



Research report

The persistence of attachment: Complicated grief, threat, and reaction times to the deceased's name

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ABSTRACT

Background: Complicated grief is increasingly recognized as a debilitating disorder with significant mental and health consequences. The underlying mechanisms of complicated grief remain unclear, however. In the present study, we investigated a specific mechanism of complicated grief (CG) derived from attachment theory: the accessibility of the deceased's mental representation under threat.

Methods: In a matched comparison of complicated ($n=26$) and asymptomatic grievors ($n=30$), we used an emotional Stroop task following subliminal threat or neutral primes to examine the accessibility of mental representations of the deceased, current attachment figures, and close others.

Results: Complicated grievors did not evidence differential accessibility to the deceased's mental representation across priming conditions, whereas asymptomatic grievors showed reduced accessibility (deactivation) of the deceased's mental representation specifically in the threat prime condition. These effects were independent of depressive symptoms. Across grievors, attachment anxiety and avoidance uniquely predicted accessibility of the deceased's name in the threat condition.

Limitations: The limitations of this study are its small sample size and reliance on analog attachment threats.

Conclusions: These data support that accessibility of the deceased's mental representation in threatening contexts is an important component of complicated and asymptomatic grieving and that attachment insecurity contributes to a maladaptive reliance on the deceased as an attachment figure.

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1. Introduction

Growing evidence supports that there are distinct patterns of response following interpersonal loss and other acutely stressful events (Bonanno, 2004; Bonanno, et al., 2002; Mancini et al., 2011). Although most people manage a loss with minimal disruptions in functioning and others experience initially acute symptoms that gradually subside (Mancini and Bonanno, 2006, 2009), an important minority, usually about 10–15%, experiences persistent and disabling

symptoms (Bonanno, et al., 2002). These include intense feelings of yearning, separation distress, avoidance of and intense distress at reminders, and substantial impairments in social and role obligations (Bonanno and Kaltman, 2001). An accumulating body of research has found that this syndrome of “complicated” grief (CG) is distinct from anxiety and depressive disorders and has unique effects on functioning (Bonanno, et al., 2007; Prigerson, et al., 1996). Although a number of correlates of CG have been identified, including interpersonal dependency (Bonanno, et al., 2002), attachment anxiety (Field and Sundin, 2001), patterns of autobiographical remembering (Golden et al., 2007), and negative cognitions related to the loss (Boelen et al., 2006), the specific

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mechanisms that underlie the phenomenology of CG have long eluded understanding.

In this study, we investigated mechanisms of CG derived from attachment theory (Bowlby, 1980), an ethological account of human bonds from infancy through adulthood. According to Bowlby (1980), human beings evolved an attachment system to seek proximity to caregivers when faced with psychological or physical threats. The functioning of the attachment system across the lifespan is shaped by early relationships with caregivers (Bowlby, 1980; Fraley and Shaver, 1998; Hazan and Shaver, 1987; Pietromonaco and Barrett, 2000). Persons with attachment histories characterized by unpredictable, cold, or inattentive care are more likely to regulate their behavior in adult relationships through anxious proximity seeking of attachment figures or overly aloof self-reliance when faced with threatening situations. These distinct strategies are now widely believed to occupy a two-dimensional space comprising avoidance, the tendency to mistrust other's good will and to maintain independence from others, and anxiety, the tendency to worry that close others won't be available in times of stress (Hazan and Shaver, 1987). Persons low on these two dimensions are thought to possess a secure attachment orientation, characterized by neither avoidance nor anxiety (Shaver and Clark, 1994).

A critical function of the attachment system is to ameliorate psychological distress (Mikulincer et al., 2002). When we are faced with a threatening circumstance—an unfavorable job evaluation, injury or illness, a conflict with a friend co-worker—we seek to restore our equilibrium through contact with close others in whom we invest important functions, such as providing a sense of security and a safe haven in times of stress (Bowlby, 1980). Such persons are specific and important individuals in one's life, often described as attachment figures. Thus, a straightforward way of understanding CG reactions is in terms of the loss of a major attachment figure and the concomitant security that person provided.

