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Levels of specificity of autobiographical memories and of biographical memories of the deceased in bereaved individuals with and without complicated grief

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Abstract

Traumatized individuals experiencing symptoms of posttraumatic stress have a relative difficulty retrieving specific autobiographical memories from across their lifespan to cue words on the Autobiographical Memory Test (AMT). It has been suggested that this represents a generalized functional avoidance of the personal past. However, such individuals also often report highly specific intrusive memories of their trauma in the day-to-day. This raises the possibility that memories tied to the source of the person's distress are immune to this putative functional avoidance process. This question was investigated in bereaved individuals with complicated grief (CG) who report intrusive specific memories from the life of their deceased loved one, and matched bereaved controls without CG. Participants performed the AMT and also Biographical Memory Tasks (BMTs) cueing memories from the life of the deceased and from a significant other who remains living. In response to negatively valenced cue words, the CG group showed the standard reduced specificity effect for the AMT and BMT-Living, relative to controls, but this effect was reversed on the BMT-deceased. These data provide support for the proposal that memories tied to the source of an individual's distress are immune to the processes that underlie the standard reduced specificity effect.

Keywords: complicated grief; autobiographical memory; over-general memory; bereavement; trauma

Introduction

Participants with emotional disorders have problems accessing specific autobiographical memories (see Williams et al., 2007, for a review). For example, in their prototypical study, Williams and Broadbent (1986) asked depressed suicide attempters and controls to generate specific autobiographical memories to a series of emotion-related cue words (the Autobiographical Memory Test [AMT]). Compared with controls, the parasuicide group produced proportionally more 'general' memories that summarized multiple specific past episodes (e.g. to the word *birthday*, such a general response might be "*I have never enjoyed birthdays*"), and found it relatively difficult to come up with the requisite memories of specific experiences (e.g. "*I enjoyed my birthday last month*").

Since this initial study, relatively reduced specificity of autobiographical memory on the AMT has been described in individuals suffering from a range of clinical conditions (Williams et al., 2007), though with a primary focus on the affective disorders (e.g. Brewin, Reynolds, & Tata, 1999; Brittlebank, Scott, Williams, & Ferrier, 1993; Kuyken & Dalgleish, 1995; Wessel, Meeren, Peeters, Arntz, & Merckelbach, 2001; Williams & Dritschel, 1988).

In a key extension of this literature Kuyken and Brewin (1995) reported that depressed women describing a history of childhood abuse were less specific on the AMT than those reporting no abuse. This association between trauma exposure and reduced memory specificity has now been replicated several times and following traumatic experiences other than abuse (e.g. Dalgleish et al., 2003; de Decker, Hermans, Raes, & Eelen, 2003; Harvey, Bryant, & Dang, 1998; Henderson, Hargreaves, Gregory, & Williams, 2002; Hermans et al., 2004; McNally, Lasko, Macklin, & Pitman, 1995; McNally, Litz, Prassas, Shin, & Weathers, 1994).

Furthermore, Harvey et al. (1998) found that greater reductions in specificity assessed post-trauma in motor vehicle accident survivors predicted higher later levels of post-traumatic distress, suggesting that reduced memory specificity in trauma-exposed samples plays a key role in the onset and maintenance of post-traumatic stress, and is not simply a cognitive epiphenomenon associated with the acute clinical state.

Theoretical conceptualizations of reduced memory specificity have proposed various pathways to the phenomenon (Williams, 2006; Williams et al., 2007) within the context of mainstream cognitive models of autobiographical recall (e.g. the Self Memory System model; Conway & Pleydell-Pearce, 2000). In the case of trauma, a compelling argument has been the affect regulation hypothesis first outlined by Williams, Stiles and Shapiro (1999). According to this view, trauma-exposed individuals develop a reduced capability to access specific memories as a form of "functional avoidance" (Williams et al., 2007) of the distress associated with remembering the specific details of their traumatic experiences. This avoidance, it is suggested, operates through the truncation of an effortful, hierarchical search of the Self Memory System (so-called "generative retrieval"; Conway & Pleydell-Pearce, 2000) at the level of categorical autobiographical descriptors, thus giving rise to reduced recall of specific memories. This resultant memory style, it is further proposed, then generalizes from instances of trauma memory recollection to the whole domain of autobiographical recollection, resulting in the classic reduced memory specificity effect on the AMT.

However, there appears to be an interesting paradox here. Traumatic events, in those exposed to them, can often be re-experienced in the day-to-day in the form of *highly specific* intrusive memories (Brewin, Dalgleish & Joseph, 1996), as opposed to the sorts of generic autobiographical summaries that exemplify the classic reduced

specificity effect on the AMT. Indeed, these everyday intrusive specific memories are a key feature of clinical states such as Posttraumatic Stress Disorder (PTSD) (American Psychiatric Association, 1994). Furthermore, there is a reliable correlation between levels of intrusion of specific trauma memories in the day-to-day and degree of reduced specificity on the AMT, such that a higher frequency of intrusions is associated with more marked reductions in memory specificity to cue words (e.g. Kuyken & Brewin, 1995). The paradox, therefore, is that trauma-exposed individuals who report intrusive memories of *specific* autobiographical material, at the same time struggle to be suitably specific in their responses on the AMT.

One possible explanation of this apparent paradox is that those memories that are explicitly concerned with the source of a person's distress, such as memories pertaining to a trauma, are somehow resistant to the proposed processes of affect regulation that subsume the reduced specificity effect on the AMT. One reason for this 'immunity' might be that such trauma-related memories are sufficiently prepotent that they are *directly* accessed in the autobiographical database (Conway & Pleydell-Pearce, 2000), in a way does not require the hierarchical search of the autobiographical memory system (i.e. "generative retrieval"), the truncation of which arguably underlies the standard reduced memory specificity effect (Williams et al., 2007).

It seems important to elucidate whether reduced memory specificity as a putative form of affect regulation is indeed impotent in this way with regard to memories tied to the source of an individual's distress, as this might indicate that reduced specificity is a somewhat ineffective method of psychological defence – less a form of "functional avoidance" (Williams et al., 2007), than a form of dysfunctional avoidance.

