The effects of suppressing a negative autobiographical memory on concurrent intrusions and

subsequent autobiographical recall in dysphoria

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Abstract

Depressed individuals endeavor to suppress intrusive thoughts and memories as a form of mood control. Two predictions from this literature were examined. First, that attempts to suppress a pre-selected negative memory during a stream-of-consciousness (SOC) task in dysphoric individuals, relative to a no-suppress condition, would lead to relatively speeded access to other negative, but not positive, memories on a subsequent cue-word recall task. No such effects were predicted for non-dysphoric controls. Second, that across all participants asked to suppress memories, higher levels of depressed mood would be associated with more intrusions of the to-be-suppressed memory during the SOC, and that this association would be stronger than the comparable relationship in participants not asked to suppress memories. Results supported both predictions.

Depression is characterised by the presence of intrusive cycles of negative thinking (Teasdale, 1983) and intrusive personal memories of negative events (Brewin, Phillips, Carroll, & Tata, 1996). In an elegant study, Wenzlaff, Wegner, and Roper (1988) have shown that when dysphoric or depressed individuals are asked to mentally distract themselves away from such negative thoughts or memories, they are more likely to settle inadvertently on other negatively valenced mental material as distracters. This is purportedly because negative mental information is sufficiently densely inter-related in depressed or dysphoric individuals (and in those vulnerable to such conditions) that the most available distracting information is invariably negative (Dozois & Dobson, 2001). Consequently, such attempts at distraction in dysphoria and depression are likely to be counterproductive in terms of breaking patterns of negative thinking or reminiscence, thus maintaining or exacerbating the current mental state. This is particularly unfortunate as it appears that distraction is one of the main strategies that depressed and dysphoric individuals endeavor to use in day-to-day life when attempting to deal with unwanted negative thoughts or memories (Wenzlaff et al., 1988).

In the present study we sought to test what we saw as a clear prediction of Wenzlaff et al.'s (1988) findings: that attempts to suppress a particular negative memory in dysphoric individuals (by virtue of the fact that mental distraction will be the modal method of suppression) should result in increased activation of mental representations of other negative information. If this is the case, we hypothesized, it should mean that this negative information would then be relatively more accessible on a subsequent memory task. If this turned out to be true it would suggest that there are 'downstream' toxic effects of negative memory suppression in dysphoria that are likely to contribute to the maintenance of the dysphoric state.

To investigate this prediction, we asked groups of dysphoric and non-dysphoric participants (the suppress groups) to try to suppress a pre-selected distressing autobiographical memory (the target memory) during a stream-of-consciousness (SOC) writing task, in which they wrote down everything that was going through their minds while also monitoring for any occurrence of the target memory (Wegner, Erber, & Zanakos, 1993). Comparison groups of dysphoric and non-dysphoric participants carried out the SOC task without the suppress instruction (the non-suppress groups). We then gave all participants an emotional cued-recall task in which they had to retrieve autobiographical memories to positive and negative cue words as fast as they could. The main hypothesis of the present study was therefore that, for the dysphoric suppress group, attempted-suppression of the target memory would result in relatively speeded access to other negative autobiographical memories on this subsequent task, compared to the dysphoric group not asked to suppress. We expected no such difference across suppress and no-suppress conditions for the non-dysphoric participants.

A secondary aim of the present study was to examine the effects of attempted memory suppression on concurrent intrusions of the to-be-suppressed memory during the SOC as a function of current depressed mood levels. The extant literature on the concurrent effects of mental suppression proposes that successful suppression of a target thought or memory is a function of two cognitive processes working in harmony (Wegner, 1994). The first ('automatic') monitoring process activates the mental representation of the to-be-suppressed material as a way of marking it out for suppression. The second (effortful) process performs the suppression itself. The thesis is that cognitive demand or 'load' will undermine this latter suppression process, thus leaving the to-be-suppressed material as relatively more activated than competing mental information by virtue of the first monitoring process. Paradoxically,

therefore, under conditions of cognitive load attempted suppression can actually lead to more concurrent intrusions of the to-be-suppressed material.

