

Recalling positive self-defining memories in depression: The impact of processing mode

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Recalling positive memories is a powerful and effective way to improve mood. However, unlike never-depressed individuals, those with current or past depression do not benefit emotionally from positive memory recall. To examine whether rumination is involved in this difficulty, 80 participants (26 currently depressed, 29 recovered depressed, and 25 never depressed) were instructed to recall a positive self-defining memory while in a sad mood. They were then instructed to think about their memory, adopting either an abstract or concrete processing mode. Never-depressed and recovered depressed participants experienced improved mood after memory recall, regardless of processing mode. However, for depressed individuals neither an abstract nor a concrete processing mode produced emotional benefit. These findings suggest that a complex relationship exists among processing mode, memory type, and depressive status, and indicate that the way in which individuals process positive emotional material may have important consequences for treatment.

Keywords: Depression; Autobiographical memory; Processing mode; Rumination.

There is evidence that depressed and formerly depressed individuals are impaired in their ability to regulate emotion and recover from experiences of sad mood compared to healthy individuals (e.g., Campbell-Sills, Barlow, Brown, & Hofmann, 2006). According to a dominant cognitive model of depression, Teasdale's Differential Activation Hypothesis (DAH; Teasdale, 1988), the ability to recover adaptively from sad mood is critical in determining whether sad mood will remain benign and transient, or whether it will escalate into a depressive episode. Therefore, intervening at the temporal point of mild dysphoria is critical if clinical interventions are to reduce the likelihood that sad mood will develop into a depressive episode.

There is now empirical evidence suggesting that difficulty in regulating emotion has implications for the course of depressive illness. For

example, the use of maladaptive responses to sad mood has been found to not only distinguish depressed and recovered depressed individuals from their never-depressed counterparts, but also predicts the recurrence of depressive episodes over a 1-year follow-up period (Kovacs, Rottenberg, & George, 2009). This prospective evidence indicates that a maladaptive response to sad mood in depressed and recovered depressed individuals is likely to be an independent risk factor for recurrence. Therefore, if depression is to be more effectively treated and even prevented in some cases, research into specific ways of responding to sad mood that facilitate recovery is needed. The current study addressed this need by investigating the affective consequences that follow the recall of positive self-defining autobiographical memories.

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Experimental studies have established that positive memory recall is an effective way that healthy individuals can improve sad mood (e.g., Joormann & Siemer, 2004; Josephson, Singer, & Salovey, 1996). However, unlike healthy individuals, depressed and formerly depressed individuals do not experience emotional benefit from recalling positive events from the past. Specifically, in a study by Joormann, Siemer, and Gotlib (2007) formerly depressed individuals reported no change in sad mood following memory recall, while currently depressed individuals actually experienced worsened mood. As a possible mechanism, the authors speculated that positive memory recall might induce unhelpful thinking processes associated with depression such as rumination.

There is good theoretical reason to expect that this is the case, with influential models of ruminative thought suggesting that discrepancies between ideal and actual states underlie rumination (Martin & Tesser, 1996). To elaborate, ruminative processing may be prompted by difficulties in goal achievement—a claim that has been substantiated by findings of increased rumination when individuals do not attain their goals (Moberly & Watkins, 2010). From this perspective the processing of a positive memory may draw attention to a discrepancy between current low mood and past, happier experiences. If it is assumed that, in general, individuals aim to experience positive mood, the recall of a positive memory during low mood would draw attention to the failure in achieving this goal and prompt a ruminative response. In this way a ruminative style of thinking may undermine the potential emotional benefits of positive memory recall, and account for why depressed and recovered depressed individuals do not experience improved mood following such recall.

