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# Autobiographical Memory in Suicide Attempters

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Mood-memory phenomena have been studied using laboratory mood induction procedures with nondepressed subjects and with clinically depressed individuals. The present study examined both hedonic and nonhedonic aspects of autobiographical memory in people who had recently attempted suicide by overdose. Attempted suicide subjects, who were required to retrieve specific personal memories to positive or negative cue words, showed biased retrieval when their performance was compared with that of control groups, but the bias was wholly due to delayed retrieval of positive memories rather than speeded retrieval of negative memories. At least part of this effect was due to inappropriate retrieval strategies that yielded general rather than specific memories in the overdose group and have implications for associative network models of emotional memory.

Among the recent growth of interest in applying experimental cognitive psychology paradigms to clinical conditions, investigations of mood-memory phenomena have been prominent. The facilitation of recall of mood-congruent material (e.g., word lists, personal memories) has been studied using laboratory manipulation of mood and naturally occurring affective states (Bower, Gilligan, & Monteiro, 1981; Bower, Monteiro, & Gilligan, 1978; Clark, 1983; Isen, Shalker, Clark, & Karp, 1978; Teasdale & Fogarty, 1979; Teasdale & Russell, 1983; Teasdale, Taylor, & Fogarty, 1980).

The present study was designed to extend the existing mood-memory research in two ways: first, to study the extent to which biasing in retrieval of personal memories is shown in a hitherto unexamined clinical population, suicide attempters, and second, to study the effects of emotional disturbance not only on hedonic aspects but also on nonhedonic aspects of personal memory. Although one or two studies have examined the phenomena in clinical populations (e.g., Clark & Teasdale, 1982), there still exists a need to test out the increasing number of laboratory findings in the clinical situation, especially following recent criticisms of analogue mood-memory experiments (Hasher, Rose, Zacks, Sanft, & Doren, 1985).

We decided to examine biases in recall of personal memories in suicide attempters, a clinical group that still poses one of the biggest mental health problems.

In the United Kingdom the number of people deliberately harming themselves is estimated to be between 2 and 3.5 per 1,000 per year, representing a fourfold increase since the early 1960s. Experimental cognitive psychology paradigms in general, and mood-memory paradigms in particular, offer a potentially useful way in which the processes associated with this sort of emotional disturbance may be made more explicit. We assume that immediately prior to the suicide attempt the person is not amenable to persuasion or able to use effective coping strategies, partly because he or she can remember nothing but a string of failures, arguments, disappointments, and so forth. If this were the case, one might expect this bias to still be present in many patients immediately after the attempt.

The current experiment used a cue-word paradigm in which the cues were themselves the names of positive or negative emotions (*happy, sorry,* etc.). Both Robinson (1976) and Bekerian (1985) have found this method to be an effective way of prompting subjects to recall appropriately valent memories. A 10-cue-word version of the task had been extensively piloted in 200 control subjects between 20 and 70 years of age (Bekerian, 1985).

However, in piloting this task with recent suicide attempters (most often within 48 hours of the attempt), it became clear that these patients did not find it easy to retrieve the sort of specific personal memories that the task demanded, responding instead with general memories such as time periods (e.g., "when I was at school") or geographical locations (e.g., "that hotel in Germany"). This tendency to retrieve general rather than specific memories interested us because we had noted the same tendency in some depressed patients undergoing cognitive therapy (Williams, 1984, p. 120). The distinction between general and specific memories makes assumptions about the structure of autobiographical memory that have only recently begun to be studied (Neisser, in press; Reiser, Black, & Abelson, 1985).

A final consideration in designing this study was that any slowness by suicide attempters to retrieve memories may be due to general slowness (due to drugs or being hospitalized) rather than being specifically related to autobiographical memory. For this reason, two tasks assessing semantic processing (one of which was sensitive to drugs) were included. In this way, preliminary evidence on the specificity of effect of mood on memory could be obtained.

