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Remembering the Past and Envisioning the Future in Bereaved Adults With and Without Complicated Grief

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Abstract

Complicated grief (CG) is associated with impairment in the ability to retrieve specific autobiographical memories. However, previous research suggests that this impairment may not occur for memories related to the deceased. We recruited conjugally bereaved adults and assessed autobiographical memory specificity for events with and without the deceased. In addition, we examined the specificity of imagined future events both with the deceased and without. Individuals with CG were no less specific than were bereaved comparison subjects when generating events that included the deceased. However, they did exhibit difficulty recalling specific past events and imagining specific future events that did not include the deceased. Difficulty generating events without the deceased may underlie the sense of lost identity and hopelessness observed in CG. Relative ease of envisioning a counterfactual future with the deceased may provide the cognitive basis for yearning. Accordingly, memory and prospection may be important targets for CG treatments.

Keywords

complicated grief, bereavement, autobiographical memory, specificity, future events

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The death of a loved one can be among the most painful and disruptive experiences that an individual will face in his or her lifetime. Although most bereaved individuals show only a transient disruption in functioning (Bonanno, 2004; Bonanno, Wortman, & Nesse, 2004), a significant subset continues to experience marked distress and impairment years after the loss (Bonanno & Kaltman, 2001; Bonanno et al., 2002; Newsom, Boelen, Hek, Hofman, & Henning, 2011). This subset of people often suffer from complicated grief (CG), a bereavement-specific syndrome characterized by distressed yearning for the deceased, hopelessness about the future, waves of painful emotion, and preoccupation with memories of the deceased (Horowitz et al., 1997; Prigerson et al., 2009; Prigerson, Vanderwerker, & Maciejewski, 2007; Shear et al., 2011; Simon et al., 2011). CG is distinct from normal grief (Boelen & van den Bout, 2008; Glass, 2005) and may be accompanied by comorbid posttraumatic stress disorder (PTSD) and major depression.

Remembering the Past

Autobiographical knowledge can be represented at varying levels of specificity, including semantic knowledge about one's life (e.g., the name of one's collegiate alma mater), general representations of events that occur repeatedly (e.g., Monday afternoon courses) or over an extended period (e.g., last semester of one's senior year), and specific episodic memories (e.g., receiving one's diploma at a graduation ceremony). In a seminal study on memory and psychopathology, Williams and Broadbent (1986) observed that suicidal patients consistently failed to retrieve specific episodic memories in response to cue words, instead retrieving "overgeneral" memories either extending over long periods or referring to categories of events. This deficit also occurs in depression (e.g., Brewin, Watson, McCarthy, Hyman, & Dayson, 1998; Moore, Watts, & Williams, 1988) and PTSD (e.g., McNally, Lasko, Macklin, & Pitman, 1995; McNally, Litz, Prassas, Shin, & Weathers, 1994). More recently, this deficit has been observed in bereaved adults with CG (Boelen, Huntjens, van Deursen, & van den Hout, 2010; Golden, Dalgleish, & Mackintosh, 2007; Maccallum & Bryant, 2010).

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Williams and colleagues (2007) proposed three mechanisms that may contribute to impairment in recalling specific events: capture and rumination, reduced executive resources, and functional avoidance. Studies implicate both rumination (Barnard, Watkins, & Ramponi, 2006) and diminished executive resources (Dalgleish et al., 2007) in overgeneral memory. The third mechanism, functional avoidance (or affect regulation; Williams, Stiles, & Shapiro, 1999), constitutes a truncation of the memory retrieval search with the aim of avoiding affective disturbance arising from the recollection of distressing memories. That is, individuals with depression, PTSD, or CG may exhibit a reduced ability to generate specific episodic memories as a consequence of avoiding the distress associated with the recollection of a specific negative or traumatic event. However, there is an apparent paradox in this account of overgeneral memory. Far from exhibiting overgeneral memory for traumatic or distressing events, individuals often recall these specific events all too readily. Indeed, memory for traumatic events is often vivid, emotionally charged, sensory laden, and highly accessible (McNally, 2003). It is unclear why individuals who report intrusive recollections of specific autobiographical memories for emotionally distressing events would fail to retrieve specific memories in tasks assessing memory specificity.