Watkins and colleagues have developed a framework which suggests that not all rumination has adverse consequences. Rather, it is the mode of processing during rumination that is adopted which determines whether it is helpful or not (for review, see Watkins, 2008). Specifically, a distinction is made between a ruminative abstract processing mode, which involves thinking at a general, abstract level, as compared to a concrete processing mode, which is more detailed and specific. There is accumulating evidence that in the context of depression, a concrete processing mode produces adaptive outcomes while an abstract processing mode results in negative outcomes, such as

impaired social problem-solving ability (Watkins & Moulds, 2005). However, this literature that has examined the consequences of engaging in different types of rumination has primarily involved negative material. That is, existing studies have typically induced rumination and examined its effect on negative outcomes such as the experience of failure and the activation of negative schemas (e.g., Watkins, Moberly, & Moulds, 2008). Evidence from these studies suggests that adopting an abstract mode when processing negative material leads to adverse consequences.

We recently extended this work to examine whether the same pattern would hold for positive material in the autobiographical memory domain. Specifically, we investigated the emotional consequences of inducing either an abstract or concrete mode of processing following positive memory recall in depressed and formerly depressed individuals (Werner-Seidler & Moulds, 2012). In line with previous studies we expected that an abstract ruminative of processing might be responsible for preventing mood benefits, but predicted that a concrete mode of processing might be beneficial, particularly because work from the imagery literature has established that thinking about positive events in a rich and detailed way has a greater emotional impact than the processing of the same material verbally (e.g., Holmes, Lang, & Shah, 2009). Consistent with predictions, abstract processing following positive memory recall was found to be maladaptive in that it did not facilitate recovery from low mood in either clinical group, while concrete processing led both depressed and recovered depressed individuals to experience improved mood. These results suggest that the concrete processing of positive memories has the capacity to enable depressed and previously depressed individuals to capitalise on the affective benefits associated with their memory. Accordingly, there may be clinical value in developing strategies designed to assist individuals who experience depressive disorders to recall their memories in a concrete way.

To address this possibility empirically, the goal of this study was investigate the utility of an experimenter-delivered processing mode manipulation in order to amplify the emotional benefits associated with the concrete processing of a positive memory. The current study improved on the methodology of previous studies in three important ways. First, an experimenter-delivered processing mode manipulation was used instead

of a self-administered manipulation, making the procedure more akin to what would occur in a clinical context. It was expected that this method of delivery might augment the benefits of positive memory recall, and if so would suggest that this procedure might be a useful adjunct to existing therapies for depression. Second, in order to enhance the emotional impact of positive memories, the memory task involved the recall of a self-defining memory. By their very nature, self-defining memories are characterised by high levels of emotional intensity (Blagov & Singer, 2004). Therefore, to harness this emotionality for the purpose of mood improvement, a self-defining memory was used as a way to amplify the emotional benefit associated with positive memory recall. Finally, to examine how the processing mode manipulation would impact a healthy sample, a never-depressed control group was included in addition to the recovered and depressed clinical groups which have been investigated previously (Werner-Seidler & Moulds, 2012).

Our objective was to examine the effectiveness of an experimenter-delivered processing mode manipulation to improve sad mood following the recall of a positive self-defining memory. Informed by existing work illustrating that healthy individuals derive affective benefits from positive memory recall (e.g., Joormann & Siemer, 2004), we hypothesised that irrespective of processing mode condition, never-depressed participants would report improved mood following positive memory recall. Based on our previous findings (Werner-Seidler & Moulds, 2012), we predicted that both depressed and recovered depressed participants allocated to the concrete processing condition would report improved mood following positive memory recall. Conversely, we expected that these two clinical groups would not benefit (i.e., would not report any mood improvement) in the abstract processing condition because of the tendency for comparative-based thinking.

METHOD

Design

A 2 (Condition: abstract, concrete) \times 3 (Diagnostic Status: never-depressed, recovered depressed, currently depressed) \times 2 (Time: pre, post) design was employed, with repeated measures on the third factor.