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## Method

### Subjects

Twenty-five patients (17 females, 8 males; average age = 31 years, $SD$ = 11.8 years) admitted to medical wards at Addenbrookes Hospital, Cambridge, England, following self-poisoning were interviewed. Nine of the female patients and 3 of the male patients had previous episodes of deliberate self-harm. Assessment of their mental state for the period prior to the overdose (Research Diagnostic Criteria; Spitzer, Endicott, & Robins, 1978) showed that of the 25 patients, 16 met the criteria for definite major depressive diagnosis. Three of these 16 were clearly diagnosable as secondary to other previous psychiatric disturbances, and 2 were known manic depressives. Three patients met the criteria for probable major depressive disorder, and 2 more met the criteria for minor depressive disorder. The remaining 4 patients' overdoses were responses to very short-term crises. Patients were interviewed following recovery from the overdose (range = 11–96 hours; $Mdn$ = 39 hours), though it was difficult to determine the extent to which aftereffects of the drugs taken affected the mental state of the patient. However, neither the type of drug, amount taken, nor time elapsed since the overdose correlated with any outcome variable in the present study.

Twenty-five hospital patients were recruited from the same wards as the overdose patients. Most were hospitalized for physical investigations. This clinical nonoverdose group also controlled for the fact of being hospitalized, which may have been an important factor in determining the nature of autobiographical memories retrieved. Finally, 25 subjects were recruited from the Applied Psychology Unit's subject panel. Both this group and the hospital control group had the same balance of sexes (17 females, 8 males) as the overdose group and were matched with the overdose group for age and educational level.

### Materials

*Profile of Mood States (POMS).* This 65-item state-mood questionnaire ("right now" form) was used to assess level of fatigue, tension, vigor, anger, depression, and confusion–bewilderment (McNair, Lorr, & Droppleman, 1981). Two further 5-point scales asked subjects how "preoccupied" and "ruminating" they felt themselves to be.

*Hopelessness Scale.* This 20-item questionnaire (Beck, Weissman, Lester, & Trexler, 1974) which has been found to be associated with severity and frequency of suicidal ideation (Nekanda-Trepka, Bishop, & Blackburn, 1983) and with suicidal intent (Maris, 1981; Dyer & Kreitman, 1984) was administered.

*Autobiographical Memory Test.* Ten of the emotional cue words used by Robinson (1976) were used to cue memories in this study. There were five pleasant words (*happy, safe, interested, successful,* and *surprised*) and five unpleasant words (*sorry, angry, clumsy, hurt* (emotional), and *lonely*). Subjects were given 1 min in each case to retrieve a specific personal memory in response to the word. Words were presented by the experimenter (ordered as above, with pleasant/unpleasant alternating), and the latency to the first word of each response made by the subject was recorded.

If subjects did not retrieve a memory that was specific, they were prompted to do so ("Can you think of a specific time—one particular episode?"). The cumulative time taken to give all subsequent responses was recorded, the prompting procedure being repeated if these responses remained inappropriately general. If subjects did not retrieve any specific memory in the time available, a time of 60 s was recorded, and the experimenter proceeded to the next item. After all 10 cue words had been presented, subjects dated the memory as accurately as possible. (Analysis of the recency of memories showed no differences between the groups, so these data will not be referred to subsequently.) Although other studies of autobiographical memory have used larger samples of words, the 10-cue-word task had been found in an extensive study of 200 nonclinical subjects to sample reliably the domain of positive and negative personal memories (Bekerian, 1985).

Reliability of the allocation of memories to general/specific categories was checked after completion of the experiment by having two independent judges categorize a random 10% sample of the 750 responses obtained. This yielded 87% and 93% agreement with the experimenter's (J.M.G.W.) categories. The specificity of the remaining memories was determined by observing whether or not subjects had been able to give specific details of date, day of week, or time of day on which the event in question had occurred.

*Semantic memory tasks.* Two tasks of semantic processing were given. In the first task, subjects were asked to generate as many instances (in 1 min each) of the categories *vegetable* and *boy's names* as they could. In the second task, subjects marked with ticks and crosses a series of 50 sentences that were obviously true or obviously false (e.g., "Pork chops are meat," "Doctors are always sold in pairs"). The time taken to complete the series was recorded by stop watch.