Although we did not manipulate mental load explicitly in the present study (as the study was not primarily concerned with load effects), all of the participants were nevertheless placed under a non-trivial mental load by the requirement to carry out the SOC task while simultaneously monitoring their output for occurrences of the their target memory[1]. In addition to this load carried by all participants, Wegner et al. (1993) have suggested that depressed or dysphoric mood states can themselves also act as a form of cognitive load due, to an imperative to process intrusive negative mental content (see also, for example, Ellis, Moore, Varner & Ottaway, 1997). Consequently, participants with higher levels of depressed mood in the present study should be carrying a relatively greater cognitive load (as a function of the SOC task combined with their mood state), compared with participants with low levels of current depressed mood.

On the basis of these lines of argument, we generated a second hypothesis for the present study: that for participants in the suppress condition, higher levels of current depressed mood should be significantly positively associated with higher levels of intrusion of the target memory during the SOC task, and that this relationship should be significantly stronger than the comparable relationship for participants in the non-suppress condition.

Method

Participants

A multi-stage process was used to identify dysphoric individuals in the present study and distinguish them from non-dysphoric participants. Multiple assessment criteria across several time points are recommended in this regard (Kendall, Hollon, Beck, Hammen, & Ingram, 1987; Wenzlaff & Bates, 1998) to ensure that dysphoric participants have

consistently experienced elevated levels of depressed mood, and are not simply those whose mood is transiently elevated at a particular one-off assessment. To this end, dysphoric participants were all recruited from the department participant panel on the basis that, first, they described themselves as "depressed" at the time of recruitment to the panel, second, that they had scored 16 or higher on the Beck Depression Inventory (BDI) – the "moderately-" to "severely depressed" range (Shaw, Vallis, & McCabe, 1985) - at some point during the previous 6 months (continuous records of BDI scores are kept for all members of the participant panel), and third, that they scored at least 10 on the BDI (the "depressed" range; Shaw et al., 1985) during a pre-experimental screening assessment 2-3 weeks before the experimental session[2]. Thirty two dysphoric participants were thus recruited and randomly allocated to either the suppress (n=16) or the non-suppress (n=15) group[3].

In contrast, the non-dysphoric participants described themselves as "non-depressed" on joining the participant panel, had not recorded a BDI score of 16 or higher during previous studies, and scored below 10 on the BDI during pre-experimental screening (in fact they all scored less than 6). Twenty one non-dysphoric participants were thus recruited and randomly allocated to either the suppress (n=11) or the control (n=10) group.

Finally, we also asked all participants questions A1 (depressed mood) and A2 (loss of interest) from the Major Depressive Episode (MDE) section of the Structured Clinical Interview for the DSM-IV (SCID; First, Spitzer, Gibbons & Williams, 1997), with respect to the present and to the lifetime period. The presence of one or both of these symptoms is necessary, though not sufficient, for a diagnosis of an MDE, and the failure to endorse either question indicates no current or previous MDEs. This screen therefore provides a proxy measure of current depression and depression history. In this study, none of the non-dysphoric group endorsed either question for the present or for the lifetime. In contrast, 27 of the 31

dysphoric participants provided a lifetime endorsement of one or both of these questions and 14/31 currently endorsed one of the two questions.

Materials

Questionnaire measures

The Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) was used to ascertain participants' levels of depressed mood over the week prior to the experimental session. In addition, a measure of mood state at various points during the session was administered. For this the 7-point self-ratings of 10 mood adjectives described by Wegner et al. (1993) were used. The scale comprises two sub-scales, one reflecting happy/sad mood (adjectives *happy, good, inspired* together with reversals *of sad, blue* and *gloomy*) and the other reflecting relaxed/tense mood (adjective *calm*, and reversals of *tense, frustrated* and *apprehensive*). The adjectives were presented in a fixed random order, which was counterbalanced to provide two parallel versions which were themselves counterbalanced in usage both within and between participants. Instructions requested participants to '*indicate how you are feeling right now with respect to that word*' by circling the appropriate number (1-7). The happy/sad subscale (higher scores equating to more happy mood) was the focus in the present study and was used to examine any differentials in state mood between groups at different points during the experimental session. The rationale was that if there were any differences in state mood the happy/sad subscale score could then be used as a covariate in the appropriate analyses.