One possibility, proposed by Golden et al. (2007), is that memories explicitly tied to the source of a person's distress are immune to functional avoidance. A central premise of this proposition is that autobiographical memories can be retrieved through either direct retrieval or generative retrieval (M. A. Conway, 2005; M. A. Conway & Pleydell-Pearce, 2000). Autobiographical memories comprise transitory patterns of activation across an autobiographical knowledge base. In direct retrieval, a cue prompts episodic details, producing a pattern of activation. This activation occurs rapidly and is subjectively experienced as an involuntarily retrieved memory. In contrast, generative retrieval is an effortful and voluntary iterative search process (Burgess & Shallice, 1996). This iterative process begins with a memory cue and continues until a pattern of activation occurs that meets the search criteria, signifying the formation of a memory. Golden and colleagues (2007) hypothesized that specific autobiographical memories related to the source of one's distress are habitually retrieved directly in response to cues, rendering them immune to functional avoidance, which operates only during generative retrieval.

To test this hypothesis, these researchers administered three memory tasks to bereaved adults with and without CG: a standard autobiographical memory task (AMT), a biographical memory task requiring recollection of specific events from the life of their deceased loved one (i.e., memories related to the source of their distress), and a control task requiring them to recall events from the life of a living significant other. Relative to bereaved individuals without CG, those with CG showed greater overgeneral recall in response to negative cues on the standard AMT as well as on the biographical memory task for a living significant other. However, they did not exhibit overgeneral recall on the biographical memory task for the deceased. Moreover, for negative cues, those with CG were significantly more specific when retrieving biographical memories of the deceased relative to the other tasks.

Golden and colleagues' (2007) study provided a novel approach for studying overgeneral memory. However, in their assessment of events from the life of the deceased, they allowed both autobiographical memories (i.e., memories in which the subject was present) and biographical memories (i.e., memories in which the subject was not present) to qualify as specific events. Accordingly, it is unclear if a similar pattern of findings would be observed if subjects were restricted to recalling events related to the deceased in which they themselves were present.

The Current Study

Primary aims

In this study, we had two primary aims. First, we examined whether individuals with CG exhibit overgeneral autobiographical memories for memories both with and without the deceased. Whereas Golden and colleagues (2007) asked subjects to recall events from their lives and events from the lives of the deceased, we asked subjects to recall episodic memories from their lives that include the deceased (i.e., an event in which the deceased was present) and episodic memories from their lives that do not include the deceased.

Second, we examined future event specificity in CG. The mechanisms mediating the capacity to retrieve specific memories also mediate one's capacity to envision one's future (Buckner & Carroll, 2007; Gilbert & Wilson, 2007; Schacter & Addis, 2007; Schacter, Addis, & Buckner, 2007, 2008). Accordingly, impairments in the ability to retrieve specific episodic memories are likely to covary with impairments in one's ability to simulate future events. To test this hypothesis in CG, Maccallum and Bryant (2011b) examined the ability to remember the past and imagine the future in treatment-seeking adults with CG and in bereaved adults without CG. Relative to comparison subjects, those with CG were less specific when imagining future events. In this study, we aimed to extend these findings by examining whether individuals with CG exhibit overgeneral future event simulations for events both with the deceased (i.e., events that could have occurred had the deceased not passed away) and without (i.e., events that could at this point realistically occur in the future).

Given previous findings (Golden et al., 2007; Maccallum & Bryant, 2011b), we hypothesized that, relative to those without CG, those with CG (a) would exhibit deficits in their ability to recall specific autobiographical memories and to imagine specific future events that do not include the deceased

but (b) would exhibit no impairment in the ability to recall memories or envision events including the deceased.

Secondary aim

As noted, Golden and colleagues (2007) found that individuals with CG did not exhibit overgeneral recall on a biographical memory task for the deceased. Given this finding, they concluded that memories related to the source of one's distress are immune to functional avoidance. However, there is an alternative explanation for these findings. Memory recollection is a competitive process (Anderson, 2003; Mensink & Raaijmakers, 1988). The presentation of a cue may activate numerous memories that will compete for access to awareness. Several memory theorists have argued that resolution of interference from competing memories requires the suppression or inhibition of competing information (Bjork, 1989; Hasher, Zacks, & May, 1999; Healey, Campbell, Hasher, & Ossher, 2010; Zanto & Gazzaley, 2009). This is especially true when the initial memory retrieved in response to a cue (i.e., the prepotent response) does not meet the criteria of the retrieval search (Anderson, 2003).

