consciousness and displayed it only at an unconscious level. Florian and Mikulincer (1998a) found that secure persons reported a higher sense of continuity and lastingness, as assessed by means of Lifton's (1979) concept of symbolic immortality, than did avoidant persons. Florian and Mikulincer (1998a) concluded that secure persons construct adequate protective means against the terror of death, avoidant persons mentally suppress this terror, and anxious-ambivalent persons experience overwhelming fear and fail to develop efficient shields.

### The Present Study

In light of the above review, the main hypothesis of the present series of studies is that a person's attachment style would moderate mortality salience effects. For avoidant persons, we hypothesize that they would show the typical mortality salience effects. This hypothesis is based on the habitual regulatory strategies of avoidant persons: mental suppression of distressing thoughts and defensive distortions of appraisals of the self and the world (e.g., Fraley & Shaver, 1997; Mikulincer, 1998; Mikulincer et al., 1998). In our terms, these regulatory tendencies would also be manifested when making mortality salient. Avoidant persons' tendency to suppress any distressing thought would reduce death-thought accessibility and consequent worldview defenses immediately after mortality salience. However, as expected by TMT, these thoughts would be accessible after a distraction task. In this case, avoidant persons may feel an urgent need to validate cultural worldviews, which may be exacerbated by their highly defensive tendency.

In the case of anxious-ambivalent persons, we also hypothesize that a mortality salience induction would strongly activate worldview defenses. These persons seem to have tenuous existing protection from mortality concerns (Mikulincer et al., 1990), which can be viewed as inefficient terror management mechanisms, and therefore may be strongly threatened by thoughts of mortality and show greater need for worldview defenses. As a result, anxious-ambivalent persons may be highly responsive to mortality salience inductions. In addition, their fragile sense of self-worth and self-defeating tendencies, including depressive affect (Shaver & Hazan, 1993; Mikulincer, 1998), may further exacerbate their reactions to mortality salience. In fact, Simon et al. (1996; Simon et al., 1998) found depressive tendencies to underlie strong worldview defenses when death reminders were present.

In addition, we hypothesize that anxious-ambivalent persons' defenses would occur without the suppression of death-related thoughts. This hypothesis is based on anxious-ambivalent persons' regulatory strategies: hyperactivation and rumination on distressing thoughts (Mikulincer, 1998). It is also based on their high fear of death at a conscious level of awareness (Mikulincer et al., 1990). In our terms, these characteristics would be manifested after mortality salience, thereby preventing the mental suppression of death-related thoughts. As a result, anxious-ambivalent persons would react to death reminders with high death-thought accessibility and worldview defenses not only after a distraction task, but also immediately following mortality salience. In this case, a distraction task may not affect the timing of defensive reactions, because death-related thoughts may already be accessible before this task. This hypothesis is in line with Arndt et al.'s (1997) findings that the addition of cognitive load prevented mental suppression and led to an immediate increase in death-thought accessibility and worldview defense. In our terms, anxious-ambivalent persons' ruminative tendencies may tax the cognitive system, thereby producing the same effects of the experimental addition of cognitive load.

In the case of secure attachment style, we hypothesize that a mortality salience induction would not necessarily activate worldview defenses. This hypothesis is based on findings showing that secure people hold a positive sense of the self and adequate coping skills that allow them to manage distress without defensively distorting their cognitions (see review in Mikulincer & Florian, 1998). In our terms, these characteristics, which reflect an inter-

nalized secure base (Bowlby, 1988), may act as a cognitive shield against the terror of death and may abolish the need to validate cultural worldviews and to derogate persons and opinions that threaten these worldviews. This response would resemble the way high self-esteem persons have been found to react to death reminders (Harmon-Jones et al., 1997). In both cases, having a positive sense of their own value, people will not need to respond to death reminders with increased worldview defense.

The above hypothesis is also based on findings showing that secure persons tend to be open-minded, to avoid rigid beliefs, to tolerate cognitive ambiguity, and to integrate belief-discrepant information within their cognitive structures (e.g., Collins, 1996; Mikulincer, 1997). This cognitive openness would also be manifested following a mortality salience induction, attenuating negative reactions to persons and opinions that threaten one's worldview. In these terms, secure persons would not opt for derogating others who threaten their worldviews, because this defensive reaction does not fit the way they usually cognitively process social information.

The above hypothesis raises two basic questions about the terror management mechanisms of secure persons. The first question concerns the delayed increase in death-thought accessibility following mortality salience. At first sight, one may argue that secure persons' lack of worldview defenses reflects their inaccessibility to death thoughts. However, these persons may have accessibility to death-related thoughts, but deal with these thoughts without attempting to validate their worldviews. In fact, secure persons may deal with accessible death-related thoughts by alternative means that are more appropriate for them. This reasoning is based on the fact that death reminders, like every priming procedure, would automatically activate death-related thoughts after a delay or distraction task, regardless of individual variations in personal factors (Greenberg et al., 1997). It is also based on findings showing secure persons' accessibility of distressing thoughts (e.g., Mikulincer & Orbach, 1995). On this basis, we hypothesize that secure persons would react to mortality salience with high levels of death-thought accessibility following a distraction task without necessarily displaying signs of worldview validation.

The second and more important question concerns the alternative ways secure persons defend themselves against the terror of death. In this context, we propose two tentative yet unexplored defensive mechanisms, which may fit secure persons' cognitive and affective makeup. The first mechanism consists of the validation of the sense of symbolic immortality (Lifton, 1979). As reviewed earlier, secure persons seem to hold a strong sense of symbolic immortality, which may bring forth a sense of continuity and death transcendence (Florian & Mikulincer, 1998a). In Lifton's (1979) terms, people may validate such a sense through biological, creative, spiritual, religious, and experiential means to protect them against the awareness of death. In our terms, when faced with death reminders, secure persons may rely on their strong sense of symbolic immortality and use it as a protective device against the terror of death. On this basis, we hypothesize that secure persons would react to death reminders with attempts aimed at validating their sense of symbolic immortality.

The second possible mechanism consists of the search for closeness and intimacy. As reviewed earlier, there is extensive evidence showing that secure persons tend to seek others' proximity and support in times of need (for a review, see Mikulincer & Florian, 1998). According to attachment theory, this response is a basic

affect regulation device that may help people in alleviating distress and managing their basic fears (Bowlby, 1988; Mikulincer & Florian, 1998). In our terms, this reliance on proximity maintenance as an affect regulation device would also be manifested following mortality salience induction, thereby leading secure persons to search for intimacy as a defensive means against the awareness of death. On this basis, we hypothesize that secure persons would react to mortality salience with a heightened search for intimacy with significant others.

The above hypotheses can be summarized as follows. For avoidant persons, mortality salience would lead to heightened death-thought accessibility and worldview defenses only after a distraction task. For anxious-ambivalent persons, mortality salience would lead to heightened death-thought accessibility and worldview defenses before and after a distraction task. For secure persons, mortality salience would lead to heightened death-thought accessibility only following a delay or distraction task but would fail to activate worldview defenses even after this task. Mortality salience would alternatively lead secure persons to validate their sense of symbolic immortality and/or to search for intimacy. These hypotheses reflect an original attempt to link the ways people regulate distress, as expressed in attachment style, and specific patterns of reactions to death awareness. These hypotheses were examined in the present series of studies.

### Study 1

Study 1 examined the hypothesized role that attachment style plays in moderating the effects of mortality salience on worldview defense, as manifested in judgments of culturally deviant behaviors. Participants completed attachment style scales, were randomly assigned to one of three conditions, and then filled out the Multidimensional Social Transgression Scale (MSTS; Florian & Mikulincer, 1997), tapping judgments about social transgressions. The three conditions were constructed on the basis of a mortality salience induction and the presence of a distraction task. In the mortality-salience/delayed-response condition, participants filled out a brief version of the Fear of Personal Death Scale (FPDS; Florian & Kravetz, 1983), which has been found to produce mortality salience effects (e.g., Florian & Mikulincer, 1997), and completed a distraction task before responding to the MSTS. In the mortality-salience/immediate-response condition, participants filled out the MSTS immediately after completing the FPDS. In the control condition, participants filled out the MSTS immediately after completing a neutral scale.<sup>1</sup>

In the current study, we also attempted to control for the possible contribution of self-esteem. Prior studies have shown that (a) secure persons hold higher self-esteem than insecure persons (Mikulincer, 1998) and (b) high self-esteem persons display weaker mortality salience effects than low self-esteem persons (Harmon-Jones et al., 1997). Therefore, it is important to examine the unique effects of attachment style on reactions to mortality salience beyond the contribution of self-esteem. For this purpose, participants completed a self-esteem scale before mortality salience induction.