If memories tied to the source of an individual's distress, such as trauma-related memories, are habitually *directly* retrieved as a function of their prepotency, then ideally one should be able to demonstrate this using the AMT. One obvious way to do this would be to constrain the search parameters of the AMT and ask participants to only respond, say, with trauma-related memories; i.e., use a 'trauma-AMT'. If trauma memories are directly retrieved, such a constraint should produce significant attenuation or elimination of the usual reduced specificity effect associated with the task which, as noted, is presumed to rely on truncated generative search. However, there is a clear methodological confound associated with using such a trauma-AMT. Restricting the search parameters of the AMT to a narrowly constrained set of experiences such as traumas would provide far fewer opportunities for any generative, hierarchical search process to become truncated. This is because, firstly, the search would need to navigate far less of the memory system and, secondly, establishing the search set in this way would necessarily have already primed a discrete number of specific events (i.e. the relevant trauma experiences). It seems inevitable therefore that there would be high levels of specificity in terms of the memories recalled on a trauma-AMT (relative to an unrestricted AMT). Consequently, it would be unclear if such relative specificity was because the memories produced on the trauma-AMT were directly retrieved as a function of their chronic prepotency, were directly retrieved because they were primed by the search set, or were generatively retrieved in the usual way but that the purview of the task was such that such generative retrieval could operate more or less successfully, with minimal risk of truncation.

One possible way around this confound would be to use the cue word methodology to investigate a group of clinically distressed, trauma-exposed

individuals who experience intrusive memories in the day-to-day that are both linked to the etiology of their distress and sourced from a rich database of specific events, as opposed to from a circumscribed set of representations of one or more discrete traumas. In this situation, if the relevant memories were directly retrieved to the cue words as a function of their chronic prepotency, one would expect such individuals to be able to be appropriately specific on an AMT that targeted the event database in question (i.e., the usual reduced memory specificity effect would be absent). In contrast, one would anticipate the standard reduced memory specificity effect in such circumstances if memory retrieval to the AMT cue words from such a database was generative.

The present study pursued this possibility by recruiting bereaved participants meeting criteria for Complicated Grief (CG) (e.g., Prigerson & Maciejewski, 2005; Prigerson et al., 1999), who report intrusive distressing memories about the deceased, and comparing their AMT performance to bereaved controls without CG. Participants were recruited from a database of bereaved individuals in Croatia. CG is indicated when, following the death of a significant other, an individual presents with a range of symptoms that have caused significant impairment in day-to-day functioning for 6 months or more. Symptoms include yearning, pining, guilt, bitterness or anger, intrusive distress and thoughts/preoccupation relating to the deceased, and a difficulty in moving on (e.g., Prigerson & Maciejewski, 2005; Prigerson et al., 1999)[1].

A clinical feature of CG is the presence of intrusive, distressing memories and preoccupation (which all participants in the present study reported), these intrusions are not restricted to the death itself and frequently consist of recollections from the *lifetime* of the deceased person (Dalgleish & Power, 2004). These memories can be about negative experiences associated with the deceased or about positive

experiences, the recollection of which is associated with distress. The experienced nature of the intrusive memories of the deceased in individuals with CG is analogous to that reported by trauma-exposed individuals with conditions such as PTSD, in that the memories are experienced as involuntary and highly affect-laden (Boelen, van den Hout, & van den Bout, 2006; Dalgleish & Power, 2004). Many intrusive memories in individuals with CG therefore provide an example of directly retrieved, specific autobiographical memories, tied to the etiology of a person's clinical distress, that critically are sourced from a broad memory database (i.e. the lifetime of the deceased) as opposed to from a database comprising a small number of discrete traumas. This characteristic nature of intrusive memories in those with CG therefore provides an excellent opportunity to examine whether the standard reduced memory specificity effect is eliminated when recollection is targeted at the source of a person's distress using the cue word methodology of the AMT.

Following this logic, the rationale for the present study was to ask participants with CG, along with bereaved controls, to complete not only the standard AMT with respect to their own life, but also a comparable *Biographical Memory Test* (BMT), with respect to the life of the deceased person (henceforth the BMT-Deceased). Our prediction was that CG participants should show the standard reduced specificity effect relative to bereaved controls on the AMT[2], but that this group difference should be significantly attenuated or disappear on the BMT-Deceased. Our rationale was that, on the latter task, specific memories would be directly retrieved in the CG group due to their chronic prepotency. To our knowledge this is the first time the cue word methodology has been extended to interrogate memories from the lifetime of someone other than the self, and it reflects a growing trend to examine memory specificity

outside the strict boundaries of the standard AMT (e.g. Rottenberg, Hildner & Gotlib, 2006).

To examine the possibility that any effects of memory task could merely be a result of one version of the task being autobiographical (the AMT) and the other primarily biographical (the BMT-Deceased)[3], we also asked our participants to complete a BMT sourcing memories from the lifetime of a significant other who is still living (henceforth the BMT-Living), and with whom the participants are as familiar as they were with the deceased person.

We predicted that CG participants would exhibit the standard reduced specificity effect on this BMT-Living, relative to bereaved controls. This prediction was based on two things. First, that searching the episodic database of another person's life should require hierarchical, generative search in the absence of prepotent intrusive memories. Second, that a reduced capacity to access specific material, once established, generalizes such that generative retrieval processes across the board are vulnerable to truncation (Williams et al., 2007), even if the memories being 'avoided' are not particularly distressing (for example, because they are of another person's experiences).

AMT studies generally include both negatively and positively valenced cue words. However, the standard reduced specificity effect does not seem to reliably interact with cue word valence in trauma-exposed samples (Williams et al., 2007), the argument being that, as noted, a reduced capacity to access specific memories generalizes across all forms of generative retrieval. Notwithstanding this lack of valence effects on the standard AMT, we did expect to see an effect of valence in the present study in terms of the kinds of memories that were 'immune' to the standard reduced specificity effect on the BMT-Deceased in the CG group. Specifically, we

reasoned that if the cue words on the BMT-Deceased are successful in eliciting the sort of memories from the deceased person's life that are being directly retrieved in the day-to-day, then these will likely be prepotent memories with strong negative connotations. In other words, they would either be about negative events in the deceased's life or would be about positive or neutral events that had become associated with negative affect such as yearning and sadness (Dalgleish & Power, 2004) and that are therefore likely to be cued by negative words. For this reason, we expected the extent of our predicted attenuation/elimination of the standard reduced specificity effect on the BMT-deceased in CG participants to be significantly greater in response to negative word cues, compared to positive cues.

