Mindfulness-Based Cognitive Therapy Reduces Overgeneral Autobiographical Memory in Formerly Depressed Patients

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Previous research on depressed and suicidal patients and those with posttraumatic stress disorder has shown that patients' memory for the past is overgeneral (i.e., patients retrieve generic summaries of past events rather than specific events). This study investigated whether autobiographical memory could be affected by psychological treatment. Recovered depressed patients were randomly allocated to receive either treatment as usual or treatment designed to reduce risk of relapse. Whereas control patients showed no change in specificity of memories recalled in response to cue words, the treatment group showed a significantly reduced number of generic memories. Although such a memory deficit may arise from long-standing tendencies to encode and retrieve events generically, such a style is open to modification.

When people try to retrieve specific events from their past, they first access higher level, general descriptions, using these as intermediate steps to derive pointers to the lower level, specific event representations (Reiser, Black, & Abelson, 1985; see Rubin, 1996, for a review). Characterizing autobiographical memory as a hierarchy, with more general information higher in the hierarchy, and more detailed, specific information lower in the hierarchy, people are normally able to move fluently through the hierarchy, selecting the level of specificity necessary to respond appropriately to the given context.

However, several recent studies suggest that depressed patients have considerable difficulties moving fluently through the memory hierarchy. Their memory appears to abort the search for a specific event prematurely, when only the general description stage has been reached. For example, in response to a word cue such as *kindness,* such a depressed patient may respond, "My grandmother was always kind to me. She used to take me out when my father got cross." In this example, the patient is responding with a summary description, a category of events, rather than retrieving a specific event that happened at a particular place and time (see Williams, 1996, for a review).

Originally described in suicidal patients (Williams & Broadbent, 1986; Williams & Dritschel, 1988), subsequent research found overgeneral memory to be a characteristic of depression (Goddard, Dritschel, & Burton, 1996; Kuyken & Brewin, 1995; Kuyken & Dalgleish, 1995; Moore, Watts, & Williams, 1988; Puffet, Jehin-Marchot, Timsit-Berthier, & Timsit, 1991; Williams & Scott, 1988) and posttraumatic stress disorder (McNally, Lasko, Macklin, & Pitman, 1995; McNally, Litz, Prassas, Shin, & Weathers, 1994).

Kuyken and Brewin (1995) found that overgenerality in memory in depressed women was associated with a higher number of previous suicide attempts and episodes of depression. In addition, overgeneral memory was associated with greater frequency of intrusions of past stressful events such as physical and sexual abuse, suggesting either that the effort involved in suppressing or avoiding unpleasant memories disrupts the memory search at the point where it moves from general descriptions to specific events or that some individuals strategically adopt an overgeneral retrieval style as a method for dealing with potentially emotional material. Although such overgeneral retrieval may thus appear to have an adaptive, affect regulation function, it has also become clear that it has a number of maladaptive effects. Although not all patients show this deficit to the same extent, patients who are more overgeneral for negative events in their lives (a) are also more overgeneral for positive and neutral events (Williams, 1996); (b) show deficits in interpersonal problem solving (Evans, Williams, O'Loughlin, & Howells, 1992; Goddard et al., 1996; Sidley, Whittaker, Calam, & Wells, 1997); (c) find it difficult to imagine the future in a specific way and are more hopeless (Williams, 1997; Williams et al., 1996); and (d) may take longer to recover from the disorder (Brittlebank, Scott, Williams, & Ferrier, 1993; Harvey, Bryant, & Dang, 1998; however, see Brewin, Phillips, Carroll, & Tata, 1998, for a nonreplication).