We predicted that the mortality-salience/delayed-response induction would lead to more severe judgments of social transgressions than would a control condition among avoidant and anxious-ambivalent persons. The mortality-salience/immediate-response induction would lead to more severe judgments of social trans-

gressions than would a control condition only among anxious-ambivalent persons. Secure persons would show no significant difference in their judgments of social transgressions among the three conditions.

### Method

**Participants.** Two hundred twenty-five undergraduate social sciences students from Bar-Ilan University (143 women and 82 men ranging in age from 18 to 35, *Mdn* = 23) participated in the study without receiving any monetary reward.

**Materials and procedure.** The study was conducted on a group basis, with 20–25 participants in each group. The study was presented as an investigation of social attitudes, and participants were asked to work through a packet of questionnaires at their own pace while making sure to follow the exact order in which the questionnaires were arranged.

Following the instructions, participants received two randomly ordered scales tapping categorical and continuous scores of attachment style. One scale was the Hebrew version of Hazan and Shaver's (1987) scale (Mikulincer et al., 1990). Participants read the three descriptions of attachment styles and endorsed the account that best described their feelings in close relationships. Fifty-nine percent of the sample classified themselves as secure ( $n = 133$ ), 29% as avoidant ( $n = 65$ ), and 12% as anxious-ambivalent ( $n = 27$ ).<sup>2</sup>

The second attachment scale consisted of 10 items, which tapped the two basic dimensions of attachment: anxiety and avoidance (Brennan, Clark, & Shaver, 1998). We added this scale, because Fraley and Waller (1998) found that categorical measures do not provide a complete picture of the variability in attachment style. Moreover, Brennan et al. (1998) have shown that a two-dimensional model underlies most measures of attachment style. We then decomposed Hazan and Shaver's (1987) descriptions of avoidant and anxious-ambivalent styles and constructed five items for each dimension (Mikulincer et al., 1990). Our anxiety items (e.g., "I worry about being abandoned") corresponded to Brennan et al.'s relevant items, and our avoidance items (e.g., "I feel discomfort when others get close to me") corresponded to Brennan et al.'s avoidance items. Participants rated the extent to which an item described themselves on a 7-point scale, ranging from 1 (*not at all*) to 7 (*very much*).

In our sample, a factor analysis yielded two main factors (51% of explained variance). Factor 1 (32%) included the five anxiety items (loading > .40), and Factor 2 (19%) included the five avoidance items (loading > .40). Cronbach's alphas for anxiety and avoidance items were acceptable (.72 and .70, respectively). Two scores were then computed by averaging items that corresponded to each factor.

Participants also completed a filler 15-item scale on social issues and a Hebrew version of Rosenberg's (1979) Self-Esteem Scale. The scale consisted of 10 items, which were rated on a 4-point scale from 1 (*strongly disagree*) to 4 (*strongly agree*). Cronbach's alpha for the 10 items was high (.85). A self-esteem score was then calculated by averaging the items. Higher scores indicate higher self-esteem. No significant difference in this score was found between the three experimental conditions of mortality salience.

<sup>1</sup>Although an ideal experimental design demanded the inclusion of two control conditions (with and without a distracting task), a pretest ( $N = 20$ ) revealed that participants in these two conditions made similar judgments of social transgressions. On this basis, we decided to construct a three-group design and to include only one control condition without any distracting task.

<sup>2</sup>In the five reported studies, no significant difference was found in the attachment style distribution across experimental conditions. Accordingly, no gender difference was found in attachment style distribution. Moreover, the introduction of gender as a covariate did not change the effects of attachment style and mortality salience.

Following their completion of the above scales, participants were randomly assigned to one of three conditions. In the mortality-salience/immediate-response condition ( $n = 75$ ), participants completed a 12-item version of the FPDS and then provided judgments of social transgressions. The FPDS items deal with one's personal death (e.g. "I fear death because of the cessation of creative activities"), and ratings were made on a 7-point scale, ranging from 1 (*entirely untrue*) to 7 (*very true*).<sup>3</sup> In the mortality-salience/delayed-response condition ( $n = 75$ ), participants filled out the FPDS items, but before providing judgments of transgressions, they received a distracting task in which they rated the degree to which 10 items belong to the category "furniture." In the control condition ( $n = 75$ ), people filled out a 12-item scale on leisure activities and provided judgments of transgressions.

Participants' judgments of social transgressions were assessed with a shortened version of the MSTs. Originally, the scale included 20 vignettes, each one describing a social transgression and its most damaging consequence (for vignette wording and construction process, see Florian & Mikulincer, 1997). Each vignette presented one of two types of consequences: intrapersonal (physical-mental injuries or damages to the ability to fulfill personal projects) or interpersonal (damages to social ties or harms to family and friends). The MSTs was found to be a highly reliable and valid measure (Florian & Mikulincer, 1997). In the present study, we randomly selected 10 vignettes (5 implying intrapersonal consequences and 5 implying interpersonal consequences). For each story, participants rated the severity of the transgression on a 7-point scale, ranging from 1 (*not severe at all*) to 7 (*very severe*). They also rated the severity of the punishment for this transgression on a 7-point scale, ranging from 1 (*very light punishment*) to 7 (*very heavy punishment*). In our sample, Cronbach's alphas were .92 for severity ratings and .90 for punishment ratings. Two scores were then computed by averaging each of the ratings across the 10 vignettes. However, because these scores were highly correlated ( $r = .77$ ), analyses were conducted only on the severity score to avoid any redundancy.<sup>4</sup>

### Results and Discussion

A two-way analysis of variance (ANOVA) for experimental condition and self-classified attachment style performed on the transgression severity rating yielded significant main effects for experimental condition,  $F(2, 216) = 3.39, p < .05$ , and attachment style,  $F(2, 216) = 28.50, p < .01$ . Fitting previous TMT studies (e.g., Florian & Mikulincer, 1997), Scheffé tests ( $\alpha = .05$ ) showed that the mortality-salience/delayed-response condition induction led to more severe judgments of the transgressions ( $M = 4.89$ ) than did the control induction ( $M = 4.46$ ). The mortality-salience/immediate-response condition induction was between the two other conditions and did not significantly differ from them ( $M = 4.74$ ). These tests also showed that secure persons made less severe judgments ( $M = 4.12$ ) than did avoidant ( $M = 4.89$ ) and anxious-ambivalent persons ( $M = 5.07$ ). This attachment-style difference may reflect the higher cognitive openness of secure persons (Mikulincer, 1997).

The above main effects were qualified by a significant interaction,  $F(4, 216) = 3.41, p < .01$ . Tests for simple main effects yielded the following differences. First, avoidant persons made more severe judgments of transgressions in the mortality-salience/delayed-response condition than in the control and mortality-salience/immediate-response conditions,  $F(2, 216) = 4.38, p < .05$ , (see means in Table 1). Second, anxious-ambivalent persons made more severe judgments of transgressions in the two mortality salience conditions than in the control condition,  $F(2, 216) = 3.02, p < .05$ , (see Table 1). For these persons, the mortality salience effect was found in both immediate and delayed severity ratings.