In sum, we had an interactional hypothesis for the present study where we predicted that the difference in memory specificity between bereaved individuals meeting criteria for CG and bereaved controls would be greater on both the AMT and the BMT-Living (with the CG group being significantly less specific for both tasks) than on the BMT-deceased. We further predicted that this interaction effect across groups and tasks would be significantly stronger in response to negative cue words than to positive cue words.

Method

Participants

Williams et al. (2007) report a mean effect size of Cohen's d = 1.12 for the 11 published studies of the AMT examining depressed participants versus controls that they review, and of d = 0.94 when the pool of studies is widened to include other affective disorders and sub-clinical groups (28 studies). We used these data as a guide to perform a power calculation for the present study (Cohen, 1988) for which we set our effect size at 1.00, our directional alpha at .05, and power at 80%, to detect a

group difference on the AMT (as this was the key anticipated significant group effect and the only measure for which previous data were available). This suggested a sample size of at least $n = 13$ in each group. On this basis, participants meeting criteria for CG (n =18) and bereaved participants without CG (n =18) were recruited from an existing database of bereaved individuals in Croatia. This database ($N = 274$) had been built up over a number of years. Members were recruited through personal contacts of the first author, through advertisements, through clinics and general practitioner surgeries, and by word of mouth. The database represents a broad cross-section of Croatian society, including individuals from all socio-economic groups, religions, ethnicities, and ages. For the present study, all members of the database were initially screened for CG (see Appendix for criteria) according to the Croatian version of the Inventory of Complicated Grief-Revised (ICG-R; Golden & Dalgleish, 2006; Prigerson et al., 1999). Those satisfying the criteria for CG according to the ICG-R (n =53) were then invited to participate in the study. Of these 53, 43 also satisfied the criteria for CG using a standardized structured clinical interview (The Traumatic Grief Evaluation of Response to Loss [TRGR2L]; Prigerson et al., 2000). Of these 43, 7 declined to take part in the study, 9 agreed to take part but were then unable to make the available appointments, 9 were no longer available, and 18 participated. These 18 CG participants all reported current intrusive memories of the deceased. The bereaved controls were selected so as to be group-matched for relationship to the deceased, time since bereavement, age, sex and education with the CG group. The controls screened negative for CG on the ICG-R and absence of CG in was confirmed using the TRGR2L. Exclusion criteria for the study were evidence of organic brain problems, psychosis, or severe physical health problems.

All participants were also assessed for the presence of Major Depressive Disorder (MDD) and PTSD with the bereavement as the setting event, using the Croatian version of the Structured Clinical Interview for the DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 2000).

Materials and measures

Inventory of Complicated Grief-Revised (ICG-R; e.g., Prigerson et al., 1999).

The ICG-R is a 17-item self-report instrument developed to measure bereavement-related symptomatology in an attempt to discriminate between non-pathological grief and CG. Questions cover the separation distress (Criterion A), and traumatic distress (Criterion B) symptom clusters of CG (Prigerson & Maciejewski, 2005; Prigerson et al., 1999; see Appendix). CG is only indicated if the requisite symptoms from Criteria A and B have been met for 6 months or longer and if there is also evidence of serious day-to-day impairment (Criterion C). The Croatian language version of the ICG-R (Golden & Dalgleish, 2007) was used as an initial screen for CG in the present study (see Participants section). The Croatian version has good internal consistency, Cronbach's alpha = 0.94, and concurrent validity. It also shows good convergent validity in identifying cases of CG determined by structured clinical interview (the TRGR2L; Prigerson et al. 2000).

The Traumatic Grief Evaluation of Response to Loss [TRGR2L] (Prigerson et al., 2000)

The TRGR2L is a structured interview for CG. It comprises 17 questions related to the symptoms of CG that mirror the content of the ICG-R (see above). The TRGR2L was translated into Croatian for the purposes of the present study using standard translation-back translation techniques.

Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock & Erbaugh, 1961)

The BDI is a widely used 21 item measure of depressive symptomatology. The Croatian language version of the BDI was used here to provide a continuous measure of depressed mood (Anic & Zivic, 1992).

Posttraumatic Stress Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997).

The PDS is a widely used 49 item measure of PTSD symptoms, generating both a provisional diagnosis of PTSD according to the DSM-IV (APA, 1994) and a continuous measure of symptom severity (ranging from 0-51). The Croatian version of the PDS (Rosner, Powell, & Butollo, 2003) was used here to provide an index of posttraumatic stress symptomatology in the participants.

The Autobiographical and Biographical Memory Tests

Each of the three memory tasks (the AMT, the BMT-Deceased, and the BMT-Living) comprised 12 cue words (6 positive, e.g. *happy, eager, lucky*; and 6 negative, e.g. *awful, rejected, hopeless*) selected from Brittlebank, Scott, Williams, and Ferrier (1993) and translated into Croatian (see below). The format of the three memory tasks was the same. Participants were given one minute for each cue to retrieve a specific autobiographical or biographical memory - a specific time and place when something happened either to them or to the other referent person. Participants were told that the memory they recalled could be something that happened recently or a long time ago, that it may be an important or trivial event, but that the memory should be of something that happened *at a particular time on a particular day*. Examples of acceptable and unacceptable responses were given. The instructions were repeated prior to each task. Cue words were presented on 12.5 cm x 7.5 cm laminated cards and were written in black ink in capital letters 3.5 cm high. To ensure that participants understood the instructions, three practice cues were given before each task.

The English versions of the three sets of 12 words were balanced for emotionality and frequency (based on Brittlebank et al., 1993). The words were then translated into Croatian and further ratings (N = 10) of valence, familiarity, imageability and emotionality were collected (on scales ranging from 1 = *not at all*, to 10 = *extremely*), to confirm that the word sets were balanced on these variables (the word sets and these Croatian ratings are available on request). Each word set was used an equal number of times across the AMT, BMT-Deceased and BMT-Living conditions, within each group of participants. Order of presentation of the three memory tasks was counterbalanced. For the BMTs, participants also had to rate how well they knew either the deceased or the living person on a scale from 0 (*not at all well*) to 10 (*extremely well*).