In CG, memories for the deceased are highly accessible (Lichtenthal, Cruess, & Prigerson, 2004; Raphael, Martinek, & Wooding, 2004). Consequently, prepotent memories involving the deceased may impede retrieval of memories that do not include the deceased. If this is the case, individual differences in the ability to inhibit interfering information should play a moderating role in the association between psychological distress and memory and future event specificity for events that do not include the deceased. To test this secondary hypothesis, we assessed working memory capacity (WMC), a construct closely associated with the ability to inhibit interfering information (Barrett, Tugade, & Engle, 2004; A. R. Conway & Engle, 1994; Engle, 2002). For individuals with high WMC, specificity on the autobiographical memory task without the deceased (AMT-without) and future event task without the deceased (FET-without) should be high regardless of CG severity. For individuals with low WMC, there should be a negative association between CG severity and specificity on these tasks.

Method

Subjects

We recruited conjugally bereaved individuals to participate in an experiment examining memory and prospection. Subjects were recruited through advertisements (e.g., on Craigslist and in the local metro newspaper) and word of mouth. Subjects had to be between 21 and 65 years old and had lost a spouse or life partner within the past 1 to 3 years. We used this time frame to ensure that members of the CG group were not experiencing a normative grief response (cf. Gupta & Bonanno, 2011). In addition, we confined recruitment to conjugally bereaved adults because CG following the death of a spouse is more strongly associated with a sense of hopeless or foreshortened future than is CG following other types of loss (Prigerson et al., 2009). Consequently, conjugally bereaved adults may be more likely to exhibit the predicted effects relative to bereaved adults experiencing other types of loss.

In keeping with Golden and colleagues (2007), we recruited a sufficient number of subjects to detect a large between-groups effect (Cohen's $d = 1.00$) on the AMT and FET tasks with 80% power. This effect size was based on previous comparisons of clinical and subclinical populations relative to nonclinical controls on the AMT (Williams et al., 2007). Hence, we aimed to enroll at least 13 subjects in the CG and bereaved comparison groups. Of the 69 who expressed interest in the study, 33 met inclusion criteria and completed all four autobiographical memory and future event tasks. The most common reasons for ineligibility were nonspousal loss ($n = 13$) and loss outside the 1- to 3-year postloss time frame ($n = 12$).

Procedure

Qualifying individuals who agreed to participate attended a single session, where they first provided written informed consent. Subjects underwent two semistructured clinical interviews, completed the four AMT tasks in random order, and completed questionnaires measuring CG, major depressive disorder, and PTSD. Finally, subjects completed a computer task assessing WMC (i.e., the operation span task). The Institutional Review Board of Harvard University approved the protocol and consent form for this study.

Measures

Diagnostic interview. The first author used the Mini-International Neuropsychiatric Interview to assess symptoms of psychopathology (Sheehan et al., 1998). The interview assessed the presence of suicidal ideation, 1 Axis II disorder, and 17 Axis I disorders, including major depressive disorder and PTSD. For PTSD, subjects were asked about both the loss and any other qualifying traumatic events. In addition, subjects received a semistructured clinical interview for CG derived for the purposes of this study from proposed criteria for CG. To qualify for CG, a subject had to endorse at least one symptom of separation distress (e.g., intrusive memories, intense pangs of grief, or distressed yearnings) and at least five of nine possible cognitive, emotional, or behavioral symptoms that were highly distressing or impairing (e.g., diminished sense of self or avoiding reminders of the reality of the loss; Prigerson et al., 2007; Prigerson et al., 2009).

Autobiographical memory and future event tasks. A computer task adapted from previous research (Cropley,

MacLeod, & Tata, 2000; Dickson & Bates, 2006; McNally et al., 1994; Williams & Broadbent, 1986) assessed the specificity of autobiographical memories and future event simulations. We administered this task four times to assess four types of events: past events in which the deceased was present (i.e., autobiographical memory task with deceased; AMT-with), past events in which the deceased was not present (AMT-without), future events in which the deceased is present (i.e., future event task with deceased; FET-with), and future events in which the deceased is not present (FET-without). For each task, subjects generated events in response to the same eight cue words (four positive: *safe, happy, successful, loved*; 4 negative: *hurt, sad, afraid, sorry*). These words were from previous AMTs (Harvey, Bryant, & Dang, 1998; Williams & Broadbent, 1986). The order of the cue words was random for each subject, with the constraint that positive and negative words alternated.