Two additional measures were used to assess the distressing autobiographical event that all participants identified during the experiment, but that only half of the participants attempted to suppress. Firstly, a Subjective Units of Distress (SUD) scale was used to obtain a numerical value (between 0 and 100) of how distressing the event had been both at the time and now. Secondly, participants completed the Impact of Event Scale (IES; Horowitz, Wilner,

& Alvarez, 1979) relating to the last 14 days, to provide a measure of the extent of recent mental intrusion and avoidance of the event. Both the SUD scale and the IES provided a means to assess the comparability of the to-be-suppressed target memories (in terms of distress) across groups and experimental conditions. In addition, the IES provided a measure of the general mental intrusiveness of these memories for use as a covariate in the examination of the second hypothesis, that was concerned with memory intrusions.

Autobiographical memory test

Seven positive (excited, relieved, friendly, hopeful, amazed, devoted, carefree) and 7 negative (rejected, helpless, ashamed, guilty, hurt, worse, hopeless) cue words were selected from Brittlebank, Scott, Williams and Ferrier (1993) for use as cues in the autobiographical memory task. Cue words were presented on cards to participants in individual random orders. The positive and negative sets were balanced for emotionality using the ratings given in Brittlebank et al. (1993) (5.13 vs 5.27 respectively; t(10) = .41, ns) and for frequency using the Kucera and Francis norms (Kucera & Francis, 1967) (26.86 vs 25.43; t(10) = 0.17, ns)[4]. Two practice words were used, *exhausted* and *interested*.

Procedure

Participants first filled in the BDI and were then given a 1 ½ minute practice at SOC writing. Instructions were as described in Wegner et al. (1993) and indicated that participants should simply write down whatever was going through their mind from moment-to-moment. The first of the 3 mood measures was then completed, to ascertain initial mood state. Next, participants were asked to identify a '*specific event or experience which happened to you in the past*'. It was emphasised that this autobiographical event should have been distressing and should have occurred sometime during their youth. Participants were given as long as necessary to think of a suitable event and were then asked to write about it for 2 minutes (to

ensure that they engaged with the event), during which time the experimenter left the room. Reassurance about confidentiality was given, and participants were able to keep their event descriptions. Following this, the two questionnaires (SUD and IES, see above) assessing the extent of distress over the event were filled in.

The suppression manipulation was then carried out using written instructions. All participants were asked to return to the SOC writing which they had previously practised, this time to last for 9 minutes. The suppress group were also asked to try as hard as possible not to think about the personal distressing event that they had described earlier. Both groups were instructed to make a mark in a designated column at any time if they happened to think about their personal event (Wegner et al., 1993). At the end of the 9 minutes both groups completed a second mood measure.

For the autobiographical memory task, which followed next, participants were again given written instructions to the effect that single words would be presented and their task was to think of a specific, personal event which the word reminded them of (with the proviso that it was not their original autobiographical event). Participants were asked to generate orally a memory as fast as they could. Two practice items followed. The time from cue presentation to first relevant response (excluding ponderous comments, such as 'let's think now..') was measured. Finally participants filled in the last mood measure. All were paid for their participation and the entire session lasted approximately 1 hour.

<div align="center">Results</div>

Participant characteristics

Baseline participant characteristics are presented in Table 1. There were no differences across groups in terms of sex ratio, Fisher's Exact, P > .2. Other characteristics were examined using two (Dysphoria: dysphoric versus non-dysphoric) by two (Condition:

suppress versus non-suppress) ANOVAs. The four groups did not differ significantly in age, $Fs < 1.79$, $P > .18$ for the Dysphoria, Condition, and Dysphoria by Condition terms from the ANOVA, or their baseline mood at the first rating, all $Fs < 1$. There were also no significant differences between groups in terms of the SUD ratings, all $Fs < 1$, and IES scores, main effect $Fs < 1$, concerning the autobiographical events that they generated, though there was a trend towards a Dysphoria by Condition interaction for IES scores, $F (1, 48) = 3.70$, $P = .06$, that was due to numerically greater IES scores in the dysphoric suppress group compared to the dysphoric non-suppress group, with the reverse pattern across the non-dysphoric groups.