### Procedure

The tasks were administered in the order shown above. In addition (and especially for the overdose group) time was taken at the outset and after completion of the tasks to explain the procedure and purpose of the experiment. The testing session lasted approximately one hour.

## Results

### Mood

The six mood subscales of the POMS were analyzed using a Group × Sex analysis of variance (unweighted means analysis to take account of unequal numbers of males and females; Winer 1971, p. 445). For this, as for subsequent analyses reported, Duncan's multiple-range test was used for post hoc comparison between the groups (Edwards, 1968). The means are shown in Table 1. There are significant group main effects in every case (all $F$s except for preoccupation were significant at the $p < .005$ level, smallest $F = 13.9$) owing to the overdose group's being significantly more disturbed than the other two groups (Duncan's test, $p < .005$). The overdose group was also more preoccupied than the other two groups, $F(2, 69) = 3.8$, $p < .05$. A Group × Sex interaction for fatigue was found, $F(2, 69) = 3.8$, $p < .05$, caused by the male subjects' not showing between-groups differences on this mood variable. Males also were generally more ruminating than female subjects, $F(1, 69) = 4.4$, $p < .05$. These effects are difficult to interpret, however, because the other mood measures did not show the same trends.

### Hopelessness

Analysis of variance of the Hopelessness Scale yielded a significant groups main effect, $F(2, 69) = 19.0$, $p < .005$, owing to the high levels of hopelessness in the overdose group ($M = 11.8$) compared to the hospital control group ($M = 3.5$) and panel control group ($M = 4.2$; Duncan's test, $p < .005$ for each comparison). The control groups did not differ from each other. These hopelessness levels are comparable with previous research using

Table 1
*Mean Mood Levels*

| Mood | Group | | |
|---|---|---|---|
| | Overdose | Hospital control | Panel control |
| Fatigue (range = 0–28) | 14.8 | 8.0 | 5.8 |
| Tension (range 0 = 36) | 18.6 | 8.3 | 6.3 |
| Vigor (range = 0–32) | 4.9 | 12.9 | 16.2 |
| Anger (range = 0–48) | 14.3 | 3.8 | 2.0 |
| Depression (range = 0–56) | 30.8 | 8.0 | 4.6 |
| Confusion (range = 0–28) | 14.6 | 7.8 | 5.6 |
| Preoccupation (range = 0–4) | 2.1 | 1.3 | 0.8 |
| Rumination (range-0–4) | | | |
| Females | 2.4 | 0.8 | 0.4 |
| Males | 2.8 | 1.1 | 1.5 |

*Note.* Higher numbers indicate higher mood levels; thus, for vigor, higher ratings are positive.

this scale. Beck et al. (1974) reported a mean score of 9.0 for 384 suicide attempters, and Greene (1981) reported a mean score of 4.5 in a normal population (396 randomly selected adults).

### *Autobiographical Memory*

No subject failed to retrieve a specific personal memory to at least some of the cue words. Analysis of variance of nonresponses yielded a significant group main effect, $F(2, 72) = 4.49$, $p < .05$, and Group × Valence interaction, $F(2, 72) = 7.73$, $p < .01$. Overdose patients showed the largest proportion of nonresponses, with a mean of 32% for positive cue words, compared to 12% and 9% for, respectively, the hospital and panel control groups' responses to positive cue words (Duncan's test, $p < .01$ for both comparisons). The proportions of nonresponses to negative cue words in the three groups did not differ from each other (19%, 20%, and 12% for overdose, hospital control patients, and panel control subjects, respectively), but each of these were significantly lower than the 32% nonresponses to positive cues in the overdose group (Duncan's test, $ps < .05$, .05, and .01, respectively). (Note that *nonresponding* refers to the failure to retrieve a specific memory, as the task instruction required. Most of these subjects were nevertheless making some memory response to the cue, details of which will be given below). The mean latencies to retrieve specific personal memories to the positive and negative cue words are shown in Figure 1.