Table 1  
Sample Sizes (*ns*), Means, and Standard Deviations of Transgression Severity Ratings According to Attachment Style and Experimental Condition (Study 1)

Attachment style	Condition		
	Control	Mortality-salience/ immediate-response	Mortality-salience/ delayed-response
Secure			
<i>n</i>	42	45	46
<i>M</i>	4.19 <sub>a</sub>	4.14 <sub>a</sub>	4.03 <sub>a</sub>
<i>SD</i>	0.74	0.85	0.84
Avoidant			
<i>n</i>	24	20	21
<i>M</i>	4.66 <sub>a</sub>	4.71 <sub>a</sub>	5.32 <sub>b</sub>
<i>SD</i>	0.91	0.67	0.68
Anxious-ambivalent			
<i>n</i>	9	10	8
<i>M</i>	4.54 <sub>a</sub>	5.38 <sub>b</sub>	5.31 <sub>b</sub>
<i>SD</i>	0.92	0.82	0.95

Note. Means with different subscripts within rows were significantly different at  $\alpha = .05$ .

Third, secure persons showed no significant effect of experimental condition. That is, mortality salience had no significant effect on the immediate and delayed severity ratings of secure persons.

In examining continuous attachment scores, we conducted two hierarchical regressions for severity ratings. First, we examined the effects of mortality salience (a dummy variable contrasting the two mortality salience conditions with the control condition), attachment scores, and all their interactive (product) terms. Second, we examined the effects of the distraction procedure (a dummy variable comparing the two mortality salience conditions with each other), attachment scores, and their interactive terms. In these regressions, the main effects of the predictors were introduced in Step 1, the two-way interactions were introduced in Step 2, and the three-way interaction was entered in Step 3.

The regression for mortality salience and attachment scores revealed a significant main effect for attachment anxiety ( $\beta = .23$ ),  $t(221) = 3.33, p < .01$ . This regression also revealed significant interactions for Mortality Salience  $\times$  Anxiety ( $\beta = .56$ ),  $t(218) = 2.85, p < .01$ , and Mortality Salience  $\times$  Avoidance ( $\beta = .51$ ),  $t(218) = 2.35, p < .05$ . Other effects were not significant. Within-condition partial correlations (controlling for the other attachment rating) revealed that attachment scores were significantly related to severity rating in mortality salience conditions ( $r = .22, p < .05$ , for avoidance;  $r = .36, p < .01$ , for anxiety) but not in the control condition ( $r = -.12, ns$ , for avoidance;  $r = -.05, ns$ , for anxiety). That is, the higher a person's avoidance and anxiety, the more severe his or her judgments after making mortality salient. These associations fit the ANOVA findings.

The regression for the distraction procedure and attachment scores revealed a significant main effect for attachment anxiety

<sup>3</sup>In line with Harmon-Jones et al.'s (1997) findings, no significant association was found between a total FPDS score and dependent variables in all the reported studies.

<sup>4</sup>Similar effects for mortality salience and attachment style were found in the ANOVA performed on severity of punishment ratings.

( $\beta = .32$ ),  $t(146) = 3.98$ ,  $p < .01$ . This regression also yielded a significant Distraction  $\times$  Avoidance interaction ( $\beta = .63$ ),  $t(143) = 2.25$ ,  $p < .05$ . Within-condition partial correlations revealed that avoidance was significantly related to severity ratings in the mortality-salience/delayed-response condition ( $r = .30$ ,  $p < .01$ ) but not in the mortality-salience/immediate-response condition ( $r = .06$ ,  $p = .10$ ). Following mortality salience, the higher a person's attachment avoidance, the more severe the delayed but not the immediate judgments of transgressions.

In examining the contribution of self-esteem, Pearson correlations revealed the expected inverse associations between self-esteem and attachment scores ( $r = -.38$ ,  $p < .05$ , for anxiety;  $r = -.25$ ,  $p < .01$ , for avoidance). Moreover, a significant correlation was found between self-esteem and the transgression severity rating ( $r = -.20$ ,  $p < .05$ ). However, the Condition  $\times$  Attachment Style interaction observed in the 2-way ANOVA was still significant after self-esteem was introduced as a covariate,  $F(2, 215) = 3.57$ ,  $p < .05$ . Accordingly, the Mortality Salience  $\times$  Anxiety, Mortality Salience  $\times$  Avoidance, and Distraction  $\times$  Avoidance interactions observed in the hierarchical regressions were still significant after self-esteem was introduced as an additional predictor:  $t(217) = 2.84$ ,  $p < .01$ ;  $t(217) = 2.39$ ,  $p < .01$ ; and  $t(142) = 2.25$ ,  $p < .05$ , respectively. The regressions also revealed that all the interactive effects for self-esteem with condition and/or attachment scores were not significant. Overall, although self-esteem was related to attachment scores, it could not explain the unique effects of attachment style on judgments of transgressions.

The findings fit our predictions. First, mortality salience led avoidant persons to make more severe judgments only after a distraction task. Second, anxious-ambivalent persons reacted to mortality salience with more severe judgments of social transgressions, even when no distracting task was present. Third, mortality salience did not produce any change in secure persons' judgments of transgressions. Importantly, these effects did not depend on a person's self-esteem and were not a mere reflection of self-esteem variations.

Although findings implied that secure people did not activate worldview defenses after mortality salience, it is still possible that they would react defensively when faced with specific threats that were not assessed in our study. For example, secure people may react negatively to targets that threaten their relationships or the well-being of loved persons. In fact, McGregor et al. (1998) showed that worldview defenses are provoked only in response to targets that threaten a person's specific beliefs and values.

Interestingly, the data allow us to explore the above possibility. The MSTs included five transgressions that threaten one's own well-being or projects and five transgressions that threaten the well-being of loved persons. On this basis, we separately averaged the ratings for the five intrapersonal crimes ( $\alpha = .89$ ) and for the five interpersonal crimes ( $\alpha = .91$ ) and then assessed reactions to these two types of crimes. The findings replicated the above reported interactions. For example, the ANOVAs revealed that mortality salience led insecure persons to rate both intrapersonal and interpersonal crimes more severely but had no significant effect on secure persons' judgments of the two types of crimes:  $F(2, 215) = 3.16$ ,  $p < .05$ , for intrapersonal and,  $F(2, 215) = 3.89$ ,  $p < .05$ , for interpersonal crimes, respectively. That is, secure persons may not activate worldview defenses even when the target threatens close relationships. However, we exclusively focused on

reactions to deviant others. More research should be conducted on other worldview defenses (e.g., reactions to out-groups).

The lack of secure persons' worldview defenses can be alternatively explained by a possible methodological problem. In this study, participants completed a self-esteem scale before the mortality salience induction. Borrowing Steele's (1988) self-affirmation reasoning, one can speculate that completing a self-esteem scale might have primed secure persons' strong inner resources and that such a self-affirmation might have made unnecessary any worldview defense. This possibility will be examined in Study 3, in which worldview defenses were assessed without completing any self-esteem scale.

## Study 2

Study 2 examined the role of attachment style in moderating mortality salience effects on death-thought accessibility. Participants filled out attachment style scales, were randomly assigned to one of the conditions described in Study 1, and then completed a Hebrew version of Greenberg et al.'s (1994) word completion task. The dependent variable was the number of death-related words that participants completed. We predicted that the mortality-salience/delayed-response induction would lead to the completion of more death-related words than would a control condition in all the three attachment styles. We also predicted that the mortality-salience/immediate-response induction would lead to the completion of more death-related words than would a control condition only among anxious-ambivalent persons.

## Method

**Participants.** An independent sample of 210 undergraduate social sciences students from Bar-Ilan University (139 women and 71 men ranging in age from 18 to 29,  $Mdn = 23$ ) participated in the study without receiving any monetary reward. They were randomly divided into three experimental groups, with 70 participants in each.

**Materials and procedure.** The attachment style scales were identical to those of Study 1. Sixty-two percent of the sample classified themselves as secure ( $n = 130$ ), 26% as avoidant ( $n = 54$ ), and 12% as anxious-ambivalent ( $n = 26$ ). Cronbach's alphas were .73 for anxiety items and .71 for avoidance items. Following these scales, participants were randomly assigned to one of the three conditions described in Study 1: control, mortality-salience/immediate-response, or mortality-salience/delayed-response.<sup>5</sup>

The accessibility of death-related thoughts was assessed by a Hebrew version of the word completion task, which has previously been successfully used by Greenberg et al. (1994) and Arndt et al. (1997) in American samples. The task included 20 Hebrew word fragments that participants completed with the first word that came to mind by filling in one missing letter. Six of the 20 Hebrew word fragments could be completed with neutral or death-related Hebrew words. The possible death-related words were the Hebrew words for death, mourning, cadaver, grave, murder, and skeleton. The dependent measure was the number of death-related words with which a participant completed the fragments.