Generated memories were tape-recorded and coded according to the criteria laid down by Williams and Dritschel (1991). Specific memories were defined as events that happened in a particular instance or lasted for a *day or less* (N.B., memories were coded as specific even if they were embedded within a memory lasting for longer than one day; e.g., *The first day of my holiday*). Non-specific memories included *extended memories* (events that lasted for longer periods of time), and *categoric memories* (events that occurred repeatedly over a period of time). If the participants failed to recall a memory within the time limit, or talked about things which were not memories (e.g. an opinion that is associated with the cue), their responses were classed as 'no memories'. If either the type of memory that the participants recalled was unclear, or they retrieved the same memory to more than one cue, or they offered responses that related to future events, they were prompted with the words '*What is the memory that you are thinking of there*?' or '*Can you tell me a bit more about that memory*?'. For the present study, analyses focus on proportions of

specific memories, with respect to the number of meaningful responses on the task (i.e., after subtracting numbers of 'no memories') in line with recommended guidelines (Williams, personal communication). The reason for focusing on specific memories, rather than on other indices of the AMT, was because measures of memory generality (such as numbers of categoric and extended memories) rarely meet the criteria for parametric statistics thus placing limits on the analyses that can be carried out with such data. The reason for focusing on proportions rather than absolute numbers of specific memories is that the former takes into account the number of overall responses on the task that were memories. So, for example, if a given participant failed to respond to a cue word within the time limit on 4 occasions on a given task, the use of a proportion measure would take this into account without presuming what an eventual response on those trials might have looked like. In contrast, the use of absolute numbers of specific memories would, de facto, count any non-responses as bona fide instances of a fundamental inability to come up with a specific memory.

Verbal Fluency Task (Lezak, 1995)

A standard version of the verbal fluency test was used. Participants were asked to list as many words as they could in one minute beginning with the letter '*s*'. Participants were informed that repetitions, proper nouns (e.g. *Sarajevo*), and more than one word of the same origin (e.g. *swim, swimming*) were not acceptable answers and were given examples of each. The total number of acceptable words produced was the verbal fluency score. The rationale for including the verbal fluency measure was to match the groups on an index of fluency to ensure that any group differences on the AMT/BMTs were not simply a result of general fluency effects (Dalgleish et al., in press).

Procedure

Following informed consent, participants completed face-to-face assessment sessions either at the local doctor's surgery, hospital, their own home or another safe and quiet place of their choosing. In a first session, demographic and background information was collected followed by the SCID, and the TRGR2L. In a second session a week later, the three memory tasks, the PDS, the BDI, and the verbal fluency test were administered. Following the study, participants were fully debriefed.

Results

Five of the bereaved control participants and 2 of the CG group were unwilling to complete the memory tasks as they felt uncomfortable when performing the BMT-Deceased. This left n = 13 in the control group and n = 16 in the CG group. These numbers were still acceptable based on our initial power calculations (see Participants section). Of these control participants, 8 had a previous diagnosis of MDD and 6 had a previous diagnosis of PTSD with the bereavement as the setting event, according to the SCID. None of the controls met current criteria for PTSD or MDD. In the CG group, 5 had a current diagnosis of MDD and 13 a current diagnosis of PTSD related to their bereavement. In addition, 1 CG participant had past PTSD and 13 had experienced prior Major Depressive Episodes (APA, 1994). All 16 CG participants met Criterion A for PTSD with the bereavement as the setting event and all reported current, distressing intrusive memories of the deceased.

Table 1 shows the demographic, mood self-report, bereavement-related and verbal fluency data across the two groups. There were no significant differences across groups. However, unsurprisingly, there were strong trends for CG participants to score higher than the controls on the PDS and BDI.

Performance on the memory tasks

Table 2 and Figure 1 show the data for the three memory tasks across the two groups. The data conformed to the requirements for parametric statistics. There was no significant difference in the ratings of how well participants knew the living and deceased persons, *ts* < 1.25, *Ps* > .2. Initial analyses included memory task presentation order as a factor. However, there were no significant main effects or interactions involving order, *P*s > .4, and so remaining analyses are presented without order included.

We initially carried out a three way mixed-model full-factorial ANOVA (cue valence by task by group), with proportions of specific memories as the dependent variable, to examine our hypotheses (see Figure 1). There were no significant main effects, *F*s < 1, and no significant two-way interactions of Cue Valence x Group, *F* < 1, or Task x Cue Valence, *F* (2, 26) = 1.30, *ns*. There was however a trend towards a two-way interaction of Task x Group, *F* (2, 54) = 2.78, *p* = .08, which was qualified by a significant three-way interaction of Task x Group x Cue Valence, *F* (2, 54) = 3.59, *p* < .05. This significant three-way interaction was deconstructed by examining responses to positive cues and negative cues separately.

Memories to negative cues

For memories to negative cues, there were no main effects, *Fs* < 1. However, there was a significant interaction of Group x Task, *F* (2, 54) = 3.96, *p* < .03, in support of our interactional hypothesis. To begin to dismantle this effect, we first examined 3 specific Task x Group contrast terms. These compared responses to negative cues on: the AMT versus the BMT-Deceased; the BMT-Living versus the BMT-Deceased; and the AMT versus the BMT-Living. The first two contrast analyses yielded significant interactions of Task x Group, *F*(1, 27) = 8.57, *p* < 0.01, and, *F*(1, 27) = 5.52, *p* < 0.03, respectively, indicating that the CG participants were

less specific than controls on both the AMT and BMT-Living but that the direction of group difference was *reversed* on the BMT-Deceased (see Figure 1). As anticipated, the contrast term for the AMT versus BMT-Living comparison was not significant, F (1, 27) = 1.01, $p > .33$, indicating a similar pattern of performance across groups on these two versions of the memory task. Given this similarity in performance across the AMT and BMT-Living to negative cues, we next examined the Task x Group contrast term comparing BMT-Deceased with AMT and BMT-Living combined. This contrast was significant, F (1, 27) = 11.69, $p < .003$[4].

In order to deconstruct the pattern of results from these two-way Group x Task contrast analyses to negative cue words, we examined the relevant one-way contrasts, first across groups and then within groups. There was no significant difference across groups on the BMT-Deceased, F (1, 27) = 2.56, $p = .12$, Cohen's $d = 0.62$, with the CG group, as noted, in fact being non-significantly *more* specific than the bereaved controls. However, as predicted the two groups did differ significantly on the pooled AMT and BMT-Living term, t (27) = 5.27, $p < .03$, Cohen's $d = 0.96$, with the controls recalling a greater proportion of specific memories.