If this memory deficit has such detrimental effects on functioning, can it be modified? One possibility is that such a deficit arises from the severity of mood disturbance. If so, then reducing mood

disturbance will reduce the memory deficit. However, research has suggested that, unlike many cognitive biases associated with emotional disorders (Williams, Watts, MacLeod, & Mathews, 1997), the phenomenon of overgeneral recall is not mood-state dependent. In a cross-sectional study, Williams and Dritschel (1988) tested a group of previously suicidal patients who had taken a drug overdose between 3 and 14 months before assessment. They found that expatients did not differ significantly from current patients in how overgeneral they were in their memories, both of these groups being significantly more impaired than controls. In a longitudinal study, Brittlebank et al. (1993) tested depressed patients on three occasions: on admission, 3 months later, and 7 months later. There was no change in response to positive or negative cues, even in those patients whose mood improved considerably. Similarly, Kuyken and Brewin (1995) found in their sample of depressed women that the correlation between level of current depression (measured with the Beck Depression Inventory) and overgeneral memory was low and nonsignificant, $r(54) = -0.02$ and -0.06 for positive and negative cues, respectively.

The results from only one study have suggested that overgenerality might normalize on recovery. Kuyken and Dalgleish (1995) replicated the overgeneral memory phenomenon in a sample of 33 depressed patients compared with 33 matched controls. However, they noticed that 14 of their controls (42%) reported having had one or more episodes of depression in the past. The remainder had never been depressed. In a post hoc analysis, they compared the previously depressed with the never depressed group, finding no difference between them in their tendency to retrieve general memories. As the authors stated, however, no strong conclusions could be drawn from this aspect of their study. There was no information about how many of the previously depressed group had received psychotherapy nor about the nature of their previous depression. Furthermore, the data was cross-sectional, and an explanation in terms of a long-term trait remains possible: Subgroups of depressed patients who have severe retrieval problems and are less likely to recover (Brittlebank et al., 1993) will be less likely to appear in the recovered group in such a study. Other subgroups of depressed patients who have relatively spared memory are more likely to recover and to be present in the recovered sample.

On the basis of these studies, previous investigators have concluded that overgeneral memory is a cognitive style, a long-term, trait-like phenomenon. For example, Williams's review (1996) suggested that such a memory style starts early in development, rendering people vulnerable to depressive breakdown and to post-traumatic stress disorder (PTSD) reactions in the face of trauma, agreeing with Brittlebank et al.'s (1993) conclusion that overgeneral memory constitutes "a trait marker of vulnerability" (p. 121). The implication of these conclusions appeared to be that such a cognitive style would be relatively resistant to change.

This conclusion was based on the finding that overgeneral memory was not mood-state dependent, so that reducing levels of emotional disturbance would be unlikely to change it. However, no study had examined whether overgeneral memory could be changed by treatment. An opportunity to examine these issues arose during the course of a randomized controlled trial of mindfulness-based cognitive therapy (MBCT; Teasdale, Segal, & Williams, 1995). This 8-week training was adapted from the Stress Reduction and Relaxation Program of the University of Massa-

chusetts Medical Center developed by Kabat-Zinn (Kabat-Zinn, 1990; Kabat-Zinn et al., 1992). The goal of this procedure is to increase patients' awareness of present, moment-to-moment experience. Patients receive extensive practice in learning to bring their attention back to the present, using a focus on the breath as an anchor, whenever they notice that attention has been diverted to streams of thoughts, worries, or general lack of awareness. MBCT combines Kabat-Zinn's mindfulness techniques with some techniques drawn from cognitive therapy in a comprehensive treatment package specifically tailored to train patients in skills relevant to the prevention of depressive relapse.

We were interested in the effect of this treatment on autobiographical memory because, first, it includes a large number of homework tasks that train patients to notice the specific aspects of their environment, thus potentially reducing overgeneric encoding. (Hierarchical search models of memory assume that encoding and retrieval share common processes so that making encoding more specific will also make retrieval more specific.) Second, the training explicitly focuses on allowing mental contents to occur without judging them or trying to suppress or avoid them, thus potentially reducing the tendency to truncate the memory retrieval process as a means of regulating affect.

To examine this question, we administered the standard Autobiographical Memory Test (Brittlebank et al., 1993) at one of the three sites involved (Bangor, Wales). This task involved giving positive, negative, and neutral cue words, one at a time, to patients and asking them to respond with a specific event from their past that the word reminded them of. It was administered before the start of the 8-week series of classes, and again during the 12-months follow-up period. We examined the specificity of the responses to determine whether or not recovered depressed patients became less generic following the treatment.