A Group × Sex × Valence repeated measures analysis of variance showed that neither the group nor sex nor valence main effects were significant. The Group × Valence interaction was highly significant, however, $F(2, 67) = 7.34$, $p < .005$, attributable to the slower retrieval of positive memories in the overdose group ($M = 28.2$ s) compared with the time taken to retrieve positive memories in the hospital control group ($M = 19.1$ s) and panel control group ($M = 17.6$ s), Duncan's test, $p < .01$ and $p < .05$, respectively. The overdose group's positive memories also took significantly longer (Duncan's test, $p < .05$) than did the retrieval of negative memories in the overdose and the panel control group ($M = 19.7$ s in both groups). Time taken to retrieve negative memories did not differ between the three groups.

Because subjects' responses were recorded verbatim, it was possible to analyze the extent to which the latency differences were a function of retrieving inappropriately general memories rather than specific memories. The proportion of memories retrieved for positive and negative cue words for each subject that were inappropriately general are given in Table 2. There were no sex differences, so the sexes were collapsed for the analysis. This yielded a significant group main effect, $F(2, 69) = 11.73$, $p < .001$, and Group × Valence interaction, $F(2, 67) = 4.24$, $p < .025$. The overdose group produced a greater proportion of nonspecific memories for both positive and negative cue words than did the other two groups (Duncan's test, $p < .01$). Unlike the control groups, within the overdose group the positive cue words elicited a greater proportion of general memories than the negative cue words ($p < .01$).

The latencies to retrieve the different types of memory were further examined by separating total latencies to retrieve a specific memory into two components: (a) latency to retrieve a general memory and (b) subsequent latency to retrieve a specific memory (by subtraction from the total time). Twenty-one of the 25 overdose patients gave at least one inappropriately general response to both positive or negative cue words. The frequency of this type of response was less for the control groups (11 of 25 in the

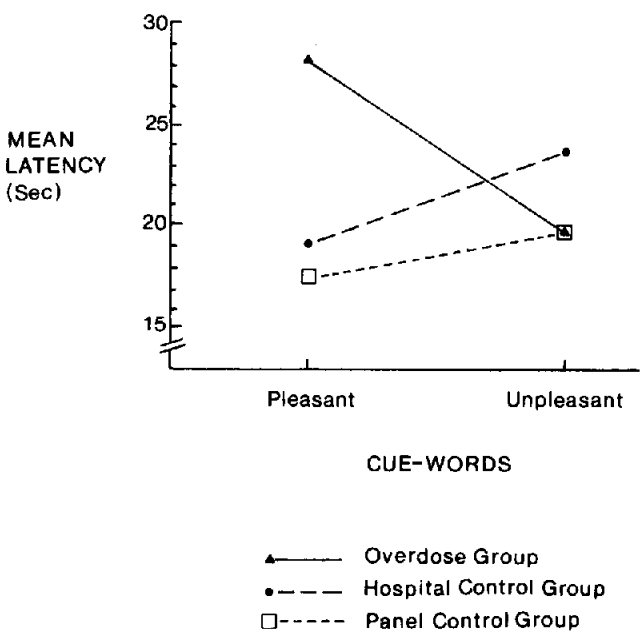


*Figure 1.* Latency to retrieve specific personal memories in response to positive and negative cue words.

Table 2
*Mean Proportion of Memories That Were Inappropriately General*

| Valence | Group | | |
|---|---|---|---|
| | Overdose | Hospital control | Panel control |
| Pleasant | 0.50 | 0.21 | 0.15 |
| Unpleasant | 0.37 | 0.18 | 0.22 |

hospital and 9 of 25 in the panel control group). Because the two control groups had shown no differences in the previous analyses, subjects from the two control groups who had given general responses were combined to form a single group of 20 control subjects.