For the within-group contrasts, the CG group was significantly more specific to negative cues on the BMT-Deceased than on the AMT and BMT-Living (pooled), F (1, 15) = 5.39, $p < .04$, Cohen's $d = .58$. Interestingly, the controls showed the opposite pattern in that they were significantly less specific on the BMT-Deceased versus the AMT and BMT-Living (pooled), F (1, 12) = 5.94, $p < .04$, Cohen's $d = .79$. For neither group was there a significant difference between AMT and BMT-Living scores, Fs < 1, ps > .66.

Memories to positive cues

In the case of responses to positive cues, in contrast to our hypothesis there were no overall significant main effects or interactions, *F*s < 1.43, *p*s > .26. Furthermore, in the opposite direction to our prediction, the CG group generated a numerically greater proportion of specific memories compared to the controls on the BMT-Living, although this difference was not statistically significant.

We nevertheless checked for the presence of the standard AMT effect to positive cues using a directional independent samples t-test for unequal variances examining proportions of specific memories across groups. This revealed that the CG group were indeed less specific than the controls on the AMT, t (23.96) = 1.80, p < .05, Cohen's d = 0.74.

Discussion

The present study tested the interactional hypothesis that the difference in memory specificity between bereaved individuals meeting criteria for CG and bereaved controls would be greater on both the AMT and the BMT-Living (with the CG group being less specific) than on the BMT-deceased. We further predicted that this interaction effect would be significantly more marked in response to negative cue words, relative to positive.

The results in response to negative cues supported our hypothesized pattern of performance. The CG sample were significantly less specific than bereaved controls on the AMT and BMT-living to negative cues with a large effect size (comparable to that found in previous studies on affective disorder and trauma-exposed groups; Williams et al., 2007) but showed no significant difference on the BMT-deceased, with in fact a non-significant tendency to be *more* specific than controls on this version of the task. As expected, there were no significant differences in the patterns of performance across groups between the AMT and the BMT-living. Furthermore,

within the CG group, participants were significantly more specific on the BMT-Deceased than on the AMT and BMT-Living. In contrast, in the control group, participants were significantly less specific on the BMT-Deceased, compared to performance on the AMT and BMT-Living (see Figure 1).

As also hypothesized, the predicted interactional effect was significantly stronger in response to negative cues than to positive cues. However, when looking at memory performance to positive cues alone we did not find this predicted interactional pattern. As one would expect, we did find the standard reduced specificity effect on the AMT in response to positive cues, with the CG group being less specific than the controls with a medium to large effect size. However, there was no significant difference between this AMT performance and performance on the other two versions of the memory paradigm in response to positive words.

The present results add to the existing literature in a number of ways. As far as we are aware, this represents the first demonstration of the standard reduced specificity effect on the AMT in a sample with CG. Perhaps more importantly, to our knowledge it is the first demonstration that attempted retrieval of specific memories relating directly to the etiological source of an individual's distress in response to (negative) cue words (i.e. the BMT-Deceased) does not seem to produce the standard reduced specificity effect in a sample with psychopathology relating to a significant trauma.

On the basis of these findings, we would argue that memories intricately linked to the source of a person's clinical levels of distress are habitually directly retrieved and that this seems to be the case irrespective of the retrieval context. In other words, for emotionally disordered individuals, regardless of whether memories are cued in the day-to-day by stimuli in the internal or external environment, or are

cued by negative words on the BMT-Deceased in a psychology laboratory, there is no evidence of the sort of reduced specificity effect that characterizes performance on the AMT with respect to memories that are not explicitly tied to the source of a person's distress. This suggests that perhaps the putative process of affect regulation that is thought to underlie such reductions in specificity on the AMT in clinical samples is ineffectual when it comes to memories intimately tied to the etiology of the individual's clinical difficulties.

This suggestion of course begs the question as to why such a process of affect regulation would develop. One possibility is that, as with thought suppression (e.g., Purdon, 1999), it can be a successful approach under some circumstances - for example, in the absence of emotional disorder and/or during the generative retrieval of memories – but becomes ineffectual or even counter-productive under other circumstances, such as in the presence of CG. Another possibility is that reduced memory specificity does not in fact index affect regulation in emotionally disordered individuals but arises due to disruptions in other forms of psychological process such as executive control when processing autobiographical information (e.g. Dalgleish et al., 2007).

An intriguing aspect of the present data is the finding that, within the bereaved controls, memory specificity was significantly reduced on the BMT-Deceased compared with the AMT and BMT-Living, for negative cue words. This pattern of data raises the possibility that reduced specificity of autobiographical recall as a putative form of affect regulation is successfully targeted at the potential source of autobiographical distress (i.e., the BMT-deceased) in these bereaved individuals without CG, but that this memory style has not generalized to other domains of

autobiographical recall nor to recall of memories from the life of a loved one who remains alive.

A notable aspect of the present findings is the failure to find the predicted pattern of effects for memories in response to positive cues. Although the CG participants were less specific on the AMT than the controls to positive cues and there was some attenuation of this effect on the BMT-Deceased, the difference across the two tasks was not significant. Furthermore, there was no evidence of a reduced specificity effect to positive cues in the CG group on the BMT-Living with the CG group in fact being numerically more specific. There are a number of possible explanations for these data. First, as discussed in the Introduction, it may be that the memories generated to positive cues by the CG group on the BMT-Deceased are less likely to be a product of direct retrieval as they have less overlap with the sort of prepotent, negatively laden memories that CG individuals participants experience as intrusive in the day-to-day. This would suggest that proportionally more of the memory retrieval to positive cues by the CG group on the BMT-Deceased would be generative (compared with retrieval to negative cues) and, as such, would be more susceptible to truncation giving rise to the standard reduced specificity effect. Such an outcome would serve to dilute any differences within the CG group between AMT performance and BMT-Deceased performance, thus leading to the present pattern of data.

Another non-mutually exclusive possibility is that the reduced specificity effect to positive material that is traditionally found on the AMT (Williams et al., 2007) does not generalize very strongly to non-autobiographical material in the way that the effect to negative cues seems to. This would account for why there was no reduced specificity effect in the CG group to positive cues on the BMT-Living,

relative to controls, in the present study. In line with this, two previous studies in the literature that have looked at the relationship between posttraumatic stress and reduced specificity have not found significant effects for positive cues, even on the AMT (Dalgleish et al., 2003; Peeters, Wessel, Merckelbach & Boon-Vermeeren, 2003), although it is important to note that the majority of studies examining this question report no effects of valence (Williams et al, 2007).