For each task, subjects read an example of an appropriate (i.e., specific) and inappropriate (i.e., general) response and completed two practice trials, in which they were presented with one positive and one negative cue word and asked to recall a specific event. To ensure that subjects understood the task, the experimenter provided feedback to them during the practice trials, and they had to generate at least one specific event before proceeding. Subjects next completed eight experimental trials, during which they saw an orientation screen displaying the text "Please [recall or imagine] a specific event [with or without (name of deceased)] in which you felt . . ." After 4 seconds, a one-word cue replaced this text in the middle of the screen. The cue remained on the screen for 60 seconds or until the subject pressed the space bar indicating that he or she had recalled a memory. The subject then recounted the memory out loud. Each memory was coded as being a specific response (i.e., a single event spanning less than 1 day), a general response (i.e., a repeated event or an event occurring over a period greater than 1 day), or a nonresponse (i.e., no memory was retrieved within the 60-second window). If the type of memory was unclear, the experimenter prompted the subject with the questions "Can you tell me a little bit more?" or "Can you tell me a little bit more about the event you are thinking of?" until a code could be assigned. In keeping with previous research (e.g., McNally et al., 1995), we calculated specificity as the proportion of cues for which the subject provided a specific response. The experimenter wrote down all responses. Consistent with past studies (e.g., Boelen et al., 2010), a second rater blind to the study hypotheses coded the written responses for each AMT and FET task for a random selection of 15% of the total sample (i.e., five subjects and a total of 160 total responses). The percentage of overall agreement was 92.5% ($\kappa = 0.61$).

Self-report measures of psychological distress. The Inventory for Complicated Grief (Prigerson et al., 1995) was administered to measure symptoms of grief over the past month. To assess PTSD symptom severity, we administered the Posttraumatic Stress Checklist–Civilian version (Weathers, Litz, Herman, Huska, & Keane, 1993). Subjects were instructed to respond to the items in reference to the loss of their spouse. Finally, we used the Center for Epidemiological Studies–Depression Scale to assess symptoms of depression (Radloff, 1977).

Working memory capacity. To assess WMC, we administered an operation span task (Turner & Engle, 1989). In this computer task, subjects were shown a word to memorize in combination with a mathematical task (e.g., "Is 8/2 − 1 = 4? CHAIR"). Subjects completed a total of 12 trials, with sets of two, three, four, and five operation-word combinations, each occurring three times throughout the task. To calculate WMC scores, we used partial-credit load scoring (i.e., the number of words that the participant recalled in the correct order, regardless of whether all words from a given trial were remembered correctly; A. R. A. Conway et al., 2005).

Results

Subjects

Of the 33 subjects who completed the study, 13 met criteria for CG. The characteristics of the CG and control groups appear in Table 1. There was no difference between the groups in age, $t(31) = 0.98$, $p = .33$; time since death of the deceased, $t(31) = 1.05$, $p = .30$; relationship duration, $t(31) = -0.13$, $p = .90$; gender, $\chi^2(1) = 0.61$, $p = .49$; ethnicity, $\chi^2(4) = 4.22$, $p = .38$; or WMC, $t(31) = 0.32$, $p = .75$.

Autobiographical memory and future event specificity

The mean number of specific, general, and nonresponses on the AMT and FET tasks for subjects with and without CG appear in Table 2. We first performed a 2 × 2 × 4 (Group × Cue Valence × Task) mixed-model full-factorial analysis of variance, with the proportion of first responses that were specific as the dependent variable. The analysis revealed a main effect of Group, $F(1, 31) = 5.13$, $p = .031$, $\eta^2 = .14$, and Task, Wilk's $\lambda = .60$, $F(3, 29) = 6.46$, $p = .002$, $\eta^2 = .40$, but not Valence, Wilk's $\lambda = 1.00$, $F(1, 31) = 0.04$, $p = .843$, $\eta^2 = .001$. In addition, there was a significant interaction between Task and Group, Wilk's $\lambda = .58$, $F(3, 29) = 6.96$, $p = .001$, $\eta^2 = .42$, as well as between Task and Valence, Wilk's $\lambda = .73$, $F(3, 29) = 3.51$, $p = .027$, $\eta^2 = .27$. The three-way interaction was nonsignificant, Wilk's $\lambda = .94$, $F(3, 29) = 0.64$, $p = .593$, $\eta^2 = .06$.

To explore these effects further, we conducted independent samples *t* tests to compare specificity between groups for each task (see Fig. 1). Bereaved adults with CG were less specific than those without CG on both the AMT-without, $t(31) = 2.72$, $p = .011$, and FET-without, $t(31) = 4.48$, $p < .001$. There was no significant difference between groups on either the AMT-with, $t(31) = -0.06$, $p = .951$, or FET-with, $t(31) = -1.42$, $p = .164$.