INSERT TABLE ONE ABOUT HERE

As expected, the dysphoric and non-dysphoric groups did differ on the BDI at the time of test, main effect of Dysphoria - $F (1,48) = 39.20$, $P < .001$, with both dysphoric groups having mean scores in the "depressed" range (Shaw et al., 1985) and both non-dysphoric groups having scores in the "non-depressed" range (Shaw et al., 1985). However, there were no Condition or Condition by Dysphoria effects for BDI, $Fs < 1$. It is important to note that by the time of testing, the BDI scores of 10 participants in the dysphoric group (5 in each of the suppress and no-suppress conditions) had dropped below the pre-experiment screening cut-off of 10. This issue is addressed in the Results section. All of the non-dysphoric participants still had BDIs of less than 6 at testing.

Finally, the dysphoric participants were less happy than the non-dysphoric participants at the second and third mood ratings (also in Table 1) following, respectively, the SOC, $F (1,48) = 4.12$, $P < .05$, and the memory task, $F (1,48) = 6.89$, $P < .02$, but in neither case was there an interaction with Condition, $Fs < 1$.

Autobiographical memory task

The mean latencies to generate autobiographical memories to the positive and negative cue words are shown in Figure 1.

INSERT FIGURE 1 ABOUT HERE

To investigate the main hypothesis that, for dysphoric participants, the suppress group would be faster, relative to the non-suppress group, to generate memories to negative cue words but would not differ from the non-suppress group on positive cue words (with no such effects expected for the non-dysphoric participants), a 2 (Condition: suppress vs. control) by 2 (Dysphoria: dysphoric vs. non-dysphoric) by 2 (Cue: positive, negative) mixed model ANOVA was carried out, with Cue as the repeated measures factor. There were main effects of Cue, $F(1,48) = 19.50$, $P < .001$, with memories being generated more quickly to positive words relative to negative, and of Dysphoria, $F(1,48) = 4.61$, $P < .05$, with the dysphoric participants being faster to generate memories compared to the non-dysphoric participants. However, these main effects were qualified by significant Group by Cue, $F(1,48) = 4.28$, $P < .05$, and, as hypothesized, Group by Cue by Condition, $F(1,48) = 5.38$, $P < .03$, interactions.

To deconstruct this expected three-way interaction, Condition by Cue ANOVAs were performed for the dysphoric and non-dysphoric participants separately. For the non-dysphoric participants, as predicted, there was no significant interaction of Condition by Cue on the memory task, $F < 1$. Indeed, as can be seen in Figure 1, the suppress group were numerically <u>slower</u> to access negative autobiographical memories compared to the non-suppress group.

For the dysphoric participants, however, there was the hypothesized significant Condition by Cue interaction, $F(1,29) = 10.64$, $P < .01$[5]. Follow-up independent samples t-tests examined the specific aspects of the hypothesis. The suppress group was faster to generate memories to negative cues relative to controls, $t(29) = 2.88$, $P < .02$, Cohen's D = 1.07[6], but the groups did not differ significantly in their speed of recall to positive cues, $t(29) = .18$, ns, Cohen's D = 0.07.

As already noted, at the time of testing the BDI scores for a number of the dysphoric participants were no longer in the "depressed" range (BDI >10; Shaw et al., 1985), despite

being in this range at screening 2-3 weeks prior to the testing session. It seems therefore that the present dysphoric sample contained some participants who were not currently experiencing significant levels of depressed mood, though they had been in the immediate past. Although the theoretical rationale for this first hypothesis focused on the interconnectedness of negative material in dysphoria, which is arguably somewhat independent of current mood state (Dozois & Dobson, 2001), and also, if anything, the presence of currently non-depressed participants in the dysphoric group should have served to dilute any significant effects rather than spuriously produce them, it nevertheless seemed important to statistically examine any impact that the presence of such non-depressed participants in the current dysphoric sample may have had on the pattern of results.

To this end we repeated the latter Cue by Condition ANOVA for the dysphoric group, this time with the relevant participants removed. There remained a significant interaction of Condition by Cue on the memory task, $F (1,19) = 9.60$, $P < .01$. Furthermore, the critical paired comparison across conditions on latency to retrieve negative memories again revealed that the suppress group was faster than the non-suppress group, $t (19) = 2.88$, $p < .02$, now with a larger effect size than for the analysis involving the whole dysphoric sample, Cohen's $D = 1.32$.