Method

Participants

Forty-five patients were recruited from the clinical services of the Community Mental Health Service in Bangor, North Wales and by advertising in the local press for volunteers who had been depressed in the past but were now recovered. Whatever the source of referral, each participant's general practitioner (GP) was contacted for verification and permission to assess the patient for the study. To take part in the study, participants needed to have had a previous history of at least two episodes of unipolar depression meeting DSM-III-R (Diagnostic and Statistical Manual for Mental Disorders, 3rd ed., revised; American Psychiatric Association, 1987) criteria for major depressive disorder, and the most recent episode of depression needed to be within the previous 2 years. They needed to be currently in remission and to have had a history of treatment with tricyclic antidepressant medication but to be free from antidepressants for at least 12 weeks before entering the study. All patients remained under outpatient care or the care of GPs during the study. A structured clinical interview for DSM-III-R (SCID) was used to assess past and present diagnostic status. Current clinical remission was confirmed by a SCID indicating that the patient had been asymptomatic for at least 8 weeks and had a current 17-item HRS-D score of 9 or less. Participants were excluded from the study if (a) they suffered from the following comorbid psychiatric disorders: bipolar affective disorder, active drug dependency or abuse, organic mental disorders, schizophrenia, schizoaffective disorder, primary obsessive–compulsive disorder, or eating disorders; (b) they could not complete measures due to illiteracy; (c) they were receiving additional

psychotropic medication other than benzodiazepine or other night sedation (e.g. lithium or neuroleptics). All participants gave written informed consent.

The mean age of the participants was 44.0 years (SD = 9.5) and the mean number of years of education was 14.5 (SD = 3.4). There were 33 women and 12 men. The median number of previous episodes of depression was 4.0.

Materials

Hamilton Rating Scale for Depression (17-item version, HRS–D; Hamilton, 1960). This is an interviewer-administered rating scale for measuring severity of depression, widely used in clinical trials, with reliability coefficients of 0.84–0.90. We administered it at entry to the trial and at follow-up.

Autobiographical Memory Test (AMT; Williams & Broadbent, 1986). Participants were required to recall events that had happened to them in response to cues. The time period from which events could be recalled was not specified, and participants were told that the event could be important or trivial. It was emphasized that the events from the past should be specific events (events that lasted less than 1 day), and practice was given until participants had been successful in retrieving a specific memory. For each memory response, participants noted how long ago the event had occurred (1 = *less than 1 week*, 2 = *less than 1 month*, 3 = *less than 6 months*, 4 = *less than 1 year*, and 5 = *over 1 year*).

Eighteen words were used as cues with which to prompt participants for responses, 6 neutral (e.g., *grass, gigantic*), 6 positive (e.g., *happy, relieved*) and 6 negative (e.g., *guilty, hopeless*), matched for word frequency. The positive and negative words were chosen to be high on emotionality, with the neutral words low on emotionality (John, 1988). An equivalent list of 18 words was compiled so that two matched sets (A and B) were available. Half of the participants were given Set A at Time 1 and Set B at Time 2 with this order being counterbalanced. (The full list of cue words, instructions, and procedure are available from J. Mark G. Williams.)

Procedure

Allocation. Following a baseline assessment, we randomly allocated the 45 patients to receive either MBCT (in addition to treatment as usual [TAU]) or TAU alone. (TAU patients continued under the care of their physician for the duration of the trial and were instructed to use whatever service they would normally use in the event of depressive relapse.) There were no differences between treatment and control groups on any pretreatment variables: age of the participants (MBCT, M = 42.5 years; SD = 11.2; TAU, M = 45.7, SD = 7.0), number of years of education (MBCT, M = 14.4, SD = 2.7; TAU, M = 14.5, SD = 4.1), or number of

previous episodes of depression (MBCT, Mdn = 5.0; interquartile range [IQR] = 6.8; TAU, Mdn = 3.0; IQR = 5.0). Three patients failed to complete the memory measure at the second testing. Another patient was inadvertently given the same list of memory cues on both occasions, so their data were not included. Data for these patients showed that they did not differ from the other patients in any respect, neither in their level of depression nor their initial autobiographical memory performance. The numbers of participants in the present study was therefore 41 (MBCT, n = 21, 16 women, M age = 42.1, SD = 11.7; TAU, n = 20, 14 women, M age = 45.6, SD = 7.2).