Consistent with this perspective, Bowlby et al. (Bowlby, 1980; Parkes and Weiss, 1983) observed that when adults lose or are separated from their attachment figures they show a behavior sequence similar to that of infants following separation. At first, the person seeks proximity, and then usually exhibits distress and protest reactions. When the loss is prolonged or permanent, these protest reactions are often accompanied by an enduring preoccupation with the missing person. In this framework, individuals suffering from CG are overly preoccupied with thoughts of their missing partners, unable to quell their protest reactions and return to normal functioning, and experience a persistent yearning for the lost loved one.

Placing this understanding within an individual differences framework, Fraley and Bonanno (2004) recently argued that complicated grievers should be characterized by more anxious and broadly insecure attachment dynamics, a supposition that is strongly supported by prior research (Fraley and Bonanno, 2004; Mancini et al., 2009; Wayment and Vierthaler, 2002; Wijngaards-de Meij, et al., 2007). One way to characterize these individual differences in attachment is in terms of activation or deactivation of the attachment system (Bowlby, 1980; Mikulincer, et al., 2002). For example, when securely attached individuals experience a

threatening situation, thoughts about specific attachment figures become more activated and accessible to consciousness, driving a desire to be close to them (Mikulincer, et al., 2002). This activation is usually adaptive because the accessibility of mental representations of attachment figures will promote positive affective states, proximity seeking, and subsequent relief of distress. By contrast, anxiously attached individuals show chronic activation (hyper-accessibility) of attachment figures regardless of threat, whereas avoidant individuals show deactivation (reduced accessibility) of attachment figures specifically in response to threats (Mikulincer et al., 2002). Given the association of anxious attachment with complicated grief (Fraley and Bonanno, 2004), one would therefore expect complicated grievers to show a pattern of excessive activation of the attachment system.

However, an important point is that specific attachment figure representations may show different patterns of activation or deactivation (Mikulincer et al., 2001). Whether these patterns of activation are adaptive or not would depend crucially on the nature of the relationship to the attachment figure. Thus, one way of understanding CG is as a persistent activation of the mental representation of the deceased, so that its preconscious availability persists regardless of context. By contrast, bereaved persons who have resolved their grief have likely transferred attachment functions to other individuals for managing distress and no longer experience accessibility of the deceased's representation, particularly under threat. In this framework, the canonical symptoms of CG—yearning for the loved one, inhibition of exploration, avoidance of reminders—are at least in part a consequence of the chronic accessibility of the lost loved one's mental representation, both in distressing and prosaic circumstances. Another possibility is that adaptive forms of grief involve the preconscious inhibition (deactivation) of the deceased's representation under threat, protecting the person from painful feelings of yearning. This hypothesis is suggested by a growing body of research on the important role of cognitive inhibition in emotion regulation, both in relation to depression (Joormann, 2010) and posttraumatic stress disorder (Amir et al., 2002). To our knowledge, no previous research has directly tested these suppositions in relation to CG.

In the present study, we tested whether the mental representation of the deceased shows different patterns of accessibility among complicated and asymptomatic grievers under threat. To address this hypothesis, we adapted Mikulincer, et al.'s (2002) experimental Stroop procedure in which neutral or threatening subliminal primes precede the appearance of names of attachment and other figures. Because the threat context should increase the accessibility of attachment figure representations, trials involving names of attachment figures should show slower reaction times in naming the color of the word when preceded by a threat prime. We adapted this procedure to a sample of persons who had suffered the loss of a spouse in the previous 1 1/2 to 3 years. We used a robust interview measure of grief, posttraumatic stress disorder (PTSD), and depression symptoms. We identified complicated grievers using a conservative algorithm comprising grief and grief-related PTSD symptoms (Prigerson, et al., 1999) and created matched groups of complicated grievers and asymptomatic grievers. To isolate the effects of grief-specific symptoms, we controlled for depression symptoms, which

would contain aspects of general distress and psychomotor retardation that could influence reaction times across groups. Each participant experienced blocks of trials involving both a threat prime (*separation*) and a neutral prime (*cognition*). Participants were exposed to the name of spouse, an attachment figure, and a close other, resulting in a 2×3 factorial design defined by prime (*separation*, *cognition*) and name (*deceased spouse*, *attachment*, *close*). We hypothesized that complicated grievers would be unresponsive to the name across conditions because of its chronic accessibility. By contrast, we hypothesized that asymptomatic grievers would show faster RTs to the deceased's name in the threat condition, a pattern consistent with an adaptive inhibition of the mental representation. We also explored whether maladaptive attachment dynamics, as revealed in self-reported attachment anxiety and avoidance, were associated with RTs for each of the name and prime conditions.