The SOC task

To examine the second hypothesis that current levels of depressed mood would be significantly associated with the number of intrusions in the SOC period for suppress participants, relative to the strength of this relationship in non-suppress participants, we performed a regression analysis. IES scores were entered on the first step (to control for any baseline variations in the levels of intrusiveness of the target memory), BDI scores and a dummy variable coding Condition (suppress vs. non-suppress) were entered on the second step, and the Condition by BDI interaction term was entered on the third and final step. The

dependent variable was the number of reported intrusions of the target memory during the

SOC (see Table 1 for means across groups and conditions).

The results revealed that the final model was significant, $F_{(4,47)} = 4.64$, $P < .003$,

accounting for 28% of the variance in numbers of memory intrusions. Both the second and

third steps produced significant changes in R^2, Step 2: R^2 change = .15, $F_{(2,48)} = 4.24$, $P <$

.03; Step 3: R^2 change = .13, $F_{(3,47)} = 8.35$, $P < .01$. The significant additional variance

accounted for by the Condition by BDI interaction term on the third step was, as

hypothesized, due to a more significant association between BDI and memory intrusions,

across participants, in the suppress condition compared with the non-suppress condition: zero-

order correlations - suppress condition, $r_{(26)} = .61$, $P < .001$; non-suppress condition, $r_{(24)} =$

$-.01$, $P = .71$.

Discussion

This study examined two hypotheses concerning the concurrent and downstream

effects of negative memory suppression, and derived theoretically from Wenzlaff's work on

dysphoria (Wenzlaff & Bates, 1998; Wenzlaff, Meier, & Salas, 2002W Wenzlaff, Rude,

Taylor, Stultz, & Sweatt, 2001; Wenzlaff, Wegner, & Klein, 1991; Wenzlaff et al., 1988) and

Wegner's work on suppression (Wegner, 1994; Wegner et al., 1993). To our knowledge this is

the first study to examine the effects of attempted memory suppression (as opposed to thought

suppression) in dysphoric or depressed individuals and the first to examine the downstream

effects of any form of suppression on later autobiographical memory (though see Richards &

Gross, 1999; Rude, Wenzlaff, Gibbs, Vane & Whitney, 2002; and Wenzlaff & Luxton, 2003,

for related longitudinal effects of suppression).

There was clear support for the main hypothesis that for dysphoric participants

(though not for non-dysphoric participants) attempted suppression of a single childhood

negative memory would be associated with relatively facilitated subsequent access to other negative, but not positive, autobiographical memories on a cued-memory task, compared with a non-suppress control condition. This facilitation effect for negative memories in the dysphoric sample had a very large effect size (Cohen's D = 1.07), with the suppress group being around 30% faster to access negative memories relative to the non-suppress participants. There were no such effects across conditions in non-dysphoric participants.

There was also clear support for the second hypothesis that the association between SOC memory intrusions and current levels of depressed mood would be significantly stronger in participants asked to try to suppress their target memories (r = 0.61), than in participants not asked to try to suppress their memories (r = -.01). This is consistent with the idea that the more severe the level of current depressed mood, the more counterproductive attempts at memory suppression are likely to be.

Taken together, these data suggest that dysphoric individuals are potentially disadvantaged by two counterproductive effects of attempting to repair their mood by suppressing negative memories. Firstly, attempted suppression of any one negative memory is likely to lead to facilitated access to other negative autobiographical material, compared with if there was no attempted suppression. Secondly, when under some cognitive load, the more currently depressed they are feeling, the more intrusions they are likely to experience of any negative memories they are trying to suppress, compared with not trying to suppress them.