Autobiographical memory was tested on two occasions, once before allocation to MBCT or TAU (Time 1), and again during the 12-months follow-up period (Time 2). The mean test–retest interval was approximately 6 months (4 months following the end of treatment) and did not differ between the groups (MBCT, M = 192 days, SD = 44; TAU, M = 195 days, SD = 67; $t[39]$ = .13, ns). Depression level (measured by HRS–D) was assessed on the same occasions as the memory testing.

Results

Mood

Because the treatment was designed to prevent future depressive relapse in people who were currently in remission, no specific reduction in mood symptoms was predicted for the treatment. Nevertheless, we could not rule out the possibility that some change in depression due to the treatment may have had an effect on memory performance, so we analyzed HRS–D scores first. A 2 (Time: 1, 2) × 2 (Group: MBCT, TAU) mixed analysis of variance (ANOVA) was carried out. Means and standard deviations are shown in Table 1. We found no significant main effects for time, $F(1, 39)$ = 1.82, MSE = 13.53, p = .19]; group, $F(1, 39)$ = 2.58, MSE = 19.43, p = .12, or for the Group × Time interaction, $F(1, 39)$ = 1.24, MSE = 13.53, p = .27.

Autobiographical Memory Responses

Participants' first responses to each of the 18 cue words presented on each occasion were analyzed. If patients did not respond within 30 s for any cue, this was scored as an omission (see Table 1). Memory responses were then categorized into three types: *specific* (a memory for a particular event lasting 1 day or less, e.g., going to a concert last summer), *categoric* (a memory response that summarized a number or category of events, e.g., going to

Table 1

Means and Standard Deviations for the Hamilton Depression Scale and Memory Variables for MBCT and TAU Groups at Times 1 and 2

| | MBCT | | | | TAU | | | |
| | Time 1 | | Time 2 | | Time 1 | | Time 2 | |
Variable	M	SD	M	SD	M	SD	M	SD
Mood								
Hamilton	4.2	2.6	4.4	4.5	4.9	2.7	6.9	5.6
Memory								
No. of omissions	1.9	1.4	2.3	1.9	1.6	1.9	1.8	1.8
Mean latency (s)	9.4	2.9	9.6	2.2	10.1	3.0	11.3	3.4
Memory age	4.1	2.4	3.0	2.4	3.9	2.4	2.7	2.3

Note. MBCT = mindfulness-based cognitive therapy; TAU = treatment as usual.

concerts as a child), and *extended* (a memory of a particular time period lasting longer than a day, e.g., my 3-week holiday in France). This categorization was done by an independent rater who was unaware of treatment allocation and time of testing of the material being rated. A reliability check on degree of specificity of responses was carried out. Following the method of Baddeley and Wilson (1986), we scored memory responses on a scale from 3 to 1, higher scores reflecting greater specificity. A second independent rater who was also unaware of treatment condition and time of testing categorized a 12% sample of the first rater's responses ($N = 88$). The Pearson correlation coefficient between the two sets of ratings was 0.86 ($df = 86$, $p < .001$).

We analyzed data for the proportion of responses that were of each memory type with a separate 2 (Group: MBCT, TAU) × 2 (Time: pre, post) × 3 (Valence: positive, negative, neutral) mixed analysis of covariance (ANCOVA), covarying out HRS–D scores at Time 2. Means and standard deviations are shown in Table 2. None of the types of memory yielded a significant valence effect, so the data are shown collapsed across the positive, negative, and neutral cues. The extended memory category of response appeared relatively rarely (occurring, on average, in response to only 1 cue per person) so were not analyzed further. We analyzed retrieval latencies to check that any differences in categoric memories were not merely due to overall impaired performance on the task (see Table 1). With regard to omissions, a 2 × 2 ANCOVA showed no significant main effects or interactions.