<sup>5</sup>An additional pretest conducted on another 20 undergraduate students revealed that similar death-thought accessibility scores were obtained with and without a distracting task following the neutral leisure time scale (control condition). In these two conditions, the accessibility score approached 0. Therefore, as in Study 1, we decided to construct a three-group design and to include only one control condition without any distracting task.

## Results and Discussion

The 2-way ANOVA for condition and self-classified attachment style performed on the number of death-related words yielded significant main effects for both condition,  $F(2, 201) = 24.17, p < .01$ , and attachment style,  $F(2, 201) = 16.06, p < .01$ . Fitting past studies (e.g., Arndt et al., 1997), Scheffé tests showed that the mortality-salience/delayed-response condition led to higher accessibility of death-related thoughts ( $M = 1.66$ ) than did the control condition ( $M = 0.62$ ) and mortality-salience/immediate-response condition ( $M = 0.93$ ). Scheffé tests also indicated that anxious-ambivalent persons displayed higher accessibility of death-related thoughts ( $M = 1.68$ ) than did secure ( $M = 0.78$ ) and avoidant persons ( $M = 0.76$ ). This difference fits past findings showing that anxious-ambivalent persons are more concerned with their death than are secure and avoidant persons (Mikulincer et al., 1990).

The above main effects were qualified by a significant interaction,  $F(4, 201) = 2.73, p < .05$ . Tests for simple main effects yielded the following differences. First, the typical mortality salience effects were found among secure persons,  $F(2, 201) = 32.45, p < .01$ , and avoidant persons,  $F(2, 201) = 15.93, p < .01$ . Secure and avoidant persons displayed higher death-thought accessibility in the mortality-salience/delayed-response condition than in the control and mortality-salience/immediate-response condition (see Table 2). Second, anxious-ambivalent persons displayed higher death-thought accessibility in the two mortality salience conditions than in the control condition,  $F(2, 201) = 3.36, p < .05$ , (see Table 2). For them, the mortality salience effect was found before and after a distraction task.

A hierarchical regression was calculated for number of death-related words with mortality salience (dummy variable described in Study 1), attachment scores, and their interactive terms as the predictors. This regression yielded significant main effects for mortality salience ( $\beta = .24$ ),  $t(206) = 4.01, p < .01$ , and attachment anxiety ( $\beta = .42$ ),  $t(206) = 7.06, p < .01$ . All the interactive effects were not significant. In line with the ANOVA findings, mortality salience led to heightened death-thought accessibility,

regardless of individual variations in attachment style. Accordingly, the higher a person's attachment anxiety, the higher the death-thought accessibility.

The second hierarchical regression, examining the effects of distraction (dummy variable described in Study 1), attachment scores, and the interactive terms, also yielded significant main effects for the distraction task ( $\beta = .45$ ),  $t(136) = 6.72, p < .01$ , and for anxiety ( $\beta = .39$ ),  $t(136) = 5.68, p < .01$ . However, the regression also yielded a significant interaction for Distraction  $\times$  Anxiety ( $\beta = -.52$ ),  $t(133) = 2.04, p < .05$ . Other effects were not significant. Partial correlations revealed that the association between anxiety and number of death-related words was stronger in the mortality-salience/immediate-response condition ( $r = .59, p < .01$ ) than in the mortality-salience/delayed-response condition ( $r = .28, p < .05$ ). In fact, as observed in the ANOVA, after a distraction task all the participants, regardless of their attachment style, exhibited heightened death-thought accessibility.

Attachment style seemed to moderate the timing of death-thought accessibility following mortality salience. On the one hand, both secure and avoidant persons reacted to mortality salience with heightened death-thought accessibility only after a distracting task. This finding implied that death thoughts might have been suppressed immediately after mortality salience and that secure persons, like avoidant persons, activated defensive suppression. Therefore, the results of Study 1 about the lack of worldview defenses among secure persons cannot be regarded as a sign of lack of defensiveness.

On the other hand, anxious-ambivalent persons, who showed relatively high death-thought accessibility in the control condition, immediately reacted to mortality salience with a further increase in accessibility. It is possible that these persons are constantly under a high cognitive load, which has been found by Arndt et al. (1997) to undermine the suppression of death-related thoughts. This cognitive load explanation fits anxious-ambivalent persons' chronic concerns with death (Mikulincer et al., 1990).

## Study 3

Study 3 was designed to examine the extent to which the effects of worldview defense on death-thought accessibility depend on attachment style. According to TMT, worldview defenses may reduce the heightened death-thought accessibility produced by death reminders (e.g., Greenberg et al., 1997). In support of this view, Arndt et al. (1997) found that following mortality salience, participants who were given an opportunity to engage in worldview validation subsequently exhibited less death-thought accessibility than did participants who were not given such an opportunity.

In our terms, the defensive function of worldview defenses would depend on attachment style. Specifically, we hypothesize that this defensive function would be found only among avoidant persons, who rely on any defensive maneuver that may allow them to attenuate distressing thoughts (Mikulincer, 1998). As a result, they may take advantage of the opportunity to validate worldviews, which, in turn, may dissipate mortality concerns. With regard to anxious-ambivalent persons, their mental rumination on distressing thoughts may impede the dissipation of mortality concerns (Mikulincer, 1998), thereby impairing the defensive function of worldview defenses. As a result, worldview validation would fail to reduce the heightened death-thought accessibility produced

Table 2  
Sample Sizes (ns), Means, and Standard Deviations of Number of Death-Related Words According to Attachment Style and Experimental Condition (Study 2)

Attachment style	Condition		
	Control	Mortality-salience/ immediate-response	Mortality-salience/ delayed-response
Secure			
<i>n</i>	41	46	43
<i>M</i>	0.42 <sub>a</sub>	0.41 <sub>a</sub>	1.51 <sub>b</sub>
<i>SD</i>	0.67	0.69	0.80
Avoidant			
<i>n</i>	21	16	17
<i>M</i>	0.33 <sub>a</sub>	0.38 <sub>a</sub>	1.59 <sub>b</sub>
<i>SD</i>	0.66	0.81	0.79
Anxious-ambivalent			
<i>n</i>	8	8	10
<i>M</i>	1.12 <sub>a</sub>	2.00 <sub>b</sub>	1.91 <sub>b</sub>
<i>SD</i>	0.99	0.75	0.97

Note. Means with different subscripts within rows were significantly different at  $\alpha = .05$ .

by death reminders. With regard to secure persons, they would not activate worldview defenses, thereby making irrelevant its defensive function. Providing secure persons with an opportunity to validate worldviews would not reduce death-thought accessibility, because these persons would not engage in such a defensive validation.

In examining the above hypotheses, we conceptually replicated Arndt et al.'s (1997) study. Specifically, after completing attachment style scales, participants were randomly divided into three conditions. In the mortality-salience/defend condition, participants were exposed to a mortality salience induction (completing the FPDS) and, then, after a distraction, judged transgressions in the MSTs that enabled them to defend their worldviews. In the mortality-salience/no-defend condition, participants were also exposed to mortality salience, but only after a distraction task answered the MSTs in a nonjudgmental way that had nothing to do with judgments of social transgressions. In the control condition, participants completed the neutral leisure time scale and were then given the same opportunity to defend their worldview as in the mortality-salience/defend condition.<sup>6</sup> The dependent variable was death-thought accessibility, which was assessed immediately after responding to (either judgmental or nonjudgmental) the MSTs.

### Method

**Participants.** Another independent sample of 210 undergraduate social sciences students from Bar-Ilan University (122 women and 88 men ranging in age from 19 to 33,  $Mdn = 24$ ) participated in the study without receiving any monetary reward. They were randomly divided into three experimental groups, with 70 participants in each.