The two hypotheses in the present study were derived from distinct (though nevertheless related) theoretical traditions concerning, on the one hand, the modal method of suppression being distraction allied to the inter-connectedness of negative information in dysphoria (first hypothesis) and, on the other hand, attempts at mental suppression being undermined by cognitive load imposed at least in part by current levels of depressed mood (second hypothesis). However, despite their distinct theoretical geneses, it is interesting and

useful to speculate about how these different processes might interact in the present study. One possibility is that the relatively greater numbers of concurrent intrusions of the target memory in the dysphoric suppress participants (as a function of their relatively elevated levels of current depressed mood), may have led the activated representation of the target memory to prime other linked memories in the autobiographical database, thus making those memories more accessible on the subsequent recall task.

There are two methodological issues concerning the present study that merit some discussion. First, the study involved a dysphoric sample selected on the basis of consistent scores on a self-report measure of depression allied with a self-description of being depressed. This contrasted with a non-dysphoric sample who did not describe themselves as depressed and had shown no signs of elevated depressed mood across multiple assessments. There was, however, only a limited assessment of current and past Major Depressive Disorder (American Psychiatric Association, 1994), consisting of selected questions from the SCID (First et al., 1995). There was therefore no formal diagnostic assessment of Major Depressive Disorder (MDD) in the dysphoric group (though this diagnosis could be ruled out for the non-dysphoric sample who did not endorse either of the SCID questions, one or both of which needs to be endorsed for the diagnosis).

The reason for selecting the samples based on the present parameters was to be conceptually consistent with the existing literature in this area (e.g. Wenzlaff & Bates, 1998; Wenzlaff et al., 2002; Wenzlaff et al., 2001; Wenzlaff et al., 1991; Wenzlaff et al., 1988). Nevertheless, the upshot is that appropriate caution must be exercised when seeking to extrapolate from the present data to the performance of patients with a confirmed diagnosis of MDD. However, it is striking that, even in the absence of clearly established diagnostic levels of major depression, there are such marked effects in the present data for the dysphoric participants, allied to clearly significant differences in comparison with the performance of

the non-dysphoric group. This pattern would strongly suggest that a clinically depressed group would also show such effects, though this of course remains an empirical question.

The second methodological issue is that there was no control in the study over how the participants in the suppress condition attempted to suppress their emotional memories. The reason for this is because we wanted to encourage participants to use the methods of suppression that they employed naturalistically, rather than direct them towards a particular strategy which may have been novel to a significant number of them. Arguably, participants will then choose the strategy that they feel is likely to be most meritorious and that represents what they would normally try to do. Given this, the presence of such clear downstream negative consequences of suppression is notable. However, it remains possible that the dysphoric participants may have been using a different suppression strategy than the non-dysphoric controls.

A final issue is that we did not manipulate load directly in the present study, instead relying on a combination of the SOC task and current depressed mood to provide a mental load. As the exact load-inducing properties of these variables are somewhat unclear, an interesting and important follow-on study would be to look at the effects of load directly on the intrusiveness of to-be-suppressed material in dysphoric and depressed individuals.

As this was a preliminary study, it is important to consider putative future research directions. There is a clear case for repeating the study with a group of participants with a confirmed diagnosis of MDD (and indeed other clinical groups). It would also be interesting to directly manipulate the type of distracting material available to participants by asking them to pre-select positive autobiographical material to focus on during the suppression task (Wenzlaff et al., 1988). According, to Wenzlaff et al.'s analysis, the use of positive distracters should eliminate the present effects in the dysphoric group. It would also seem important to investigate whether similar effects would be found in a group of participants at-risk for

depression but not currently experiencing significant levels of depressed mood, perhaps by using an explicit manipulation of cognitive load (Wegner et al., 1993). Finally, it would be interesting to examine whether suppression of a particular memory led to a relative increase in subsequent (as opposed to concurrent) intrusions of that memory.

In summary, to our knowledge the present study is the first to indicate that there might be a downstream memory 'cost' associated with mental suppression, in this case in a dysphoric sample. Furthermore, there is the suggestion of an additional concurrent cost to mental suppression in individuals with higher levels of depressed mood, in the form of a relatively increased likelihood of intrusions of the to-be-suppressed material, when under some cognitive load. Together, these findings indicate that mental suppression in dysphoria may be a counterproductive mood repair strategy, at least under certain conditions.