Table 1. Participant Characteristics

Characteristic	Overall	Complicated grief (*n* = 13)	No complicated grief (*n* = 20)
Age, years (*M*)	50.73	48.54	52.16
Men (%)	54.54	46.15	60.00
Ethnicity (%)			
Caucasian	72.72	64.29	80.00
African American	21.21	23.07	20.00
Other	6.06	14.29	0.00
Working memory capacity (*M*)	22.24	21.77	22.55
Relationship duration, years (*M*)	19.75	20.07	19.54
Time since death, years (*M*)	2.33	1.75	2.61
Type of loss (%)			
Chronic illness	18.18	46.15	55.00
Sudden illness	30.30	38.46	25.00
Sudden accident	51.51	15.38	20.00
Current posttraumatic stress disorder (%)	15.15	30.76	5.00
Current major depressive disorder (%)	21.21	46.15	5.00
ICG (*M*)	26.06	41.85	15.26
PCL (*M*)	39.44	54.77	28.95
CES-D (*M*)	17.47	31.00	8.21

Note: ICG = Inventory of Complicated Grief; PCL = Posttraumatic Stress Disorder Checklist; CES-D = Center for Epidemiological Studies–Depression Scale.

Working memory capacity and specificity

To examine the potential moderating role of WMC on the association between CG symptom severity and specificity for events without the deceased, we regressed AMT-without and FET-without specificity on WMC and CG severity (centered on their means). As seen in Table 3, there was a significant interaction between WMC and CG severity predicting AMT-without specificity but not FET-without specificity. We next calculated simple slopes for the relationship between CG severity and AMT-without specificity at varying levels of WMC (i.e., one standard deviation below the mean, at the

Table 2. Number of Responses on Autobiographical Memory and Future Event Tasks, *M* (*SD*)

	Autobiographical memory tasks				Future event tasks			
	With deceased		Without deceased		With deceased		Without deceased	
Responses	CG	Control	CG	Control	CG	Control	CG	Control
Specific								
Overall	7.08 (1.32)	7.05 (1.14)	6.23 (1.69)	7.50 (1.00)	7.00 (1.35)	6.25 (1.55)	4.92 (1.38)	6.85 (0.88)
Positive	3.31 (0.85)	3.40 (0.75)	2.92 (1.38)	3.80 (0.52)	3.62 (0.51)	3.30 (0.73)	2.62 (0.77)	3.40 (0.82)
Negative	3.77 (0.60)	3.65 (0.67)	3.31 (0.85)	3.70 (0.66)	3.38 (1.12)	2.95 (1.14)	2.31 (1.44)	3.45 (0.51)
General								
Overall	0.85 (1.34)	0.55 (0.83)	1.54 (1.51)	0.40 (0.82)	0.62 (0.77)	1.45 (1.19)	2.69 (1.65)	0.80 (0.83)
Positive	0.62 (0.87)	0.30 (0.57)	0.92 (1.32)	0.10 (0.31)	0.31 (0.48)	0.70 (0.73)	1.07 (0.86)	0.55 (0.83)
Negative	0.23 (0.60)	0.25 (0.55)	0.62 (0.77)	0.30 (0.66)	0.31 (0.48)	0.75 (0.72)	1.62 (1.45)	0.25 (0.44)
None								
Overall	0.08 (0.28)	0.40 (0.82)	0.23 (0.60)	0.10 (0.31)	0.38 (0.96)	0.30 (0.66)	0.38 (0.96)	0.35 (0.49)
Positive	0.08 (0.28)	0.30 (0.66)	0.15 (0.38)	0.10 (0.31)	0.08 (0.28)	0.00 (0.00)	0.31 (0.75)	0.05 (0.22)
Negative	0.00 (0.00)	0.10 (0.31)	0.08 (0.28)	0.00 (0.00)	0.31 (0.75)	0.30 (0.66)	0.08 (0.28)	0.30 (0.47)

Note: CG = complicated grief.

Table 3. Linear Regression Estimating Specificity From Complicated Grief Severity, Working Memory Capacity, and Their Interaction

Dependent variable: specificity	*b*	*SE*	β	R^2
AMT–without deceased				.39
ICG	–.003†	.002	–.296	
WMC	.015**	.004	.563	
ICG × WMC	.001*	.000	.390	
FET–without deceased				.34
ICG	–.007**	.002	–.563	
WMC	.004	.004	.160	
ICG × WMC	.000	.000	.051	

Note: AMT = autobiographical memory task; ICG = Inventory of Complicated Grief; WMC = working memory capacity; FET = future event task.
†$p < .10$. *$p < .05$. **$p < .001$.

mean, and one standard deviation above the mean). CG severity was negatively associated with AMT-without specificity at low and medium levels of WMC (respectively, β = –.73, p = .004; β = –.30, p = .051) but not high (β = .14, p = .548). In contrast, CG severity was negatively associated with FET-without specificity at each level of WMC.