Proportion of specific memories. There was a main effect of time, $F(1, 39) = 15.72$, $MSE = 0.15$, $p = .0005$, due to a general tendency for both groups to recall a greater proportion of specific memories at Time 2 (80%) than at Time 1 (71%). There was no significant effect of group, $F(1, 38) = 2.56$, but there was a significant Group × Time interaction, $F(1, 39) = 4.98$, $MSE = 0.05$, $p = .031$. Planned comparisons showed this interaction to be due to the fact that at Time 1 there was no significant difference between the groups in the proportion of specific memories (72% in the MBCT, and 70% in the TAU group). At Time 2, however, the MBCT gave specific memories 85% of the time versus only 74% for the TAU group, $t(39) = 2.34$, $p = 0.03$.

Proportion of categoric memories. There was a main effect of time, $F(1, 39) = 14.36$, $MSE = 0.12$, $p = .001$, due to a tendency for both groups to recall less categoric memories at Time 2 (15%) than at Time 1 (23%). However, this effect was qualified by a significant Group × Time interaction, $F(1, 39) = 8.42$, $MSE = 0.07$, $p = .006$. Planned comparisons showed this inter-

action to be due to the fact that in the MBCT group the proportion of categoric memories recalled fell from 24% of responses at Time 1 to 10% of responses at Time 2, ending significantly lower than the proportion recalled by the TAU (control) group at Time 2 (19%), $t(39) = 2.28$, $p = .03$.

Latency to Respond

To check that the pattern of results was not due to general sluggishness in responding to the cue words, we analyzed the mean response latencies (shown in Table 1). Results of a 2 (Group: MBCT, TAU) × 2 (Time: 1, 2) mixed ANOVA showed no significant main effect of group, $F(1, 39) = 2.19$, $MSE = 13.14$, $p = .15$, or of time, $F(1, 39) = 2.87$, $MSE = 3.33$, $p = .10$, neither was there a significant Group × Time interaction, $F(1, 39) = 1.17$, $MSE = 3.33$, $p = .29$.

Memory Age

The reduction in number of categoric memories following treatment, described earlier, may be due to the MBCT group retrieving events from a more recent time frame than the control patients. For each memory response, patients had noted how long ago the event had occurred (1 = *less than 1 week*, 2 = *less than 1 month*, 3 = *less than 6 months*, 4 = *less than 1 year*, and 5 = *over 1 year*). For each patient's set of responses, the modal time since the retrieved events had occurred was recorded (using the mode because of the abnormal distributions of each individual's event ages). Mean memory ages for each group are shown in Table 1. A 2 (Group: MBCT, TAU) × 2 (Time: 1, 2) mixed ANOVA was carried out. We found a significant main effect for time: more distant events were recalled at Time 1 ($M = 4.05$, $SD = 2.38$) compared with Time 2 ($M = 2.83$, $SD = 2.34$), $F(1, 39) = 9.07$, $MSE = 3.37$, $p = .005$. There was no significant main effect for group, $F(1, 39) = .19$, $MSE = 8.02$, $p = .67$, neither was there a significant Group × Time interaction, $F(1, 39) = .04$, $MSE = 3.37$, $p = .85$. In sum, both groups retrieved memories from more recent time periods on the second occasion of testing, but there was no evidence that the MBCT group did so more than the control (TAU) group.

Discussion

The aim of the present study was to examine the stability of the tendency to be overgeneral in retrieval of autobiographical mem-

Table 2
Means and Standard Deviations for the Proportion of Specific, Categoric, and Extended Memories Recorded at Times 1 and 2 for MBCT and TAU Groups

	MBCT				TAU			
	Time 1		Time 2		Time 1		Time 2	
Memories	M	SD	M	SD	M	SD	M	SD
Specific	0.72	0.14	0.85	0.13	0.70	0.16	0.74	0.17
Categoric	0.24	0.13	0.10	0.08	0.21	0.11	0.19	0.16
Extended	0.04	0.06	0.05	0.08	0.09	0.06	0.07	0.06

Note. MBCT = mindfulness-based cognitive therapy; TAU = treatment as usual.

ory in formerly depressed patients. The balance of evidence from previous studies had suggested that categoric memory was a long-term cognitive style persisting despite short-term changes in mood. The findings of this study show that when recovered depressed patients undergo training that includes instructions to focus more carefully on everyday events and to allow cognitions to occur without trying to avoid or suppress them, the tendency to retrieve events in a categoric style is reduced. Furthermore, consistent with earlier studies showing that this aspect of memory is not mood-state dependent, overgenerality in memory was reduced significantly in the MBCT group despite there being no change in mood scores over this interval: The memory changes were not mood driven.