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Author note

Table 1

Baseline mean (SD) participant and target memory characteristics, and mood scores throughout the experimental session, for the dysphoric and non-dysphoric participants, across the suppress and non-suppress conditions.

|	Dysphoric group		Non-dysphoric group	
	Suppress (N = 16)	Non-suppress (N=15)	Suppress (N = 11)	Non-Suppress (N = 10)
Age	41.81 (13.61)	48.67 (11.76)	42.64 (9.81)	40.20 (13.26)
Sex ratio (M:F)	3:13	6:9	2:9	4:6
BDI	12.75 (8.28)	11.33 (5.77)	2.64 (1.63)	1.40 (1.35)
Mood rating 1	4.89 (1.11)	5.19 (0.96)	5.29 (0.83)	5.18 (0.96)
Mood rating 2	4.68 (1.26)	4.62 (0.79)	5.35 (0.77)	5.12 (1.11)
Mood rating 3	4.60 1.38)	4.62 (1.12)	5.32 (0.75)	5.52 (0.71)
SUD	84.75 (21.88)	82.87 (15.48)	85.82 (10.07)	79.30 (15.03)
Intrusions	5.75 (6.69)	3.00 (2.39)	2.36 (1.63)	4.20 (4.57)
IES	14.63 (18.29)	8.67 (9.42)	3.64 (7.53)	12.30 (14.28)

Note

SUD = Subjective Units of Distress score. BDI = Beck Depression Inventory. Intrusions = number of reported intrusions of the target memory during the stream-of-consciousness task. IES = Impact of Event Scale total score. Mood rating = happy mood score

Figure 1

Mean latency in seconds (error bars are $\pm$ 1 SE) to retrieve autobiographical memories to

positive and negative cue words on the recall task in the dysphoric and non-dysphoric

groups, across the suppress and no-suppress conditions

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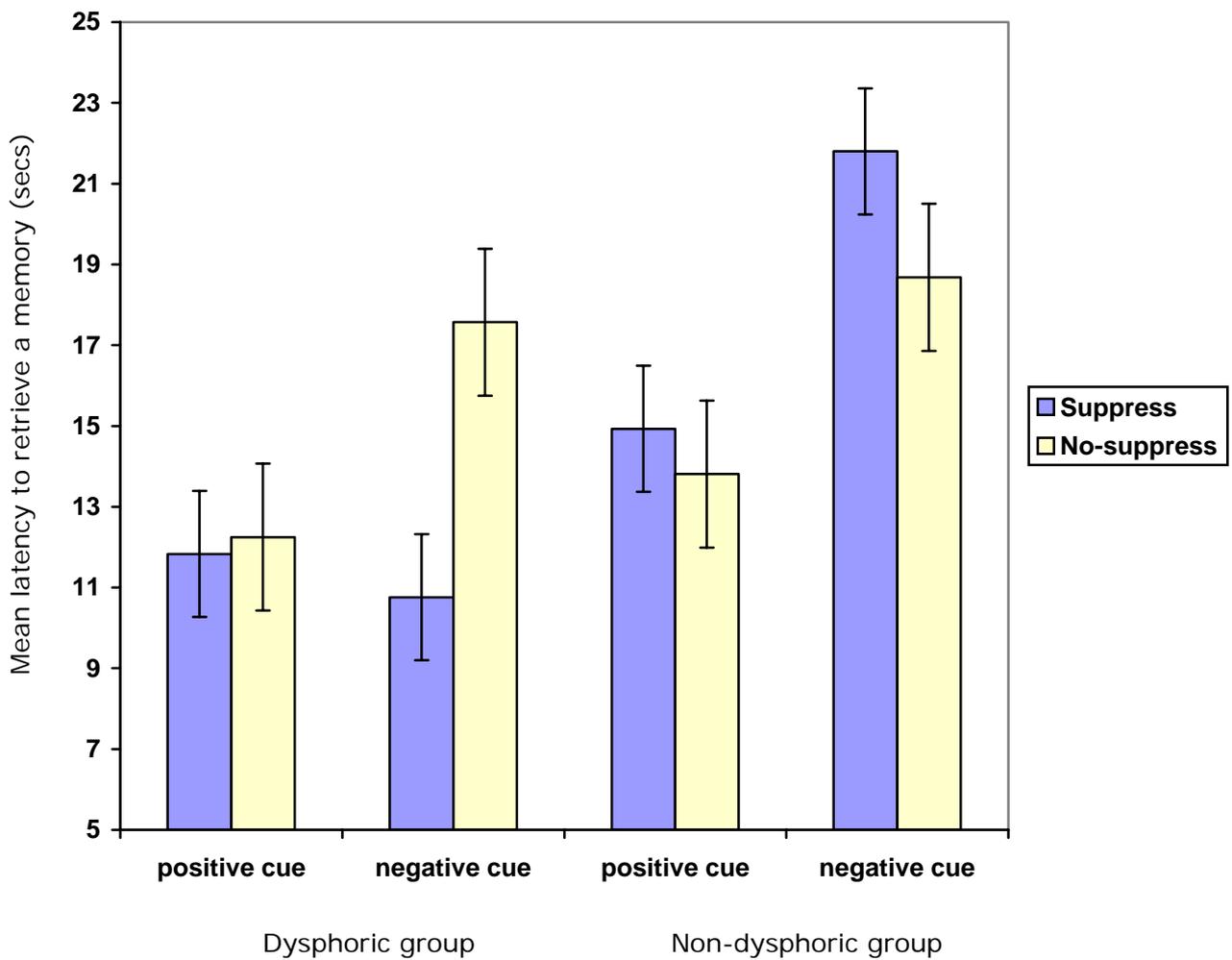
Footnotes