Participants

Participants were recruited from the community through online advertisements and in the volunteer sections of local newspapers. Potential participants were briefly screened over the telephone and, if they were over 18 and spoke fluent English, they were invited into the laboratory. To determine depression status and history, participants were administered the Mood Module of the Structured Clinical Interview for DSM-IV disorders (SCID-IV; First, Spitzer, Gibbons, & Williams, 1996). A total of 82 participants took part and were reimbursed (\$AUD20/hour) for their time.

Measures

Beck Depression Inventory – Second Edition (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report measure of the presence and severity of depressive symptoms over the previous 2 weeks with strong psychometric properties (Beck et al., 1996).

Leiden Index of Depression Sensitivity Revised (LEIDS-R; Van der Does, 2002). The LEIDS-R is a 34-item self-report measure that indexes cognitive reactivity and has good psychometric qualities (Van der Does, 2002).

Ruminative Response Scale (RRS) of the Response Styles Questionnaire (Nolen-Hoeksema & Morrow, 1991). The RRS is a 22-item self-report measure which indexes the tendency to ruminate in response to sad mood with strong psychometric properties (Nolen-Hoeksema & Morrow, 1991).

Mood Rating Scale. Participants completed a mood rating scale on three occasions: prior to the mood induction (i.e., baseline), following the mood induction (i.e., post-induction), and following the processing mode task (i.e., post-memory task). Participants rated on a 9-point Likert scale how “sad” they were feeling, with additional adjectives interspersed throughout in order to mask the study’s focus on mood. Sad mood ratings provided the primary affect measure of interest (happy mood ratings were examined as an additional mood check).

Self-Defining Memory Task. The self-defining memory task was adapted from the procedure

designed by Blagov and Singer (2004). Participants were told that a self-defining memory was a memory of an event that was important to them and had some relation to who they were as a person. They were instructed to recall a specific, positive self-defining memory, which needed to be a memory for a positive event that made them happy. Participants were asked to describe their positive self-defining memory to the experimenter from their own perspective on the basis that a first person perspective enhances emotionality (Holmes, Coughtrey, & Connor, 2008). After reporting their memories, participants rated these memories on a 9-point scale on dimensions of positivity, vividness, and the extent to which they viewed the memory through their own eyes (where 1 = *not at all* and 9 = *very*). All responses were audiotaped and coded.¹

Mood Induction. Sad mood was induced in never-depressed and recovered depressed participants using a 10-minute video clip. Replicating previous research (e.g., Joormann et al., 2007), a clip from "Dead Poets Society" depicting a suicide was shown. Participants were instructed to imagine how they might feel if they were in the situation presented in the film. For ethical reasons, and replicating the methodology of previous studies (e.g., Joormann et al., 2007; Werner-Seidler & Moulds, 2012), participants who were currently depressed were not administered the sad mood induction on the basis that they were already in a naturally occurring state of low mood. Therefore a do-it-yourself home maintenance instruction video was used instead and pilot data indicated it did not cause a change in mood. Importantly, these inductions led to comparable mood ratings following the induction for each of the three groups.

SCID-IV – Mood Module (First et al., 1996). The SCID-IV is a semi-structured interview that is widely used in clinical research to diagnose DSM-IV Axis 1 disorders. The mood module was administered to assess for the presence of current and previous Major Depressive Episodes (MDEs).² For inclusion in the depressed group, participants needed to indicate symptoms that

were consistent with a current depressive episode ($n = 26$). Two participants were excluded from this group on the basis that they had experienced significant symptoms in the previous month, but did not reach criteria for a current MDE. For inclusion in the recovered depressed group, participants needed to report symptoms that were consistent with at least one previous MDE but must not have been experienced in the previous month ($n = 29$). Participants were allocated to the never-depressed group if they denied symptoms that were consistent with a diagnosis of current or past MDE ($n = 25$). There were 80 participants in the final sample.