2. Method

2.1. Participants and procedure

We recruited bereaved participants under the age of 65 who had suffered a spousal loss within the previous 1 1/2 to 3 years. Information about the study was made available to potential participants in the New York metropolitan area by distributing flyers, posting advertisements in local newspapers and online, and sending letters to recently bereaved persons listed in public obituaries and to individuals likely to have contact with bereaved persons (for example, leaders of bereavement support groups at community organizations and local hospitals). In flyers and ads, the research was described as a “study of bereaved spouses with persistent struggles.” Participants received \$200 for completing two 2-hour sessions, involving the completion of questionnaires, interviews, and experimental tasks. One hundred and eighteen bereaved participants eventually enrolled in the study, which was approved by the Institutional Review Board at Teachers College, Columbia University. Among enrolled participants, we identified 29 persons with CG (see below for operational definition of CG). Twenty-six bereaved persons with CG were matched with 30 bereaved persons with resolved grief ($n = 30$) based on gender, ethnicity, years of education, and age. Demographic characteristics and significance tests are listed in Table 1.

Participants completed a structured clinical interview, a semi-structured narrative interview, and two experimental tasks. The semi-structured narrative interview served to build rapport with participants, to provide important naturalistic data about participants' style of coping and regulating emotion, and to reduce any residual effects of the structured symptom interview on the experimental task that followed. Here we report on one of the tasks from the experimental session. The other two tasks are reported separately.

2.1.1. Questionnaire measures

Before arriving at the laboratory, participants completed and returned a paper and pencil questionnaire. Included in this questionnaire was a series of measures. We used the six-item WHOTO scale (Fraley and Davis, 1997) to identify the first names of people who serve basic attachment

Table 1
Demographic characteristics and symptoms by group.

Variable	Complicated grief ($n = 26$)	Asymptomatic grief ($n = 30$)	Test statistic
	<i>M</i> or % <i>SD</i>	<i>M</i> or % <i>SD</i>	
Demographics			
Age	47.46 (6.99)	47.78 (7.78)	$t(56) = .593$
Women	54%	64%	$\chi^2(1, N = 56) = 1.35$
White	58%	53%	$\chi^2(1, N = 56) = .121$
Education	3.58 (1.48)	3.69 (1.23)	$t(56) = .069$
Years married	16.12 (10.11)	13.84 (8.30)	$t(56) = .535$
Symptoms			
Depression	4.77 (2.20)	1.75 (2.18)	$t(56) = 5.22^{***}$
PTSD	7.38 (3.00)	2.69 (2.25)	$t(56) = 6.82^{***}$
Grief	4.92 (1.62)	1.03 (1.14)	$t(56) = 10.67^{***}$

*** $p < .001$.

functions for the respondent. The attachment system is widely thought to include three components: a) *maintaining proximity* with an attachment figure, b) using the attachment figure as a *safe haven* for comfort in times of distress, and c) using the attachment figure as a *secure base* from which to explore the environment (Fraley and Shaver, 2000). Accordingly, the WHOTO addresses each attachment function in relation to a specific person, assigning two questions to each function. Examples include: “who is the person you most like to spend time with” (*proximity seeking*); “who is the person you would count on for advice” (*safe haven*); “who is the person you can always count on” (*secure base*). We then asked individuals to identify additional people to whom they feel close. Participants wrote down the first names of their mother, father, brothers, sisters, friend, child, current romantic partner, grandfather, grandmother, and other close family members, and were asked to assign a rank order to the names in terms of “how close you feel to them.” We selected two names from these assessments. The name that was mentioned most frequently in serving attachment functions (attachment name) and the name that was ranked highest among the close others identified (close name). A third measure was intended to identify *unknown* first names that were not associated with someone the person knew. These names were treated as filler names to enhance the salience of the known names. The measure included 102 common first names and asked participants to indicate with a “y” whether they personally knew anyone with each of those names. In addition to the name of the spouse, the attachment, close, and filler names were used in the experiments that followed.