In terms of potential limitations, the present study ended up with relatively small sample sizes for the 2 groups. These sample sizes nevertheless still satisfied the conditions of our pre-study power analyses. Examining the patterns of results carefully, it seems unlikely that lack of power was a factor with respect to any of the findings pertaining to our key hypotheses. The hypothesized interactional pattern of data emerged significantly to negative word cues, and performance to negative cues was significantly more in line with this predicted pattern than was performance to positive cues, as also hypothesized. In the case of positive cues, the failure to find support for the predicted interactional pattern was not a function of reduced power because performance on the BMT-Living was actually in the opposite-to-predicted direction, with the CG group being numerically *more* specific than the controls. However, it remains possible that reduced power was responsible for some of the unexpected findings in the present study not reaching statistical significance. In particular, the unpredicted reversed effect across groups on the BMT-Deceased, with the CG group being more specific than the controls, may have reached statistical significance with a larger sample size. Furthermore, a failure to complete the PDS by some of the participants, with a requisite loss of power, probably accounts for why the group difference on the PDS was a strong trend rather than a significant effect.

The samples used in the present study were heterogeneous for several bereavement-related variables such as relationship to the deceased and time since bereavement. However, care was taken to match the groups on these variables and there were no theoretical reasons why these variables should interact with memory specificity. Nevertheless, this heterogeneity allied to the small sample size precluded us from examining systematically any effects these variables may have had on the data and this remains a question for future studies.

A number of the bereaved control participants in the present study had a significant degree of past psychiatric history and this represents a potential research limitation. We know that trauma exposure per se (e.g., Stokes, Dritschel & Bekerian, 2004), as well as past MDD (e.g. Mackinger, Pachinger, Leibetseder & Fartacek, 2000), are themselves associated with reduced memory specificity. Consequently, the presence of past PTSD and MDD in the bereaved controls may have served to dilute the strength of any differences between these participants and the CG group. Given this, the fact that the hypothesized pattern of findings emerged so clearly to negative cue words seems particularly notable. Ideally, the present study would have included a healthy control group with no history of emotional disorder. However, it proved impossible to recruit a sample of control participants who had experienced a comparable bereavement as the CG group but who had no current or past psychopathology and, indeed, it would be appropriate to question the representativeness of such a control group.

CG is invariably highly comorbid with both MDD and PTSD (see Lichtenthal et al., 2004) and it is noteworthy that 13/16 of the present CG sample also had a diagnosis of PTSD with the bereavement as the setting event (with another participant recovered from PTSD). On this basis, one could quite easily argue that the present

pattern of results is a function of bereavement-related PTSD as much as it is of CG. However, given the rationale of the current study to investigate retrieval of memories to cue words that are related to the source of an individual's distress, it seems less important whether the clinical context of that distress is a diagnosis of CG or PTSD. Indeed, it seems possible that revealing similarities in the profiles of cognitive task performance between PTSD and CG may contribute in the future to the debate about whether or not they are meaningfully distinct conditions (e.g. Dalgleish & Power, 2004; Stroebe, Schut & Finkenauer, 2001).

In terms of possible future research directions, it is interesting to speculate whether these past psychiatric difficulties in the bereaved controls discussed above are associated with the reduced memory specificity in that group on the BMT-Deceased, relative to the AMT and BMT-Living. This merits investigation in a future study comparing bereaved individuals recovered from PTSD, MDD, or even CG, with bereaved participants who have never met criteria for these diagnoses (cf. Mackinger et al., 2000).

In the current study we did not compare the content of responses on the memory tasks, in particular the BMT-Deceased, with the content of the intrusions that the CG participants reported experiencing in the day-to-day, where we simply ascertained the presence of intrusions. Adopting such an approach in the future would permit investigation into whether the day-to-day intrusions overlapped significantly in content with responses to the cue words, as we would predict. Such an overlap would provide further support for our conclusions regarding the prepotency of memories retrieved to cues on the BMT-Deceased.

In conclusion, the present study showed that participants with a diagnosis of CG were less specific than bereaved controls on the standard AMT but that, for

negative cue words, this difference was significantly eliminated on a cue word task probing memories from the lifetime of the deceased (the BMT-Deceased) but not on a task probing memories from the lifetime of a loved one who remains alive (the BMT-Living). This pattern of results suggests that constraining the cue word methodology in order to probe the database of memories that give rise to day-to-day intrusions in a CG group serves to eliminate the standard relatively reduced memory specificity effect on the task. Such a finding calls into question theoretical accounts of the utility of reduced memory specificity as a form of affect regulation. It also raises doubts about the ecological validity of the standard AMT methodology as an index of autobiographical memory retrieval in everyday life.

References

American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.). Washington D.C.: American Psychiatric Association.

Anic, N., & Zivic, I. (1992). Depressive symptoms among psychiatric and somatic patients. *Godisnjak Zavoda za psihologiju. Rijeka. Decembar.*

Boelen, P. A., van den Hout, M. A., & van den Bout, J. (2006). A cognitive-behavioral conceptualization of complicated grief. *Clinical Psychology-Science and Practice, 13*, 109-128.

Brewin, C. R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of post-traumatic stress disorder. *Psychological Review*, 670-686.

Brewin, C., Reynolds, M., & Tata, P. (1999). Autobiographical memory processes and the course of depression. *Journal of Abnormal Psychology, 108*, 511-517.

Brittlebank, A. D., Scott, J., Williams, J. M. G., & Ferrier, I. N. (1993). Autobiographical memory in depression: State or trait marker? *British Journal of Psychiatry, 162*, 118-121.

Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review, 107*, 261-288.

Dalgleish, T., & Power, M. J. (2004). Emotion-specific and emotion-non-specific components of Posttraumatic Stress Disorder (PTSD): Implications for a taxonomy of related psychopathology. *Behavior Research and Therapy, 42*, 1069-1088.

Dalgleish, T., Tchanturia, K., Serpell, L., Hems, S., De Silva, P., & Treasure, J. (2003). Self-reported parental abuse relates to autobiographical memory style in patients with eating disorders. *Emotion, 3*, 211-222.