**Materials and procedure.** The attachment style scales were identical to those described in Study 1. In the self-classification scale, 59% of the sample classified themselves as secure ( $n = 123$ ), 28% as avoidant ( $n = 60$ ), and 13% as anxious-ambivalent ( $n = 27$ ). In the 10-item scale, Cronbach's alphas were .76 for anxiety items and .71 for avoidance items. Following completion of these scales, participants were randomly assigned to one of three conditions. In the control condition, participants completed three scales described in Study 1 in the following order: the neutral 12-item leisure time scale, the distracting categorization task, and the MSTs. In the mortality-salience/defend condition, participants completed the 12-item FPDS (see Study 1), the distracting categorization task, and then the MSTs. In the mortality-salience/no-defend condition, participants also completed the FPDS, performed the distracting categorization task, and received the 10 MSTs vignettes. However, instead of rating the severity of the transgressions, participants were asked to evaluate the vignettes in a nonjudgmental manner (e.g., "What gender do you think the author of the vignette was?"). Following this procedure, all the participants performed the word completion task described in Study 2 to assess death-thought accessibility. Participants were then debriefed.

### Results and Discussion

**Worldview validation.** Before examining the defensive function of worldview validation, we examined whether participants who had the opportunity to defend their worldview following mortality salience were doing so. We averaged severity ratings for the 10 MSTs vignettes ( $\alpha = .93$ ) and subjected this score to a 2-way ANOVA for attachment style and condition (control, mortality-salience/defend). Participants in the mortality-salience/no-defend condition were excluded from this analysis, because they did not provide severity ratings. The ANOVA yielded a significant interaction effect,  $F(2, 134) = 3.59, p < .05$ . Tests for simple main

effects replicated findings of Study 1. Both avoidant ( $M = 5.35$ ) and anxious-ambivalent ( $M = 5.45$ ) persons made more severe judgments of transgressions in the mortality salience condition than in the control condition ( $M_s = 4.72$  and  $4.53$ , respectively),  $F(1, 134) = 4.92, p < .05$ , for avoidant persons,  $F(2, 134) = 4.36, p < .05$ , for anxious-ambivalent persons. In contrast, secure persons showed no significant difference between conditions ( $F < 1$ ;  $M_s = 3.97$  and  $3.86$  for the mortality salience and control conditions, respectively).

A hierarchical regression for mortality salience (dummy variable contrasting mortality-salient/defend and control conditions) and attachment scores revealed significant interactions for Mortality Salience  $\times$  Anxiety ( $\beta = .70$ ),  $t(133) = 2.87, p < .01$ , and Mortality Salience  $\times$  Avoidance ( $\beta = .56$ ),  $t(133) = 2.19, p < .05$ . Partial correlations revealed significant associations of attachment scores and severity rating in the mortality-salience/defend condition, ( $r = .40, p < .01$ , for avoidance;  $r = .29, p < .01$  for anxiety) but not in the control condition ( $r = .09$ , for avoidance;  $r = -.16$ , for anxiety).

It is important to note that the present findings replicated the findings of Study 1 despite the fact that participants did not complete a self-esteem scale before the mortality salience induction. In this way, we can reject the alternative self-affirmation explanation.

**Death-thought accessibility.** A two-way ANOVA for attachment style and condition on the number of death-related words yielded significant main effects for condition,  $F(2, 201) = 21.37, p < .01$ , and attachment style,  $F(2, 201) = 4.58, p < .05$ . Fitting previous TMT studies (e.g., Arndt et al., 1997), Scheffé tests showed that the mortality-salience/no-defend condition led to higher death-thought accessibility ( $M = 1.75$ ) than did the mortality-salience/defense-condition ( $M = 1.22$ ), which, in turn, led to higher accessibility than the control condition ( $M = 0.58$ ). Replicating findings of Study 2, Scheffé tests indicated that anxious-ambivalent persons displayed higher death-thought accessibility ( $M = 1.52$ ) than did secure ( $M = 1.13$ ) and avoidant persons ( $M = 0.89$ ).

The above main effects were qualified by a significant interaction,  $F(4, 201) = 3.37, p < .05$ . Simple main effect tests indicated that the typical effect of worldview defense was only observed among avoidant persons. In this case, death-thought accessibility was higher in the mortality-salience/no-defend condition than in the control and the mortality-salience/defend conditions,  $F(2, 201) = 16.10, p < .01$ , (see means in Table 3). In contrast, for secure and anxious-ambivalent people, the opportunity to defend worldviews did not have any significant effect on death-thought accessibility. In fact, they had higher accessibility to death thoughts in the two mortality salience conditions (with and without defense) than in the control condition,  $F(1, 201) = 20.45, p < .01$ , for secure persons, and,  $F(1, 201) = 3.39, p < .05$ , for anxious-ambivalent persons (see Table 3). These persons showed no significant difference between the two mortality salience conditions ( $p > .10$ ). Despite this lack of statistical significance, it is impor-

<sup>6</sup>An additional pretest conducted on another 20 undergraduate students revealed no significant differences in death-thought accessibility between control/defend and control/no-defend conditions. On this basis, we decided to construct a three-group design and to include only the control/defend condition.

Table 3  
*Sample Sizes (ns), Means, and Standard Deviations of Number of Death-Related Words According to Attachment Style and Experimental Condition (Study 3)*

Attachment style	Condition		
	Control	Mortality-salience/ defend	Mortality-salience/ no-defend
Secure			
<i>n</i>	41	42	40
<i>M</i>	0.41 <sub>a</sub>	1.33 <sub>b</sub>	1.65 <sub>b</sub>
<i>SD</i>	0.81	0.93	0.97
Avoidant			
<i>n</i>	19	20	21
<i>M</i>	0.42 <sub>a</sub>	0.45 <sub>a</sub>	1.81 <sub>b</sub>
<i>SD</i>	0.77	0.83	0.87
Anxious-ambivalent			
<i>n</i>	10	8	9
<i>M</i>	0.90 <sub>a</sub>	1.87 <sub>b</sub>	1.78 <sub>b</sub>
<i>SD</i>	0.99	0.99	0.97

Note. Means with different subscripts within rows were significantly different at  $\alpha = .05$ .

tant to note that the means displayed in Table 3 indicated a trend for death-thought accessibility to be reduced following worldview defense among secure persons.

A hierarchical regression for number of death-related words, as predicted by mortality salience (dummy variable contrasting mortality-salience/no-defend and control conditions), attachment scores, and the interactive terms, only yielded significant main effects for mortality salience ( $\beta = .38$ ),  $t(136) = 5.37$ ,  $p < .01$ , and anxiety ( $\beta = .47$ ),  $t(136) = 6.97$ ,  $p < .01$ . All the interactive effects were not significant. These findings replicated those of Study 2 and showed that (a) mortality salience led to heightened death-thought accessibility, regardless of a person's attachment style, and (b) the higher the attachment anxiety, the higher the death-thought accessibility.

A second hierarchical regression, examining the effects of the worldview defense (dummy variable contrasting the two mortality salience groups) and attachment scores, yielded significant main effects for avoidance ( $\beta = -.37$ ),  $t(136) = 4.99$ ,  $p < .01$ , and anxiety ( $\beta = .45$ ),  $t(136) = 5.80$ ,  $p < .01$ , and a significant Defense  $\times$  Avoidance interaction ( $\beta = -.75$ ),  $t(133) = 2.18$ ,  $p < .05$ . Partial correlations revealed that the association between avoidance and number of death-related words was stronger in the mortality-salience/defend condition ( $r = -.52$ ,  $p < .01$ ) than in the mortality-salience/no-defend condition ( $r = -.11$ , *ns*). Fitting the ANOVA findings, the higher a person's avoidance, the lower the death-thought accessibility after the opportunity to defend his or her worldview.<sup>7</sup>

In line with our hypotheses, the opportunity for worldview validation reduced death-thought accessibility only among avoidant persons. In contrast, secure persons did not show strong evidence of defensive reactions or a significant decline in death-thought accessibility. Interestingly, anxious-ambivalent persons showed marked defensive reactions, but did not show a resultant decline in death-thought accessibility. That is, their activation of worldview defenses seemed to be ineffective for dissipating mortality concerns. Alternatively, given the high base rate of death-thought accessibility of anxious-ambivalent persons, the opportu-

nity for worldview defenses provided in the present study might have been insufficient to restore psychological equanimity. This possibility could be tested in further research by giving people an opportunity to defend worldview a second time. If this reasoning is correct, only anxious-ambivalent persons should continue to defend and show a consequent decline in death-thought accessibility.