1 - We could find no data relating to the question of how much of a cognitive load an SOC task might impose. We therefore conducted a small supplementary study with 6 unselected participants each of whom we asked to carry out: the SOC task while monitoring for thoughts about their home; a standard cognitive load task - counting backwards in 3s; and a baseline task - silently going with their thoughts in an unstructured way. Each task was 4 minutes long. Participants performed the baseline task first and the subsequent order of the other two tasks was counterbalanced. The dependent variable was a subjective rating of difficulty for each task on a 0-100 scale, with 0 = 'not at all difficult' and 100 = 'extremely difficult'. One-way repeated-measures ANOVA revealed a significant effect of Task, $F(2, 10) = 5.98$, $P < .03$, with both the SOC task and counting backwards being rated as more difficult than the baseline task, $ts(5) > 2.7$, $Ps < .05$, though not significantly different from each other, $t < 1$, $P > .80$. However, the SOC task was rated, on average, as numerically more difficult than counting backwards: means of 47.50 and 44.17 respectively. These data provide some support for our claim that the SOC task imposes a non-trivial mental load.

2 - This approach is similar to that used by Wenzlaff and colleagues in their studies (e.g. Wenzlaff & Bates 1998), where the short form of the BDI was used and "depressed" participants (Wenzlaf and colleagues preferred this term to the label dysphoric) scored above 7 on this measure at the time of testing and also several weeks earlier.

3 – One of the non-suppress dysphoric group did not complete the study.

4 - A broad assumption of the AMT is that retrieved memories will be emotionally congruent with the cue words; i.e., negative memories will be generated to negative cues. This is an

important issue with respect to the present study, which focuses on negative memories. To verify this we examined 50% of the memories from each experimental condition for each group (35-56 memories per condition-group combination), with two raters categorising them as negative, neutral, or positive. All ratings were unanimous after discussion and percentages of negative memories ranged from 91%-100% across all conditions, indicating that negative cues almost invariably bring to mind negative memories on the AMT.

5 - To check that this interaction effect was not merely a function of any differential mood levels following the SOC task the analysis was repeated with the post-SOC mood measure (mood rating 2) covaried out. The interaction remained significant, $F(1,28) = 8.30$, $P < .01$. This was also the case when initial BDI levels were covaried out, $F(1,28) = 12.87$, $P < .001$, indicating that the effect was not simply carried by baseline depression levels.

6 - To check that this simple main effect was not merely a function of any differential mood levels following the SOC task the analysis was repeated with the post-SOC mood measure (mood rating 2) covaried out. The effect remained significant, $F(1,28) = 8.30$, $P < .01$. This was also the case when initial BDI levels were covaried out, $F(1,28) = 8.26$, $P < .01$, indicating that the effect was not simply carried by baseline depression levels.