Although mood change could not explain this effect, it remains possible that change in some other, third variable was being affected by the MBCT treatment and then affecting memory. For example, it is possible that treatment simply affects the amount of energy that patients are prepared to put into psychological tasks such as these. A related artifactual explanation for the results could be that, following 8 weeks of contact with a class-based instruction, patients may have been more used to receiving and acting on instructions, affecting their ability to perform the task. If that were the case, one might expect an overall better performance on the memory task: The latency to respond might be faster for the MBCT treatment group at Time 2 or there might be fewer omissions at Time 2. There were no such effects, however. In fact, if anything, the trend was in the opposite direction, with slightly more omissions following MBCT treatment, which, once excluded, might exaggerate the apparent impact of the treatment on the proportion of specific memories. Omissions were excluded before analysis of memory responses because they are ambiguous: They may mean that no memory has been retrieved, or a memory has been retrieved that the person does not wish to report, or that the treatment has alerted the participant to the inappropriateness of a categoric memory when a specific memory is unavailable. The latter possibility is consistent with participants being more aware of their retrieval processes, consistent with the aims of the treatment.

The final possible artifactual explanation is that the treatment group might have sampled events from a more recent time frame following treatment. An excess number of events from the period since the treatment started might change the profile of the retrieval protocols in the MBCT group to favor, by accident, more recent events and therefore less categoric memories. However, both groups showed a tendency to retrieve from a more recent period on second time of testing, and there was no difference between the groups in the time elapsed since the retrieved events took place.

Of course, the present data can only be seen as preliminary for two reasons. First, there was no placebo control group, so we cannot definitively attribute the changes in memory to a specific effect of the MBCT. Second, there was no independent measure taken during the treatment to check that individuals were in fact changing their cognitive style in the way predicted by the theory. Nevertheless, the main intention of this study was to see whether overgeneral memory could be modified. How such change occurs will be for future research to determine. The finding that it can change has potentially important clinical implications.

Williams (1996) reviewed evidence suggesting that such a style arises early in development. Hypersensitivity to affectively toned aspects of events (positive and negative), whether present as an aspect of temperamental style or due to negative experiences, gives rise to a tendency to encode specific aspects of the environment in terms of their more general schematic aspects. This leads to a habitual use of encoding and retrieval strategies in which more general aspects of events (intermediate general descriptions) are represented in memory, with poorer strategic access to specific episodic exemplars. This style affects the processing of further events (positive, negative, or neutral) but has particular implications for the satisfactory emotional processing of any new negative event that occurs. First, such a retrieval style makes the strategic recollection of specific aspects of such events (necessary for recoding, reattribution, etc.) effortful and unlikely to be satisfactorily accomplished. Second, specific aspects of events will come to be associated with more intense affect and lead increasingly to attempts to avoid specific retrieval.

Mindfulness-based cognitive therapy addresses this avoidant mode of processing by encouraging patients to practice noticing elements of their experience and to do so in a nonjudgmental way. In this way, it encourages not only more specific encoding of events but also more specific retrieval of past events by reducing the tendency for individuals to abort the search process. Further research will be needed to establish how much of the change in memory comes about as a result of the MBCT's effect on encoding versus retrieval. Nevertheless, the finding that overgeneral memory style can be changed is potentially important clinically. For example, there are now a number of studies showing that patients who have difficulty in being specific in their memory have problems in finding sufficient numbers of solutions and sufficiently effective solutions to current interpersonal problems (Evans et al., 1992; Goddard et al., 1996; Sidley et al., 1997). Because social problem-solving deficits are known to be a prevalent feature of depression (Nezu & Nezu, 1989), it is important to know that one of the underlying processes that contributes to poor problem solving—overgenerality in autobiographical memory—can be changed by treatment and that systematic instruction in attentional control is promising as a preliminary method by which to bring about such change.

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