#### Study 4

Study 4 examined the hypothesis that secure persons would react to death reminders with attempts to validate their sense of symbolic immortality. As stated earlier, when exposed to mortality salience, secure persons may rely on their habitual strong sense of symbolic immortality (Florian & Mikulincer, 1998a) and then report an increase in such a sense. Participants completed attachment scales, were assigned to a mortality salience or control condition, and completed a scale tapping the biological-creative mode of the sense of symbolic immortality (Mathews & Kling, 1988). This mode was found to differentiate between secure and insecure persons and to be inversely related to fear of death (Florian & Mikulincer, 1998a). Participants also completed a self-esteem scale to examine the alternative self-esteem explanation.

#### Method

**Participants.** An independent sample of 120 undergraduate social sciences students from Bar-Ilan University (76 women and 44 men ranging in age from 19 to 32, *Mdn* = 24) participated in the study without receiving any monetary reward. They were randomly divided into two experimental groups, with 60 participants in each.

**Materials and procedure.** The attachment style scales were identical to those given in Study 1. Sixty percent of the sample classified themselves as secure ( $n = 72$ ), 23% as avoidant ( $n = 28$ ), and 17% as anxious-ambivalent ( $n = 20$ ). On the 10-item attachment scale, Cronbach's alphas were .69 for anxiety items and .75 for avoidance items. Participants also completed Rosenberg's Self-Esteem Scale (see details in Study 1). Cronbach's alpha for the 10 items indicated adequate internal consistency (.79). Following these scales, participants were randomly assigned to one of two conditions: control and mortality salience. The material and procedure were identical to those of Study 1. All the participants then completed the distracting task described in Study 1. Following this procedure, participants completed 12 items tapping the biological-creative mode of Mathews and Kling's (1988) Symbolic Immortality Scale (e.g., "I would do almost anything to ensure the future of my children," "It is important for me to write, create, or build something that will exist after my death"). Participants rated the extent of their agreement or disagreement with each item using a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). In our sample, Cronbach's alpha coefficient was high (.89). A symbolic immortality score was then calculated by averaging the 12 items.

#### Results and Discussion

The 2-way ANOVA for condition and self-classified attachment style performed on the sense of symbolic immortality yielded significant main effects for both condition,  $F(1, 114) = 5.79$ ,  $p < .01$ , and attachment style,  $F(2, 114) = 7.37$ ,  $p < .01$ . Participants in the mortality salience condition reported a higher sense of

<sup>7</sup>As in Arndt et al.'s (1997) study, no significant association was found between judgments of social transgressions and death-thought accessibility.

symbolic immortality ( $M = 3.42$ ) than did those in the control condition ( $M = 3.03$ ). Fitting past studies (Florian & Mikulincer, 1998a), Scheffé tests showed that secure persons reported a higher sense of symbolic immortality ( $M = 3.47$ ) than did anxious-ambivalent ( $M = 2.82$ ) and avoidant persons ( $M = 2.81$ ). However, the main effects were qualified by a significant interaction,  $F(2, 114) = 3.14, p < .05$ . In line with our hypothesis, tests for simple main effects indicated that the effect of mortality salience was significant only among secure persons,  $F(1, 114) = 12.33, p < .01$ , but not among avoidant or anxious-ambivalent persons ( $F < 1$ ). That is, mortality salience led to heightened sense of symbolic immortality only among secure people (see Table 4).

A hierarchical regression for symbolic immortality, as predicted by condition (dummy variable contrasting mortality salience and control conditions) and attachment scores, revealed significant interactions for Condition  $\times$  Anxiety ( $\beta = -.65$ ),  $t(113) = 2.58, p < .05$ , and Condition  $\times$  Avoidance ( $\beta = -.82$ ),  $t(113) = 2.42, p < .05$ . Partial correlations revealed a stronger inverse association between attachment scores and symbolic immortality in the mortality salience condition ( $r = -.34, p < .01$ , for anxiety;  $r = -.31, p < .01$ , for avoidance) than in the control condition ( $r = -.02, ns$ , for anxiety;  $r = -.05, ns$ , for avoidance). This finding replicated the results of the ANOVAs.

In examining the contribution of self-esteem, Pearson correlations revealed the expected inverse associations between self-esteem and attachment scores ( $r = -.20, p < .05$ , for anxiety;  $r = -.18, p < .05$ , for avoidance). Interestingly, self-esteem was also significantly associated with symbolic immortality ( $r = .21, p < .05$ ). However, findings showed that self-esteem could not explain the effects of attachment style and mortality salience. First, the ANOVA's interaction for Condition  $\times$  Attachment Style was significant after adding self-esteem as a covariate,  $F(2, 113) = 3.51, p < .05$ . Second, the Condition  $\times$  Anxiety and Condition  $\times$  Avoidance interactions observed in the hierarchical regression were still significant after introducing self-esteem as an additional predictor,  $t(112) = 2.62, p < .01$ , and,  $t(112) = 2.17, p < .05$ , respectively. Third, this regression revealed that all the interactions for self-esteem with condition and/or attachment

scores were not significant. It seems that the effects of attachment style on symbolic immortality did not depend on self-esteem.

Overall, secure persons reacted to mortality salience with a heightened sense of symbolic immortality. In contrast, avoidant and anxious-ambivalent persons did not show any notable variation in symbolic immortality following mortality salience. Borrowing Lifton's (1979) reasoning that symbolic immortality serves as a cognitive shield against death awareness, secure persons' heightened symbolic immortality may be interpreted as a protective response against death reminders. Of course, our findings only documented the existence of such a response. Further research should be conducted on the defensive function of symbolic immortality. However, together with findings of Study 2 showing secure persons' low death-thought accessibility immediately after mortality salience, the current findings imply that secure persons' lack of worldview defenses observed in Studies 1 and 3 may not reflect lack of concern with death. Rather, the findings may reflect that, although all the attachment styles are affected by the problem of death, secure persons differ from insecure persons in the way they cope with this problem.

### Study 5

Study 5 examined the hypothesis that secure persons would react to death reminders with heightened search for intimacy. As stated earlier, when exposed to mortality salience, secure persons may rely on the basic guideline of the attachment system for regulating distress: attainment or maintenance of proximity to significant others. Therefore, they would report a higher desire for intimacy following a mortality salience condition than they would following a control condition. Participants completed attachment scales, were assigned to a mortality salience or control condition, and then filled out a scale tapping their desire for intimacy in romantic relationships (Sharabany, 1994). In Study 5, continuous attachment scores were assessed by means of the Experience in Close Relationships Scale (Brennan et al., 1998). This instrument is one of the most updated and integrative scales of attachment style and has been developed through factor analytic procedures (Brennan et al., 1998). In this way, we attempted to improve the measurement of attachment style.

Participants also completed a self-esteem scale to examine the alternative self-esteem explanation. In addition, participants completed a neuroticism scale to control for possible confounding effects between attachment and neuroticism. In fact, neuroticism has been found to be significantly related to insecure attachment (Shaver & Brennan, 1992) and to moderate mortality salience effects (Goldenberg, Pyszczynski, McCoy, Greenberg, & Solomon, 1999).

### Method

**Participants.** An independent sample of 110 undergraduate social sciences students from Bar-Ilan University (72 women and 38 men ranging in age from 19 to 31,  $Mdn = 22$ ) participated in the study without receiving any monetary reward. They were randomly divided into two experimental groups, with 55 participants in each.