To measure attachment styles, we used the Experiences in Close Relationships – Revised scale (ECR-R; Fraley et al., 2000), a 36-item questionnaire that assesses self-reported adult romantic attachment anxiety and avoidance and was developed using a combination of classical psychometric techniques and item response theory. The ECR-R has shown adequate psychometric properties across varying populations (Sibley et al., 2005). Participants' responses are rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Consistent with established procedures (e.g., Fraley et al., 2000), the items were used to scale people along the dimensions of anxiety and avoidance. The two scales were moderately correlated ($r = .34$).

2.1.2. Structured clinical interview

Upon arriving at the lab, participants engaged in a structured clinical interview for the symptoms of Major Depressive Disorder, Posttraumatic Stress Disorder, and grief-related symptoms. Trained interviewers administered a structured questionnaire corresponding to the DSM-IV criteria (Association, 2000) for symptoms of Major Depressive Disorder (MDD; 9 items, $\alpha = .84$), and symptoms of Posttraumatic Stress Disorder (PTSD) that did not overlap with the MDD items (14 items, $\alpha = .85$). Grief symptoms were also assessed (Horowitz et al., 1997): strong yearning for the deceased; preoccupation with thoughts about the loss; recurrent regrets or self-blame about own behavior toward the deceased; recurrent regrets or blame regarding the behavior of others toward the deceased; difficulty accepting the finality of the loss; marked loneliness or sense of emptiness; pervasive sense that life is meaningless; unusual difficulty developing new relations (8 items, $\alpha = .81$). The interviewers were 9 doctoral candidates in clinical psychology. Each interviewer coded a randomly selected set of five additional interviews. Interrater reliability was very high ($\kappa = .92$).

To identify persons with CG, we used an algorithm based on Prigerson et al.'s criteria (Prigerson, et al., 1999). We defined CG as requiring either separation distress, intrusive thoughts, or intense distress related to reminders of the loss, as well as at least 5 grief and grief-related PTSD symptoms (avoidance of thoughts, feelings, and talking about the loss, avoidance of people and places related to the loss, and feelings of detachment from others). To corroborate this designation, we provided participants with a graphic representation of different grief trajectories and a verbal description of them, including a resilient, recovered, CG, and chronic distress trajectories (Bonanno, 2004). We then asked bereaved participants to identify the trajectory that best described their bereavement experience. Of the participants who were identified as complicated grievers using Prigerson's algorithm, 84% also self-identified as complicated grievers using the above method.

2.1.3. Emotional Stroop task

Participants were next asked to perform a color-naming task in which they were to indicate as quickly and as accurately as possible the color of a given word. The experimental tasks were run on a PC-based computer with a high-resolution 19 in. flat screen monitor. DirectRT software was used to program the experiments. Words appeared in high contrast colors (red, yellow, green, and blue) against a black background. Participants indicated the color of the word by pressing one of four color-coded buttons arranged horizontally on a box designed by DirectRT. They were told that the words will all be proper names and will include the name of their deceased spouse and other important people in their lives, as well as names of other people they do not know. In addition to the names, we employed an experimental manipulation using subliminal primes, consisting of two blocks of experimental trials. One block consisted of a subliminal presentation of an attachment-threat word ("separation") and the other block consisted of a subliminal presentation of a neutral word ("cognition"). Previous research and our own pilot study have shown that priming attachment threat increases the accessibility of the

representations of attachment figures (Mikulincer, et al., 2002). Based on previous research (Mikulincer et al., 2004), each priming condition was presented within a separate block of trials; the order of the priming blocks was randomized across participants. The target stimuli in the practice trials were chair, table, house, and wall. Participants worked at a pace that felt comfortable to them. They first completed 30 practice trials to permit over-learning of key-color responses and then 192 experimental trials.

Each experimental trial began with an *x* in the middle of the screen which was replaced by a rapid (20 ms) subliminal presentation of one of the two primes (separation or cognition) and followed immediately by a masking stimulus (an XXX pattern) for 500 ms. Immediately following the mask, one of six possible names (spouse, attachment, close, and three unknown filler names) were presented for 1000 ms in 1 of the 4 possible colors. Each combination of name and color were presented *four* times with each of the *two* primes (16 trials for each word in each priming condition = 32 total trials for each name) for a total of 192 trials overall. The order of presentation of the names and colors were randomized for each participant with the constraint that no two consecutive target names were displayed in the same color. Although all participants received each of the *two* primes, based on pilot testing in our lab, we presented each prime in separate blocks of stimuli.