Dalgleish, T., Williams, J.M.G., Golden, A.J., Perkins, N., Barrett, L.F-., Barnard, P.J., Au-Yeung, C., Murphy, V., Elward, R., Tchanturia, K. & Watkins, E. (2007). Reduced specificity of autobiographical memory and depression: the role of executive control. *Journal of Experimental Psychology: General, 136,* 23-42.

de Decker, A., Hermans, D., Raes, F., & Eelen, P. (2003). Autobiographical memory specificity and trauma in inpatient adolescents. *Journal of Clinical Child and Adolescent Psychology, 32*, 22-31.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (2000). *Strukturirani klinicki intervju za poremecaje s osi I iz DSM-IV – klinicka verzija (SKID-KV): Naklada Slap.* Washington DC: American Psychiatric Press.

Foa, E. B., Cashman, L., Jaycox, L. H., & Perry, K. J. (1997). The validation of a self-report measure of posttraumatic stress disorder: the Posttraumatic Diagnostic Scale. *Psychological Assessment, 9*, 445-451.

Golden, A. J., & Dalgleish, T. (2007). Reliability and validity of a Croatian version of the Inventory for Complicated Grief. *Manuscript submitted for publication*.

Harvey, A. G., Bryant, R. A., & Dang, S. T. (1998). Autobiographical memory in acute stress disorder. *Journal of Consulting and Clinical Psychology, 66*, 500-506.

Henderson, D., Hargreaves, I., Gregory, S., & Williams, J. M. G. (2002). Autobiographical memory and emotion in a non-clinical sample of women

with and without a reported history of childhood sexual abuse. *British Journal of Clinical Psychology, 41,* 129-142.

Hermans, D., Van den Broeck, K., Belis, G., Raes, F., Pieters, G., & Eelen, P. (2004). Trauma and autobiographical memory specificity in depressed inpatients. *Behavior Research and Therapy, 42,* 775-789.

Horowitz, M. J., Siegel, B., Holen, A., Bonnano, G. A., Milbrath, C., & Stinson, C. H. (1997). Diagnostic criteria for complicated grief disorder. *American Journal of Psychiatry, 154,* 904-910.

Kuyken, W., & Brewin, C. R. (1995). Autobiographical memory functioning in depression and reports of early abuse. *Journal of Abnormal Psychology, 104,* 585-591.

Kuyken, W., & Dalgleish, T. (1995). Autobiographical memory and depression. *British Journal of Clinical Psychology, 33,* 89-92.

Lezak, M. D. (1995). *Neuropsychological Assessmen* (3rd ed.). New York: Oxford University Press.

Mackinger, H. F., Pachinger, M. M., Leibetseder, M. M., & Fartacek, R. R. (2000). Autobiographical memories in women remitted from major depression. *Journal of Abnormal Psychology, 109,* 331-334.

McNally, R. J., Lasko, N. B., Macklin, M. L., & Pitman, R. K. (1995). Autobiographical memory disturbance in combat-related post-traumatic stress disorder. *Behaviour Research and Therapy, 33,* 619-630.

McNally, R. J., Litz, B. T., Prassas, A., Shin, L. N., & Weathers, F. (1994). Emotional priming and autobiographical memory in posttraumatic stress disorder. *Cognition and Emotion, 8,* 351-368.

Peeters, F., Wessel, I., Merckelbach, H., & Boon-Vermeeren, M. (2003). Autobiographical memory specificity and the course of major depressive disorder. *Comprehensive Psychiatry, 43*, 344-350.

Prigerson, H. G., & Maciejewski, P. K. (2005). A call for sound empirical testing and evaluation of criteria for Complicated Grief proposed for DSM-V. *Omega-Journal of Death and Dying, 52*, 9-19.

Prigerson, H. G., Shear, M. K., Jacobs, S. C., Kasl, S. V., Maciejewski, P. K., Silverman, G. K., et al. (2000). Grief and Its Relationship to PTSD. In N. D & D. J.R.T. (Eds.), *Post Traumatic Stress Disorders: Diagnosis, Management and Treatment* (pp. 163-186). New York: Martin Dunitz Publishers.

Prigerson, H. G., Shear, M. K., Jacobs, S. C., Reynolds, C. F., Maciejewski, P. K., Davidson, J. R. T., et al. (1999). Consensus criteria for traumatic grief - A preliminary empirical test. *British Journal of Psychiatry, 174*, 67-73.

Purdon, C. (1999). Thought suppression and psychopathology. *Behaviour Research and Therapy, 37*, 1029-1054.

Rosner, R., Powell, S., & Butollo, W. (2003). Posttraumatic stress disorder three years after the siege of Sarajevo. *Journal of Clinical Psychology, 59*, 41-55.

Rottenberg, J., Hildner, J. C., & Gotlib, I. H. (2006). Idiographic autobiographical memories in major depressive disorder. *Cognition & Emotion, 20*, 114-128.

Stokes, D. J., Dritschel, B. H., & Bekerian, D. A. (2005). The effect of burn injury on adolescents' autobiographical memory. *Behaviour Research and Therapy, 42*, 1357-1366.

Stroebe, M., Schut, H., & Finkenauer, C. (2001). The traumatization of grief? A conceptual framework for understanding the trauma-bereavement interface. *Israel Journal of Psychiatry and Related Sciences, 38*, 185-201.

Wessel, I., Meeren, M., Peeters, F., Arntz, A., & Merckelbach, H. (2001). Correlates of autobiographical memory specificity: the role of depression, anxiety and childhood trauma. *Behaviour Research and Therapy, 39*, 409-421.

Williams, J. M. G. (2006). Capture and rumination, functional avoidance, and executive control (CaRFAX): Three processes that underlie overgeneral memory. *Cognition and Emotion, 20*, 548-568.

Williams, J. M. G., Barnhofer, T., Crane, C., Hermans, D., Raes, F., Watkins, E. & Dalgleish (2007). Autobiographical memory specificity and emotional disorder. *Psychological Bulletin*, 133, 122-148.

Williams, J. M. G., & Broadbent, K. (1986). Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology, 95*, 144-149.

Williams, J. M. G., & Dritschel, B. (1991). Categoric and extended autobiographical memories. In M. Conway, H. Rubin, W. Spinnler & W. Wagennar (Eds.), *Theoretical perspectives on autobiographical memory* (pp. 391-409). Dodrecht: Kluwer Academic Publishers.