The overall mean latency to retrieve memories in the revised overdose group ($n$ = 21) was 30.8 s for positive cues and 22.6 for negative cues. These values are slightly higher than for the whole group ($n$ = 25) because the fastest patients (who had given no general memories at all) are not included. Similarly, the overall mean latency to retrieve memories in the combined control group ($n$ = 20) was 22.4 s for positive cues and 27.3 s for negative cues, higher than the means for the two original control groups because the new combined group reflects the slowest 40% of the distribution of retrieval latencies. Because these data do not reflect the performance of their groups as a whole, it is not feasible to draw conclusions from these overall means. However, it is of interest to make a preliminary examination of the relative contribution to the total retrieval latency made by the time taken to retrieve a general memory versus subsequent time taken to retrieve a specific memory. Of the 30.8 s overall time taken to retrieve a memory to a positive cue word in the overdose patients, 11.6 s (38%) were taken up with retrieving a general memory, leaving 19.1 s (62%) subsequent retrieval time. Of the 22.6 s overall time taken for overdose patients to retrieve a memory to negative cue words, 8.3 s were taken up with retrieving a general memory (37% of the total time), leaving 14.5 s subsequently (63%). Thus, it can be seen that although positive memories were slower than negative memories in overdose patients, the distributions of time for accessing general memories and subsequent retrieval were similar. The 20 control subjects' overall latency of 22.4 s for positive memories was made up of 11.6 s (52% of total time) to retrieve a general memory and 10.8 s (48%) thereafter. The control subjects' overall latency of 27.3 s for negative memories was made up of 15.2 s (56%) to retrieve general memories and 12.1 s (44%) thereafter. Further research will be needed to establish whether the apparent differences between overdose subjects and controls in relative time spent at each stage of the retrieval process are reliable.

The Group × Sex analysis of variance for the semantic memory tests revealed a pattern of results different to that of the autobiographical memory task. The category generation task was performed equally well by all three groups, with females in all groups generating more items than males (overall $M$s = 18.4 for females and 15.4 for males, sex main effect), $F(1, 69) = 6.2$, $p < .025$. The sentences task revealed a group main effect, $F(2, 69) = 7.52$, $p < .005$, owing to the panel control group's ($M$ = 77.2 s) performing more efficiently than the overdose group ($M$ = 116.3 s) and hospital control group ($M$ = 112.2 s), Duncan's test, $p < .005$ in each case, but the overdose and hospital control groups did not differ from each other.

## Discussion

The aim of this study was to examine bias in autobiographical memory in suicide attempters, an emotionally disturbed and vulnerable group for whom such biasing may have played a significant part in precipitating the attempt. The results showed that they were indeed more emotionally disturbed and hopeless than the control groups and that they did show a bias in the speed of retrieval of positive and negative memories. Before discussing the implications of these results in detail, it is important to assess the extent to which factors other than the mood disturbance may have been responsible for the findings.

First, it is possible that the overdose patients had characteristic trait biases in their autobiographical memory, rendering them vulnerable both to emotional disturbance and to suicide gestures. Only a longitudinal study would definitely establish whether this was the case, though the evidence from another clinical study (Clark & Teasdale, 1982) which found that variations in biasing covaried with diurnal variations in mood in depressed patients suggests that state effects of mood are likely to provide at least part of the explanation.

Second, because the interviewer was not blind to the hypotheses underlying the investigation, experimenter bias cannot be ruled out as an explanation. The size of the effects found suggests that systematic recording biases are unlikely to have been a major factor, but the effects of possible differences in how the cue words were read to the patients cannot be ruled out. Future experiments might exclude this source of bias by using tape-recorded or visual presentation of the cues.

Third, although some time had elapsed since the overdose, it must be assumed that the groups differed in the level of drugs in their bloodstreams. There is no research evidence available on the effect of such large doses of drugs on cognitive processing. What studies exist (e.g., Evans, 1980) are confined to reporting the general effects (e.g., confusion, delirium, etc.) of drugs in overdose. Other studies (e.g., Brown, Brown, & Bowes, 1983) have examined the effects of small doses of specific drugs on cognitive performance, but because 16 of the 25 overdose patients in this study took more than one drug, this literature would not be helpful, because it does not examine the interactive effects of multiple drugs. Nevertheless, it is possible to make the assumption that most of the drugs taken in overdose would tend to make the subject drowsy and to slow down performance of most tasks.