3. Results

We removed latencies that were more than 2 *SD* above or below an individual's mean for all trials, resulting in the elimination of 3.6% of trials. We then averaged response times for each person across all trials. To ensure our findings were related to grief and not general distress that could involve psychomotor retardation, we next examined the association of depression and PTSD symptoms on global RTs. We simultaneously regressed depression and PTSD symptoms on RTs for all participants. The overall model was marginally significant, $F(2, 53) = 2.60, p = .08$, and depression symptoms were significantly positively associated with RTs ($\beta = .37, p = .04$), whereas PTSD ($p = .32$) was not. This indicated that more depression symptoms were associated with increased RTs, regardless of group membership. On the basis of these findings, we used depression as a covariate in the repeated measures analyses that followed. No main or interactive effect of group membership on overall RTs was observed.

3.1. Repeated measures for CG

As shown in Table 2, we averaged response times according to name (spouse, attachment, close) and condition (neutral, threat). This 3×2 matrix resulted in six mean RTs for each person.¹ To examine the differential effect of name and priming condition on RT, we conducted a repeated measures analysis of variance with group (asymptomatic bereaved and CG) as the between participants factors, and name (spouse, attachment, close) and condition (neutral or threat) as the within subjects factors. Main effects for

¹ We excluded filler names from our analyses. However, when these names were included, the significant three-way interaction also emerged.

Table 2
Adjusted mean RTs for Stroop task by group, threat prime, and name.

Variable	Complicated grief (<i>n</i> = 26)	Asymptomatic grief (<i>n</i> = 30)
	<i>M</i> , <i>SE</i>	<i>M</i> , <i>SE</i>
Threat prime		
Deceased	814.01, 36.60	925.85, 33.55
Attachment	782.80, 40.51	959.04, 37.15
Close	792.22, 34.28	956.37, 31.43
Neutral prime		
Deceased	800.32, 45.03	972.30, 41.90
Attachment	813.48, 39.85	966.22, 36.54
Close	813.16, 38.43	932.56, 35.23

Note: RTs are adjusted for depression symptoms. RT = reaction time. SE = standard error.

condition and name ($p > .10$) were non-significant. There was a significant two-way interaction between name and condition $F(2, 106) = 3.91, p = .02, \eta_p^2 = .07$. These results were qualified by the predicted three-way interaction among bereavement status, name, and condition, $F(2, 106) = 4.87, p = .009, \eta_p^2 = .08$. To decompose this interaction, we first divided the sample and examined the two-way interaction of name and prime in the two bereaved groups. Because people with CG tend to experience a near-constant state of yearning for their lost partner, we predicted that the CG group's response to the name stimuli would not be affected by the presence of a separation threat. Consistent with this prediction, the two-way interaction of name and prime was not significant for the CG group, $F(2, 48) = .02, p = .98, \eta_p^2 = .01$. By contrast, because the asymptomatic bereaved group was not exhibiting intense grief symptoms, we predicted that this group would be more reactive to the separation prime. Consistent with this prediction, the two-way interaction of name and prime was significant for the asymptomatic bereaved group, $F(2, 56) = 3.18, p = .05, \eta_p^2 = .10$. We next examined simple effects for name across conditions in the asymptomatic group. Pairwise comparisons revealed that the asymptomatic group showed significantly faster RTs ($p = .04$) for the spouse in the threat condition ($M = 925.85, SE = 33.55$) than in the neutral condition ($M = 972.30, SE = 41.90$). This difference, which suggests that the asymptomatic group is deactivating the spousal representation specifically in threat contexts, is illustrated in Fig. 1. No other differences for name across conditions were observed in the asymptomatic group.

3.2. Regression analyses for Stroop RTs

We suspected that maladaptive attachment styles underlay these results. To examine that possibility, we employed regression analyses in which we predicted RTs using attachment anxiety and avoidance as the independent variables. We conducted six regression analyses for the averaged RTs for each of the target/condition combinations (separation–spouse, separation–attachment, separation–close, cognition–spouse, cognition–attachment, and cognition–close). We expected RTs in the condition with the threat prime and the deceased's name to be associated with more maladaptive attachment strategies. The model predicting separation–spouse RTs was significant (Table 3). This analysis

revealed that attachment avoidance ($p = .05$) and attachment anxiety ($p = .056$) predicted slower RTs to the deceased's name in the separation condition. In the neutral (cognition) condition, attachment dimensions were unrelated to RTs for the deceased's name. These findings replicate and extend previous research and theory indicating that attachment insecurity contributes to hyper-accessibility of the attachment figure's representation when threat is activated. Interactions terms for anxiety and avoidance did not significantly predict any of the RT variables and were therefore excluded from our models. In addition, no significant interaction with bereavement status was observed.