**Materials and procedure.** Before the mortality salience induction, participants completed a randomly ordered series of self-report scales. The self-classification attachment style technique was identical to that of Study 1. Sixty-three percent of the sample classified themselves as secure ( $n = 69$ ), 22% as avoidant ( $n = 24$ ), and 15% as anxious-ambivalent ( $n =$

Table 4

Sample Sizes (ns), Means, and Standard Deviations of the Sense of Symbolic Immortality According to Attachment Style and Experimental Condition (Study 4)

Attachment style	Condition	
	Control	Mortality salience
Secure		
<i>n</i>	37	35
<i>M</i>	3.13 <sub>a</sub>	3.82 <sub>b</sub>
<i>SD</i>	0.89	0.81
Avoidant		
<i>n</i>	13	15
<i>M</i>	2.80 <sub>a</sub>	2.97 <sub>a</sub>
<i>SD</i>	0.94	0.68
Anxious-ambivalent		
<i>n</i>	10	10
<i>M</i>	2.98 <sub>a</sub>	2.64 <sub>a</sub>
<i>SD</i>	1.04	1.03

Note. Means with different subscripts within rows were significantly different at  $\alpha = .05$ .

17). Dimensions of attachment anxiety and avoidance were assessed by means of the 36-item Experience in Close Relationships Scale (Brennan et al., 1998). Participants rated the extent to which each item was descriptive of their feelings in close relationships on a 7-point scale, ranging from 1 (*not at all*) to 7 (*very much*). Eighteen items tapped attachment anxiety, and 18 tapped attachment avoidance. This scale was found to be highly reliable and valid (Brennan et al., 1998). For the present study, a team of three bilingual psychologists translated the scale to Hebrew, according to the classic back-translation technique. Then, the Hebrew version of the scale was given to 256 Israeli students, and a factor analysis replicated the original two-factor structure of the scale. Whereas all 18 anxiety items loaded high ( $>.50$ ) in the first factor (34% of explained variance), all 18 avoidance items loaded high ( $>.50$ ) in the second factor (22%). Moreover, a subsample of 80 participants completed the new scale together with the 10-item scale described in Study 1, and high correlations were found between the anxiety scores of the two scales ( $r = .67, p < .01$ ) as well as between the avoidance scores ( $r = .73, p < .01$ ). That is, similar constructs were assessed by the two scales. In the current sample, Cronbach's alphas were high for anxiety items (.92) and avoidance items (.93). Two scores were then computed by averaging items in each factor.

Participants also completed Rosenberg's Self-Esteem Scale (see details in Study 1). Cronbach's alpha for the 10 items was .87. In addition, participants completed the Neuroticism subscale of the Eysenck Personality Inventory (Eysenck & Eysenck, 1967). This scale consisted of 23 items that could be answered with a dichotomous "yes" or "no" response. In the present sample, Cronbach's alpha for the 23 items was .77, and a total neuroticism score was calculated by summing the number of affirmative responses.

Following completion of the above scales, participants were randomly assigned to one of two conditions: control or mortality salience. The materials and procedure were identical to those of Study 1. Participants then completed the distracting task described in Study 1, and their desire for intimacy was assessed by Sharabany's (1994) Intimacy Scale. This scale consisted of 32 items, tapping various dimensions of intimacy (e.g., frankness, spontaneity, closeness). Several studies documented the reliability and validity of this scale (for a review, see Sharabany, 1994). In our study, participants were asked to focus on the relationship they ideally wanted to have with a romantic partner. They then rated the extent to which each item fit their wishes in this relationship on a 7-point scale, ranging from 1 (*not at all*) to 7 (*very much*). Cronbach's alpha for the 32 items was .95, and a total intimacy score was calculated by averaging the 32 items.

### Results and Discussion

The 2-way ANOVA for condition and self-classified attachment style performed on the desire for intimacy yielded a significant main effect for attachment style,  $F(2, 104) = 18.40, p < .01$ . Fitting past studies (e.g., Collins & Read, 1990), Scheffé tests showed that secure persons reported higher desire for intimacy in romantic relationships ( $M = 5.62$ ) than did anxious-ambivalent ( $M = 4.25$ ) and avoidant persons ( $M = 4.41$ ). However, this main effect was qualified by a significant interaction,  $F(2, 104) = 3.13, p < .05$ . In line with our hypothesis, tests for simple main effects indicated that the mortality salience condition led to higher desire for intimacy than did a control condition only among secure persons,  $F(1, 104) = 9.11, p < .05$ , (see means in Table 5). For avoidant and anxious-ambivalent persons, mortality salience had no significant effect on the desire for intimacy ( $F < 1$ ).

The hierarchical regression conducted for desire for intimacy, as predicted by condition (a dummy variable described in Study 4) and attachment scores, yielded significant main effects for anxiety ( $\beta = -.34, t(106) = 3.90, p < .01$ , and avoidance ( $\beta = -.22, t(106) = 3.74, p < .01$ ). The regression also yielded significant interactions for Condition  $\times$  Anxiety ( $\beta = -.53, t(103) = 1.99,$

Table 5  
Sample Sizes (*ns*), Means, and Standard Deviations of the Desire for Intimacy According to Attachment Style and Experimental Condition (Study 5)

Attachment style	Condition	
	Control	Mortality salience
Secure		
<i>n</i>	34	35
<i>M</i>	5.25 <sub>a</sub>	6.01 <sub>b</sub>
<i>SD</i>	1.11	0.96
Avoidant		
<i>n</i>	13	11
<i>M</i>	4.58 <sub>a</sub>	4.23 <sub>a</sub>
<i>SD</i>	1.16	1.22
Anxious-ambivalent		
<i>n</i>	8	9
<i>M</i>	4.37 <sub>a</sub>	4.14 <sub>a</sub>
<i>SD</i>	1.04	1.02

Note. Means with different subscripts within rows were significantly different at  $\alpha = .05$ .

$p < .05$ , and Condition  $\times$  Avoidance ( $\beta = -.61, t(103) = 2.39, p < .05$ ). Although attachment scores were significantly related to desire for intimacy in the two conditions, partial correlations revealed stronger inverse associations in the mortality salience condition ( $r = -.58, p < .01$ , for anxiety;  $r = -.59, p < .01$ , for avoidance) than in the control condition ( $r = -.28, p < .05$ , for anxiety;  $r = -.26, p < .01$ , for avoidance). These associations replicated the findings from the ANOVAs.

In examining contributions of self-esteem and neuroticism, Pearson correlations revealed that attachment anxiety was significantly related to self-esteem ( $r = -.26, p < .01$ ) and neuroticism ( $r = .46, p < .01$ ). However, self-esteem and neuroticism were not significantly related to the desire for intimacy ( $r_s = .04$  and  $-.12$ ). Moreover, the ANOVA's interaction for Condition  $\times$  Attachment Style was still significant after introducing either self-esteem,  $F(2, 103) = 3.11, p < .05$ , or neuroticism as a covariate,  $F(2, 103) = 3.09, p < .05$ . Accordingly, the interactions for Condition  $\times$  Anxiety and Condition  $\times$  Avoidance observed in the hierarchical regression were still significant after introducing self-esteem,  $t(102) = 1.97, p < .05$ , and,  $t(102) = 2.01, p < .05$ , or neuroticism,  $t(102) = 2.38, p < .05$ , and,  $t(102) = 2.55, p < .05$ , as an additional predictor. The regression also revealed that all the interactions for self-esteem or neuroticism with condition and/or attachment scores were not significant. Similar findings were obtained when self-esteem and neuroticism were introduced together in the analyses. Overall, these factors failed to explain the effects of attachment style on the desire for intimacy after mortality salience.

The findings support the idea that secure persons defend themselves against death awareness in a different manner from insecure persons. Only secure persons reacted to mortality salience with heightened desire for romantic intimacy. Although a desire for intimacy may have a wide variety of meanings, the threatening context in which this response was observed favors Bowlby's (1988) functional meaning of intimacy—the search for proximity to a significant other who may provide comfort in times of need. In this way, a heightened desire for intimacy may be another

defense that may dissipate death concerns of secure persons and may make other worldview defenses unnecessary.