Discussion

Relative to bereaved adults without CG, those with CG exhibit deficits in their ability to recall specific autobiographical memories and to imagine specific events in the future (Boelen et al., 2010; Golden & Dalgleish, 2007; Maccallum & Bryant, 2010, 2011b). We found that individuals with CG exhibited deficits in their ability to recall or imagine specific events only when those events did not include the deceased. When recalling past events or imagining future events that included the deceased, individuals with CG were just as specific as bereaved controls were.

Implications for overgeneral autobiographical memory in CG

The findings from this study are consistent with previous research on overgeneral autobiographical memory in CG. Most notably, Golden and colleagues (2007) found that individuals with CG exhibited reduced specificity on the standard AMT but were no less specific when they recalled events from the life of the deceased individual on a biographical memory task (BMT-deceased). Moreover, for negative cues, individuals with CG exhibited a nonsignificant tendency to be more specific than bereaved controls on the BMT-deceased and were more specific on that task than they were on both the AMT and a comparison BMT. Golden and colleagues cited these latter findings as evidence that negative cues are more likely than positive cues to trigger direct retrieval of memories tied to the source of subjects' distress and consequently would be more likely to elicit specific memories. However, as an arguably more direct test of this hypothesis, there was little difference in the mean number of specific memories elicited by positive cues (M = 4.06, SD = 1.88) and negative (M = 4.19, SD = 1.51) on the BMT-deceased within the CG group. This finding suggests that (a) positive and negative cues are comparably likely to provoke memories related to the source of one's distress or (b) positive and negative memories of the deceased are sufficiently accessible in individuals with CG as to be retrieved with a relatively high rate of specificity regardless of the level of distress associated with the memory.

Consistent with Golden and colleagues (2007), we found that individuals with CG were less specific when recalling autobiographical memories that do not include the deceased but were no less specific when recalling memories that do include the deceased, with a nonsignificant tendency to be more specific than bereaved controls when recalling memories with the deceased in response to negative cues. Notably, both of these studies had power to detect large group differences in memory specificity. It may be that group differences in specificity for events including the deceased do exist but require larger sample sizes to detect.

Golden and colleagues (2007) interpreted the findings from their study to mean that memories related to the source of one's distress are immune to the functional avoidance that produces overgeneral recall for other memories. They hypothesized that memories for the deceased are directly retrieved in response to the cue words and are thereby not subject to the functional avoidance process that operates during generative retrieval. There are limitations to this conclusion. First, it is not necessarily the case that memories related to the deceased constitute the source of distress in CG in the same way that memories of trauma constitute the source of distress in PTSD. Indeed, recalling and imagining the deceased may itself be a means of avoiding distress associated with the loss (Stroebe et al., 2007). Second, the "immunity" hypothesis presupposes direct retrieval of memories related to the deceased. However, there is reason to believe that the specific memories of the deceased were not exclusively directly retrieved in our study. The efficiency with which a cue triggers recall of a memory is inversely associated with the number of memories with which it is related (Watkins & Watkins, 1975). Our cue words in the AMT and FET tasks were sufficiently generic as to have associations with numerous memories. Consequently, they are unlikely to be efficient cues capable of consistently provoking direct retrieval of any particular memory. Moreover, response latencies for accessing specific memories in our study (data available upon request) were far too long to constitute rapid, direct retrieval. Finally, the findings from our study regarding WMC are inconsistent with a functional avoidance account of OGM in CG. If functional avoidance