4. Discussion

In this study, we examined a specific mechanism of grief-related symptomatology: the accessibility of the mental representation of the lost loved one under threat. Consistent with the assumption that CG is characterized by chronic accessibility of the representation of the lost loved one, participants with CG did not evidence differential reactivity to the deceased's name in the threat prime. However, in contrast to complicated grievers, asymptomatic grievers showed a pattern of faster RTs in response to the name of the spouse in the threat context. This finding indicated that the mental representation of the deceased is deactivated in threatening contexts for asymptomatic but not complicated grievers. These patterns could not be attributed to general distress, because they emerged when depression was controlled. In addition, avoidant and anxious attachment dynamics were associated with longer RTs for the deceased's name in the threat context, implicating insecure attachment in a continuing preoccupation with the deceased.

To our knowledge, the present study is the first application of an experimental paradigm to address attachment theory's implications for CG (Bowlby, 1980). Although the findings are broadly consistent with previous work on attachment patterns and bereavement distress, they extended and qualified prior work in a number of important ways. First, complicated grievers' failure to respond differentially to the deceased's name across conditions is consistent with a continuing preoccupation with the deceased that is insensitive to context. This pattern suggests that separation distress is at least in part a consequence of the chronic availability of

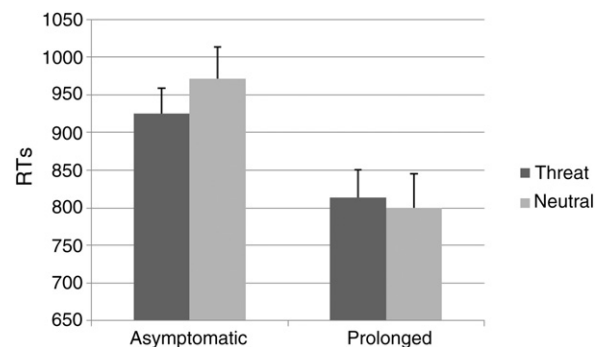


Fig. 1. Comparing asymptomatic and complicated grievers' reaction times (RTs) to the deceased name by condition with error bars (95% confidence intervals).

Table 3
Bereaved subjects' Stroop RTs as predicted by attachment variables.

Variable	Neutral condition									Threat condition								
	Spouse RT ^a			Attachment RT ^b			Close RT ^c			Spouse RT ^d			Attachment RT ^e			Close RT ^f		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Attachment anxiety	28.76	24.86	.16	40.20^{††}	21.29	.25	21.55	20.18	.14	36.72[†]	18.66	.25	33.87	22.70	.20	21.96	19.43	.15
Attachment avoidance	30.96	20.44	.20	15.99	24.56	.09	38.12	23.29	.22	45.05[*]	21.77	.27	41.44	26.20	.21	35.40	22.42	.21

RT = reaction time.

Coefficients in bold are significant at $p < .07$.

^a $F(2, 53) = 1.83, p = .17, R^2 = .07$.

^b $F(2, 53) = 2.37, p = .10, R^2 = .08$.

^c $F(2, 53) = 2.39, p = .11, R^2 = .08$.

^d $F(2, 53) = 5.13, p < .01, R^2 = .16$.

^e $F(2, 53) = 3.01, p = .06, R^2 = .10$.

^f $F(2, 53) = 2.37, p = .10, R^2 = .08$.

^{††} $p = .07$.

[†] $p = .056$.

^{*} $p < .05$.

the deceased's representation. It also implies that the working model of the deceased has not been revised sufficiently to accommodate the reality of his or her death, so that the representation continues to play a role in attachment functioning (Bowlby, 1980). A second critical finding is that asymptomatic griever deactivated the spousal representation specifically in response to threat, a process that appears highly adaptive. In effect, it appears as though asymptomatic griever are able to short-circuit the yearning that might occur if the deceased's representation were activated in distressing circumstances. Our findings strongly suggest that this deactivation is a critical—and previously undocumented—component of adaptive grieving.