Williams, J. M. G., & Dritschel, B. H. (1988). Emotional disturbance and the specificity of autobiographical memory. *Cognition and Emotion, 2*(3), 221-234.

Williams, J. M. G., Stiles, W. B., & Shapiro, D. (1999). Cognitive mechanisms in the avoidance of painful and dangerous thoughts: elaborating the assimilation model. *Cognitive Therapy and Research, 23*, 285-306.

Appendix

Criteria for Diagnosing Complicated Grief (CG) at study onset (June, 2004)

DSM-V CG Workgroup: Prigerson, Parkes, Raphael, Rynearson, Neimeyer, Bonanno, Horowitz, Goodkin, Maciejewski, and Jacobs

Criterion A: Chronic and persistent yearning, pining, longing for the deceased resulting in daily, intrusive distressing and disruptive heartache.

Criterion B: The person should have four of the following seven remaining symptoms at least several times a day or to a degree intense enough to be distressing and disruptive:

1. Trouble accepting the death
2. Inability to trust others
3. Excessive bitterness or anger related to the death
4. Uneasy about moving on
5. Survivor guilt
6. Feeling life is empty or meaningless without deceased
7. Preoccupation with thoughts about the deceased

Criterion C: The above symptom disturbance causes marked and persistent dysfunction in social, occupational, or other important domains.

Criterion D: The problems persist for at least 6 months.

CG = when Criteria A, B, C and D are met.

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Footnotes

[1] There have been a number of proposed criteria sets for CG (e.g. Horowitz et al., 1997; Prigerson et al., 1999), though recently the various proponents have collaborated in a CG workgroup to generate criteria for the DSM-V. In this study we used the latest criteria from the DSM-V CG work group of Prigerson and colleagues that were available at study onset (Prigerson, personal communication, June 2004). These are laid out in the Appendix.

[2] We predicted reduced specificity in the CG group on the standard AMT, even with respect to bereaved controls, because similar reduced specificity effects have been found in trauma-exposed individuals with PTSD relative to trauma-exposed individuals without PTSD with large effect sizes (see Williams et al., 2007, for a review).

[3] Some of the memories retrieved on the BMT will also have involved the individual recollecting the memory. These memories will therefore be both autobiographical and biographical. Other memories will be biographical only.

[4] This interaction was also significant if we used numbers, rather than proportions of specific memories, F (1, 27) = 7.28, p = 0.012.

Table 1.

Mean demographic, bereavement-related, self-report mood and verbal fluency data (standard deviations where appropriate in parentheses) across the two groups

	Control	CG	Test statistic	P value
n	13	16		
Age	39.85 (15.97) Range 18-69	36.56 (13.55) Range 19-68	t(27)=0.60	0.55
Sex (Male: Female)	1:12	1:15	Fisher's exact	0.99
Education	1:6:4:2	1:11:3:1	Fisher's exact	0.71
Monthly salary	4:1:2:1:1:2:2	3:2:3:3:3:1:2	Fisher's exact	0.92
Verbal Fluency	11.00 (3.19)	11.19 (2.97)	t(27)=0.16	0.87
BDI	6.08 (4.11)	12.37 (10.76)	t(27)=1.99	0.06
PDS severity[a]	7.15 (3.97)	15.15 (13.37)	t(24)=2.07	0.05
Time since bereavement	7.01 (4.15) Range 6months-13years	7.31 (3.94) Range 1yr 4months-13years	t(27)=0.20	0.84
Who died?[b]	7:0:0:3:3	8:3:1:4:0	Fisher's exact	0.45
Multiple bereavement (yes: no)	8:5	12:4	Fisher's exact	0.69
Anniversary-tested 1 month before or after (yes: no)	5:8	8:8	Chi square	0.71

PTO for note

Table 1 note

Education: primary school:secondary school:university:postgraduate.

Monthly salary: less then US$150:$150-300:$300-450:$450-600:$600-$750:$750-900:over $900

BDI = Beck Depression Inventory

PDS = Posttraumatic Stress Diagnostic Scale

Who died: parent:child:sibling:partner:grandparent.

a = Three participants did not complete the PDS

b = CG was diagnosed with respect to the single most significant bereavement.

Table 2. Means and standard deviations for numbers of specific, categoric, and extended memories for the three memory tasks across the two groups, and ratings of closeness to the index individuals in the Biographical Memory Tasks.

	CONTROL GROUP (*n*=13)			COMPLICATED GRIEF GROUP (*n*=16)		
Memory task	AMT	BMT-D	BMT-L	AMT	BMT-D	BMT-L
Ratings of how well	n/a	7.70	8.15	n/a	7.70	8.19
persons were known		(1.25)	(1.21)		(2.1)	(1.60)
Specific Positive	5.00	4.46	4.00	4.00	4.06	3.62
	(1.08)	(1.39)	(1.87)	(1.93)	(1.88)	(2.12)
Specific Negative	4.85	3.69	4.54	3.67	4.19	3.87
	(1.52)	(1.55)	(1.13)	(1.66)	(1.51)	(1.71)
Categoric Positive	0.46	0.46	1.00	0.50	0.50	0.69
	(0.66)	(0.77)	(1.15)	(1.09)	(1.09)	(1.30)
Categoric Negative	0.46	1.07	0.54	0.62	0.50	0.56
	(0.77)	(1.38)	(0.77)	(0.72)	(0.63)	(0.81)
Extended Positive	0.38	0.77	0.84	1.06	0.87	0.81
	(0.51)	(1.16)	(1.07)	(0.93)	(1.20)	(1.04)
Extended Negative	0.31	0.92	0.54	1.12	0.37	0.94
	(0.85)	(1.04)	(0.88)	(1.36)	(0.50)	(0.85)
No Memory Positive	0.15	0.31	0.15	0.44	0.56	0.87
	(0.55)	(0.63)	(0.37)	(0.73)	(0.63)	(1.36)
No Memory Negative	0.38	0.31	0.38	0.50	0.94	0.62
	(0.65)	(0.48)	(0.65)	(0.63)	(0.99)	(1.09)

PTO for Note

Table 2 Note

AMT = Autobiographical Memory Test

BMT-D/L= Biographical Memory Test-Deceased/Living

Figure 1

Proportions of specific memories retrieved to positive and negative cues across the two groups (error bars are ± 1 S.E.).