Could such effects explain the memory phenomena observed? There are three reasons for thinking they could not. First, there were no correlations between any outcome variable and amount or type of drug taken, or with time elapsed between the overdose and the research interview. Second, the tasks of semantic processing, at least one of which (sentences) has been found sensitive to drug effects (Baddeley, 1981), did not show specific deficits

associated with the overdose group. The overdose group performed the sentences task more slowly than the panel control group but not more slowly than the hospital control group. Third, the distinctive feature of autobiographical memory performance in the overdose group was not a general slowing down of retrieval but a slowing of retrieval specifically for positive memories. It is to the explanation of this result that we now turn.

The most striking finding was that the mood-biasing effect was wholly attributable to delay in retrieving memories to positive cue words rather than speeded retrieval of negative memories. This result is all the more surprising because of the increased incidence of negative life events, which has consistently been found to precede suicide attempts (see Hawton & Catalan, 1982, for a review). These patients have more negative episodes in their recent past, yet show no tendency to retrieve these or any other negative memories faster than control subjects. At first sight, these data seem inconsistent with those of Teasdale and co-workers. Teasdale et al. (1980) found that depressed mood made negative memories more probable and positive memories less probable, which could be taken to imply that negative mood facilitated recall of negative personal memories. But this was not in fact the case. Although they found clear-cut effects of mood on probability of recall for both happy and unhappy memories, they found only slight effects of mood on latency to recall unhappy memories (p. 46). That is, the probability effects were due to the happy memories' winning the accessibility race by their reduced latencies in elated mood (producing greater probability of recall of happy memories) and losing the race by their increased latencies in depressed mood (producing greater probability of recall of unhappy memories).

If latency to retrieve unpleasant memories is relatively immune to shifts in mood, what implications does this have for associative network theories of the mood-memory phenomena? The present data do not fit easily with semantic network models within which the primary effect of negative mood (activation of negative emotion nodes) should be to facilitate access to the propositions representing negative events. The network theory states that the activation of the emotion node may inhibit the activation of a node representing the opposite emotion (Bower & Cohen, 1982, p. 299) and the secondary effects of such inhibition could be to retard retrievability of memories that were incongruent with current mood. But for this inhibition to be evident in the absence of any facilitation of mood-congruent personal memories suggests that the network model incorporates these data only with difficulty. Although it could be argued that a larger or different sample of words, or a different cuing technique, would have yielded results more consistent with the network model, the similarity of these results to those of Teasdale and co-workers who did use more and different words and a different technique strengthens confidence in the reliability of these findings.

In examining the cause of the delayed latency to retrieve positive memories in the overdose group, it was found that at least part of the effect was due to an inappropriate retrieval strategy. Subjects tended to retrieve general memories (e.g., safe . . . "when I'm in bed"; happy . . . "the first few years of my marriage"). Although the tendency to access nonspecific memories was more evident in the overdose group as a whole in comparison with other groups, it was a stronger tendency for positive than negative memories. This difference due to valence of cue word suggests that the production of nonspecific memories was not the result of subjects' not having understood the instructions. Indeed many overdose patients were able to verbalize and paraphrase the instruction that they were required to produce specific memories but still found difficulty in doing so.

Whether this phenomenon explains mood biasing of autobiographical memory in other contexts it is too early to say, but the phenomenon points out the importance of ensuring that subjects in these experiments are actually retrieving specific memories when told to do so. If it is the case that longer latencies to retrieve specific positive memories in some emotionally disturbed patients are partly a function of a tendency for them to block at the general level in autobiographical recall (cf. Reiser et al., 1985) then this will need to be taken into account explicitly in selecting techniques that aim to change cognitive biases.

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