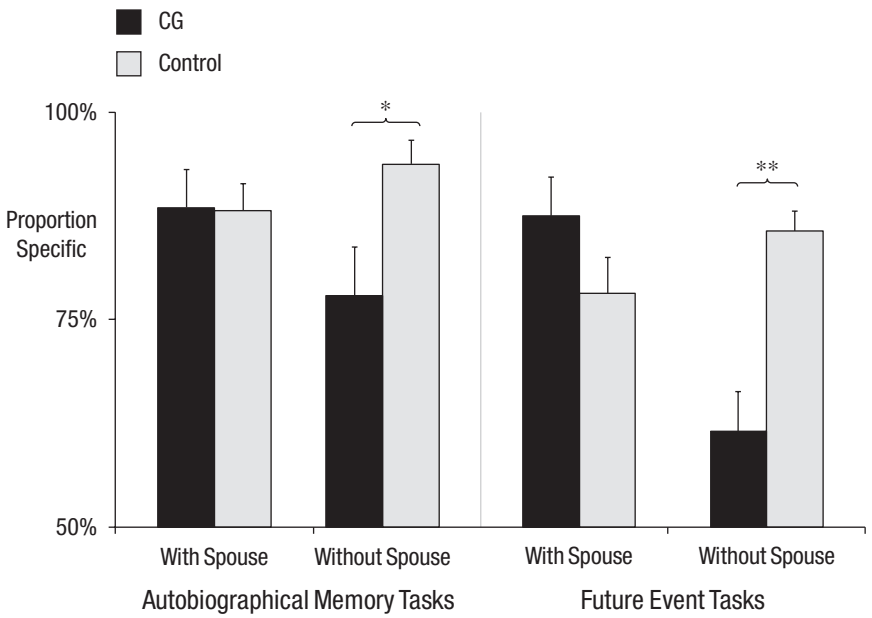

Fig. 1. Proportion of specific responses with standard error for the autobiographical memory and future event tasks with and without the deceased.

were the primary cause of OGM in CG, one would hypothesize that individuals with CG and high WMC would be more overgeneral on the AMT-without than those with low WMC owing to their superior ability to truncate the retrieval search. That is, those with high WMC should be better able to functionally avoid and consequently should exhibit a lower rate of specificity than those with low WMC. However, we observed that those with CG and high WMC were more specific than those with low WMC on the AMT-without.

We propose that for individuals with CG, both positive and negative memories related to the deceased are sufficiently accessible to frequently constitute the prepotent response to memory cues through either direct or generative retrieval. Consistent with this proposal, individuals with CG are significantly more likely than are bereaved controls to retrieve memories related to the deceased (Maccallum & Bryant, 2010). The relatively greater accessibility of memories with the deceased in those with CG allows them to recall specific events with the deceased at rates comparable to bereaved controls (as seen in the AMT-with). We further propose that prepotent memories with the deceased may interfere with the ability to retrieve memories unrelated to the deceased. Consistent with this possibility, we found that individual differences in WMC were associated with the ability to recall specific memories without the deceased. Individuals with high CG severity and low WMC exhibited the largest deficits in the ability to retrieve specific autobiographical memories without the deceased.

Although our findings are consistent with the possibility that memory competition contributes to OGM, we did not directly assess for the presence of competition or inhibition during the memory retrieval process. Accordingly, our findings may merely reflect the greater accessibility of memories related to the deceased relative to memories without the deceased in those with CG. That is, subjects with CG may have been less specific when recalling memories without the deceased because these memories are less accessible and thus require greater cognitive effort to retrieve, even in the absence of competition from memories with the deceased. It remains for future research to directly examine inhibition during memory retrieval and to explore factors that may contribute to the high accessibility of specific memories with the deceased in those with CG (e.g., memory rehearsal through ruminative thoughts or a sense of identity that remains closely entwined with the deceased).

Imagining the future in CG

With findings from Maccallum and Bryant (2011b), this study demonstrates that individuals with CG exhibit difficulty imagining the future without the deceased. However, the boundaries of this dysfunction remain largely unexplored. It is unclear whether this deficit is exclusive to the domain of specificity or if individuals with CG would exhibit broader deficits in the richness of future event simulations, fluency of future thoughts, or frequency of future thoughts. In

subsequent studies, it will be important to further clarify the dysfunction in future-oriented thinking in CG.

Implications for CG symptoms

Impairments in the ability to generate specific memories or envision future events may underlie several symptoms of CG. For example, an impoverished ability to generate possible future events is a core component of hopelessness (A. K. MacLeod & Byrne, 1996; A. K. Macleod, Rose, & Williams, 1993). Accordingly, difficulty generating specific future events without the deceased may be central to feelings of hopelessness in CG. Conversely, the relative ease of envisioning the future with the deceased may provide the cognitive basis for the symptom of yearning, especially when accompanied by difficulty envisioning the future without the deceased.

Deficits in the ability to remember or imagine specific events may also contribute to the identity disturbance that occurs in CG (Bowlby, 1980; Horowitz et al., 1997; Lindemann, 1944; Shuchter & Zisook, 1993). Most commonly, this disturbance involves a sense of lost identity (e.g., "a piece of me is missing"; Shuchter & Zisook, 1993). As highlighted by Maccallum and Bryant (2008, 2010), difficulty recalling specific events is associated with a sense of self that remains closely tied to the deceased. Although these researchers have emphasized the impact of the self on the ability to retrieve autobiographical memories, it is likely that this is a reciprocal relationship. Just as our current goals and sense of self influence the memories we retrieve, the autobiographical memories we retrieve and future events we imagine inform our sense of self. Accordingly, difficulty retrieving memories or imagining the future without the deceased may contribute to a sense of lost identity.