Third, although prior research and theoretical speculation have long suggested that insecure attachment dynamics are associated with CG (Fralely and Bonanno, 2004; Mancini et al., 2009; Wijngaards-de Meij et al., 2007), no prior studies have adduced evidence that anxious and avoidant attachment is associated with a continued reliance on the deceased as an attachment figure. The present findings offer support for this supposition and are consistent with previous research indicating that attachment insecurity contributes to hyper-accessibility of the attachment figure's representation when threat is activated. However, a novel and important aspect of these findings is that the attachment figure representation is deceased, suggesting a specific attachment-related deficit in developing new attachment relationships.

We did not find evidence that accessibility of the deceased's name was enhanced for persons who reported high levels of both avoidant and anxious attachment, a pattern usually described as “fearful” attachment (Fralely and Shaver, 2000). Previous research has suggested that this attachment pattern poses particular risks for CG (Fralely and Bonanno, 2004). Although in this circumscribed sense our results were inconsistent with prior research, we would emphasize that the accessibility of the deceased's name in the threat condition is not a proxy for symptoms of CG, and our results do not speak directly to the question of how attachment dimensions interact to influence the occurrence of CG.

The present findings suggest even broader insights into adaptive grieving and attachment system functioning. One implication of asymptomatic griever's capacity to deactivate

the spousal representation is that they are employing what is in effect an avoidant attachment strategy specifically in relation to the deceased. This suggests that avoidant strategies are a part of the normative repertoire of the attachment system and can be selectively applied by persons who may not possess an avoidant attachment “style.” In this sense, our results underscore that the attachment system can be understood both in global terms and in relation to specific individuals in a person's life (Mikulincer et al., 2002). Our results also suggest that preconscious inhibitory processes serve to facilitate an adaptive response to loss, acting as a kind of psychological immune system that can protect people from distressing mental contents at a preconscious level (see particularly Joormann, 2010).

Taken together, our results can be seen as supporting the growing emphasis on exposure as a clinical strategy in CG. Such techniques can potentially assist complicated griever's efforts to regulate their reactions to the representation of the deceased and to situations that remind the griever of the deceased (Foa and Rothbaum, 1998). Moreover, by revising the working model of the deceased, a process that many theorists consider arrested in complicated grief (Bowlby, 1980; Shear and Shair, 2005), exposure techniques can reduce the reliance on the deceased as an attachment figure. At the same time, the present findings suggest a role in treatment for facilitating the transfer of attachment functions to current relationships. A number of treatment approaches now incorporate behavioral techniques, designed to enhance the person's involvement in life activities and new relationships. Moreover, treatments employing these strategies have proven efficacious when targeted to complicated griever (Boelen et al., 2007; Shear et al., 2005), results that stand in contrast to the poor effect sizes revealed in meta-analyses of traditional grief treatments (Currier et al., 2008).

There were both strengths and limitations in the present study. One limitation is that our sample size was relatively small. However, we used conservative criteria for identifying CG and thus our sample likely represents a relatively pure population of complicated griever. We further note that our sample was unusual in that it included significant representation from non-white participants (42% of CG participants) and from men (46% of CG participants), enhancing

the generalizability of the findings. Another limitation is that we relied on experimentally manipulated threat-inducing words as opposed to real-life attachment threats. Future research should use experience sampling methods to examine the role of attachment threats in day to day life.

The role of the attachment system in CG has been the focus of extensive theorizing and debate (Bowlby, 1980; Fraley and Shaver, 1999; Stroebe et al., 1996). The present study suggests that specific attachment-related deficits, which are related to but distinct from global attachment style, play an important role in CG. Future research should further examine the role of mental representations of the deceased in threat contexts and attachment system functioning more broadly. One implication of the present findings, for example, is that complicated grievers' attachment system is less able to make important discriminations and to respond flexibly to an altered interpersonal world. The reasons for this lack of discrimination and inflexibility are not yet clear. A more nuanced understanding of the mechanisms underlying these deficits can offer important insights into the treatment of complicated grief, which despite recent gains has historically suffered from inefficacious treatments (Currier et al., 2008).

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Conflict of interest

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