### General Discussion

The current findings seem to be of potentially considerable importance for both TMT and attachment theory. With regard to TMT, the findings documented alternative, unexplored ways of coping with death reminders beyond the well-documented worldview defenses and indicated that people differ in the extent to which they use specific coping responses. The findings also emphasize that a person's habitual strategies of affect regulation are manifested in terror management, moderating death-thought accessibility and the activation of specific defenses. With regard to attachment theory, our findings provide an important demonstration of the potential power of the theory for explaining distress regulation, even when dealing with death awareness.

The findings can be summarized as follows. First, people differing in attachment style differ in the way they cope with death reminders. Whereas the two insecure groups reacted to death reminders with more severe judgments of transgressions, secure people showed a heightened sense of symbolic immortality and desire for intimacy. Second, the effects of a distraction task after mortality salience seemed to depend on attachment style. Whereas avoidant and secure persons reacted to mortality salience with heightened death-thought accessibility only after a distraction task, anxious-ambivalent people showed this reaction before and after this task. Third, attachment style moderated the defensive function of worldview defenses. In fact, the opportunity for worldview validation led to a reduction in death-thought accessibility only among avoidant persons.

Avoidant and anxious-ambivalent persons have been found to exclusively rely on worldview defenses when dealing with death reminders. In our terms, their history of frustrating interactions with rejecting others (Shaver & Hazan, 1993) may inhibit the use of inner resources, such as symbolic immortality, and of proximity maintenance as a terror management means. According to Lifton (1979), a negative attachment history may prevent the development of a positive connection to the world, which is one of the core components of symbolic immortality. This history also creates serious doubts about others' goodwill and the effectiveness of proximity maintenance as an affect regulation means (Mikulincer & Florian, 1998). Therefore, when dealing with death reminders, insecure persons should search for more impersonal and external shields, such as those provided by culture, and attack anyone who threatens these shields. That is, avoidant and anxious-ambivalent persons' reliance on worldview defenses may reflect their failure to develop a sense of trust in their inner forces and others' goodwill. Research should assess the association between worldview defense and developmental failures.

Interestingly, avoidant and anxious-ambivalent persons differed in the use of mental suppression and the defensive function of worldview validation. The activation of mental suppression immediately after death reminders (lack of heightened death-thought accessibility) and the effectiveness of worldview defenses for mitigating death concerns were observed among avoidant but not among anxious-ambivalent people. These results may be a reflection of their habitual regulatory strategies (Mikulincer & Florian, 1998).

Avoidant persons' pattern of responses to death reminders—initial suppression of death-related thoughts, subsequent increase in death-thought accessibility, concomitant activation of worldview defenses, and resultant reduction in death concerns—fit their habitual reliance on distancing and repressive strategies (Fraley & Shaver, 1997). These strategies may lead avoidant people to confront threatening events, such as death awareness, with suppression of distressing thoughts. Moreover, because of a possible "rebounding" of the to-be-suppressed material (Wegner, 1994), these persons may search for impersonal defensive shields (e.g., worldview validation) that may protect them from mortality concerns without depending on the help of significant others. In this way, worldview defenses may fit two basic goals of avoidant persons: rapid mitigation of distressing thoughts and maintenance of distance from significant others (Shaver & Hazan, 1993).

In the case of anxious-ambivalent persons, one should note that they had high death-thought accessibility even in the control condition. It seems that these persons, who regulate distress by ruminating on distressing thoughts, are probably unable to activate mental suppression (Mikulincer & Florian, 1998). As a result, they may exhibit high accessibility to distressing material, such as death-related thoughts, even when there is no contextual cue priming this material. Of course, the presence of such cues would immediately increase the accessibility of the distressing material and aggrandize the need for defensive actions. Because these persons have serious doubts about their inner forces and others' intentions, they probably can only search for the defensive path of worldview validation. However, the findings seem to indicate that even though anxious-ambivalent persons engage in worldview validation, this shield may lack its protective power and may leave these persons exposed to the hyperactivated awareness of death.

Probably the most interesting finding of our studies was secure persons' lack of activation of worldview defenses after mortality salience. This lack of activation may reflect their strong inner resources that allow them to deal with distress without distorting their social perceptions (Mikulincer, 1998). It may also reflect secure persons' cognitive openness and benevolent perceptions of others (Collins & Read, 1990; Mikulincer, 1997), which may interfere with worldview defenses that imply the derogation of other persons. However, the lack of worldview defenses does not necessarily imply that secure persons are not concerned with the threat of death or that they do not feel any need to cope with this threat. In fact, they were found to show relatively low death-thought accessibility immediately after mortality salience—a sign of mental suppression. More important, they were found to alternately react to mortality salience with a heightened sense of symbolic immortality and desire for intimacy. It seems that these persons deal with death reminders by relying on alternative defensive responses.

Our findings may suggest that secure persons react to death reminders in growth-oriented terms. As in other stressful situations, secure people may hold an optimistic attitude toward the threat of death, may rely on the guidelines of the attachment system (proximity to others), and may symbolically transform this threat into a manageable event. As observed in Studies 4 and 5, this transformational process may validate their sense of symbolic immortality or their sense of intimacy. In this way, secure persons may show growth-promoting reactions to death reminders, which may lead them to engage in creative activities and to strengthen close relationships. This conclusion implies that terror manage-

ment means may also consist of the activation of what TMT labeled *growth* motives (e.g., Greenberg et al., 1997). It seems that a secure base may allow people to rely on growth motives for dealing with death reminders. In this case, defensive and growth motivations may promote rather than inhibit each other.

At this point, it is important to note that our findings cannot discern whether a growth-oriented approach prevails over a defensive approach in shaping secure persons' responses. For example, one may suggest that although intimacy may promote growth, it sometimes could be a regressive response that leads people to excessively immerse themselves into another person at the expense of a sense of individuality. Accordingly, our findings cannot discern whether secure persons' responses differ entirely from worldview validation or are another alternative manifestation of worldview defenses. For example, a person's worldview may include beliefs of living on in one's children or being close with others and may lead the individual to invest in family and close relationships. Of course, this novel line of reasoning demands further research examining the meanings and underlying orientations of secure persons' responses to death reminders.

In interpreting the present findings, one should note that the effects of attachment style are open to alternative interpretations on the basis of the variables with which this style is related. However, our findings allow us to partially reject some of the alternative explanations. In Studies 1, 4, and 5, self-esteem variations failed to explain the moderating effects of attachment style. Accordingly, neuroticism failed to explain attachment-style differences in the desire for intimacy after mortality salience (Study 5). Of course, there are other personal factors that may be correlated with attachment style and may mediate its effects on terror management mechanisms. Further research should attempt to delineate the unique link between attachment style and terror management.

Although the lack of worldview defenses after death reminders among secure persons resembles Harmon-Jones et al.'s (1997) findings on high self-esteem persons, there was a basic difference between the responses of high self-esteem and secure persons. Harmon-Jones et al. showed that high self-esteem led to less worldview defenses and less death-thought accessibility after mortality salience. In contrast, secure persons showed lack of worldview defenses despite the heightened death-thought accessibility they exhibited after mortality salience. In this context, one can speculate that secure persons, who hold high self-esteem (Mikulincer, 1998), may react to death reminders with self-esteem enhancement attempts rather than with worldview validation. However, although this is an interesting hypothesis that can be tested in future research, some previous findings seem to favor its rejection. Mikulincer (1998) found that secure people showed no defensive distortion in their self-views under stressful contexts. In fact, only avoidant persons, who are highly concerned with maintaining a positive self-view, tended to engage in defensive self-inflation attempts under stressful contexts (Mikulincer, 1998).

Before ending this discussion, one should note that our study yielded only initial evidence on the relevance of attachment to terror management. Future studies should examine the effects of attachment style on other terror management means, such as self-enhancement devices and other worldview defenses. One should also consider that attachment style was measured before the mortality salience inductions. The completion of attachment scales then might have primed attachment-related thoughts, which, in turn, might have affected terror management. Future studies

should examine the possible effects of the contextual activation of attachment-related schemas on terror management. Further studies should also attempt to replicate the current findings using different populations and in different cultural settings. Despite these possible limitations, our findings diversify the psychological ways by which people can cope with the terror of death, link two basic evolutionary systems, and relate terror management to individual differences resulting from the history of interpersonal interactions with significant others.

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