Implications for CG treatment

These findings support the use of treatments for CG that emphasize the importance of generating personal goals about the future (e.g., Boelen, de Keijser, van den Hout, & van den Bout, 2007; Maccallum & Bryant, 2011a; Shear, Frank, Houck, & Reynolds, 2005). Setting goals can serve several purposes relevant to the findings of our study. First, goals are highly associated with the ability to recall past events in those with CG (Maccallum & Bryant, 2010). Accordingly, establishing goals unrelated to the deceased is likely to increase the ability to retrieve memories unrelated to the deceased. In addition, the process of setting goals requires patients to imagine events that may occur in the future. In doing so, these patients will gain a series of positive future event simulations that may foster a sense of hope and build a stronger sense of identity.

Limitations and future directions

Our study has limitations. Most notably, the data are cross sectional, precluding determination of causality. It is unclear whether difficulty generating specific autobiographical memories and future event simulations is a cause, correlate, or consequence of postloss psychopathology. In addition, our sample was restricted to conjugally bereaved adults. It is unclear whether the results of this study are generalizable to other bereaved populations.

In this study, we hypothesized that difficulty inhibiting prepotent memories that do not match the criteria for the retrieval search (i.e., memories including the deceased on the AMT-without) may impair the ability to recall specific memories that do meet criteria. Our findings are consistent with previous work on the role of executive resources in OGM (Williams et al., 2007) and suggest that executive resources may moderate the association between psychological distress and the specificity with which one can recall specific autobiographical memories.

In future studies, researchers should test this possibility in several ways. First, the small sample size in our study suggests that some caution may be warranted when interpreting our results on the moderating role of WMC in the relation between CG severity and event specificity on the AMT and FET tasks. Replication with a larger sample size would increase confidence in these findings.

Second, if the hypothesis is correct, poor executive functioning should be associated with overgeneral autobiographical memory in other contexts in which there are likely to be prepotent memories that do not match the criteria for the retrieval search. For example, Swales and colleagues (2001) found that adolescents who were admitted to a psychiatric residential service frequently reported the same specific memory in response to multiple cue words, suggesting that the same event was repeatedly the initial memory retrieved in response to the cue word. These memories were frequently traumatic, such as the death of a family member or a sexual assault. In future studies, researchers should examine whether requiring individuals in this population to report a unique memory in response to each cue leads to greater OGM and, in particular, whether those with greater ability to inhibit interfering information (e.g., those with high WMC) outperform those with less ability when completing the task under those conditions. Similarly, a relation between WMC and OGM may emerge in clinical populations characterized by intrusive memories (e.g., PTSD) or in analogue studies in which an AMT is administered after subjects watch a negative film clip likely to induce prepotent negative memories.

Finally, in future studies researchers should more directly examine inhibition during memory retrieval among individuals with CG. Although our results are consistent with a relation between memory retrieval inhibition and overgeneral memory, low WMC in those with CG may lead to difficulty maintaining task instructions, impoverished retrieval strategies, and difficulty inhibiting other contextually inappropriate responses (for a review of executive control and overgeneral memory, see Dalgleish et al., 2007). Moreover, there is debate about the role of inhibition in cognitive tasks. C. M. MacLeod

and colleagues (C. M. MacLeod, Dodd, Sheard, Wilson, & Bibi, 2003) have argued that the findings from many cognitive tasks whose effects are often attributed to inhibition (e.g., directed forgetting) can be explained by other mechanisms (e.g., selective rehearsal). However, Healey et al. (2010) found that subjects who successfully recalled a target word rather than a competitor word in a word fragment completion task were subsequently slower to name the rejected competitor word, relative to subjects who were not required to resolve this interference. This reduced accessibility of the competing word provides strong evidence that resolving competition during memory retrieval entails inhibition of competing memories. A similar study examining the role of inhibition in memory retrieval among bereaved adults with and without CG would provide a more direct test of our hypothesis regarding OGM in this population.

Conclusion

Conjugally bereaved adults with CG exhibit deficits in the ability to recall specific events from the past and imagine specific events in the future that do not include their deceased loved ones. The association between CG and memory specificity for events without the deceased is strongest in those with low WMC, supporting the possibility that those with CG may experience competition from prepotent memories of the deceased when attempting to recall events without the deceased.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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