Processing induction. The mode of processing induction was adapted for the current study from the procedure we used previously (Werner-Seidler & Moulds, 2012). However, it differed in that it was experimenter-guided rather than self-guided. Participants were encouraged to close their eyes during the procedure and it was framed as a memory exercise. Prompts for the abstract and concrete conditions were matched as closely as possible in terms of length and use of emotive language. However, participants were asked to focus on their memory either in a general, abstract way and to think about the causes, meaning, and consequences of the event they recalled, or in a concrete, detailed way and to view the event as though they were watching a movie of what happened. This procedure lasted for 4 minutes. To ensure that participants had engaged in the intended processing mode, three manipulation check items were administered following the completion of the task. Participants were asked to report on a 9-point Likert scale the degree to which they were thinking in either an abstract or concrete way, where 1 = *concrete* and 9 = *abstract*. For details, see the Appendix.

Procedure

Participants were informed that the study was designed to examine the relationship between imagination and memory, and how they relate to thinking styles. After providing informed consent, participants were administered the SCID-IV and completed the questionnaire package that included demographic information, baseline mood ratings, LEIDS-R, RRS, and BDI-II. Next, participants were administered the mood induction, and completed the second mood rating. Participants

¹Memories were classified as either achievement-related or of interpersonal events. Of the memories reported, 60% were of an achievement-based event and 40% were themed around an interpersonal event.

²For inter-rater reliability purposes, 10% of these interviews were audio-recorded and re-rated by an independent clinical psychologist blind to group membership. There was perfect agreement between the two assessors.

TABLE 1
Participant characteristics and self-report measures

	Currently depressed n = 26	Recovered depressed n = 29	Never-depressed n = 25
Gender (% female)	50.0	72.0	64.0
Age	28.46 (10.73)	28.44 (10.68)	28.00 (12.95)
Marital Status (% single)	76.9	72.4	76.0
Educational History (% completed school)	92.0	90.0	96.0
Employment Status (% unemployed)	65.0	48.0	68.0
Ethnicity (% of sample)			
Caucasian	60.0	54.0	72.0
Asian	23.0	11.0	12.0
Other	17.0	35.0	16.0
LEIDS-R	105.88 (10.73)	93.79 (14.65)	72.28 (15.23)
RRS	63.85 (10.33)	55.97 (13.02)	40.44 (11.79)
BDI-II	28.50 (10.11)	12.24 (7.50)	3.48 (3.66)
Number of previous episodes	4.73 (3.08)	2.76 (1.92)	-
Current Antidepressant Treatment (%)	58.0	24.0	-
Current Psychological Treatment (%)	50.0	17.0	-

Values refer to mean (and standard deviation) scores unless stated as a percentage. LEIDS-R = Leiden Index of Depression Sensitivity - Revised; RRS = Rumination Response Scale; BDI-II = Beck Depression Inventory-II.

were then asked to recall and describe one positive self-defining memory and rate their memory in terms of valence, vividness, and vantage perspective. Participants were then randomly allocated to either the abstract or concrete condition and instructed to close their eyes and attend to particular aspects of their memory, as guided by the experimenter. They were instructed not to say anything during the memory exercise, but to remain focused on their memory and to think about the answers to the questions that they were asked. Participants then completed the final mood rating scale and manipulation checks, were thanked for their time and fully debriefed.

RESULTS

Participant characteristics

Demographic information and sample characteristics are presented in Table 1. A series of one-way analyses of variance (ANOVAs) indicated that groups were comparable in age, but that the depressed, recovered depressed, and never-depressed groups differed in cognitive reactivity, $F(1, 77) = 35.92, p < .05$, trait rumination, $F(1, 77) = 25.82, p < .05$, depressive symptoms, $F(1, 77) = 71.55, p < .05$, and depression chronicity, $F(1, 53) = 8.30, p < .05$. Post-hoc Tukey pairwise comparisons indicated that depressed individuals had higher levels of cognitive reactivity, rumination and depressive symptoms than either

the recovered depressed or never-depressed groups ($ps < .05$), and that the recovered group were higher on these dimensions than the never-depressed group ($ps < .05$). Further, the currently depressed group was more chronic than the recovered depressed group in terms of their depressive history, reporting a greater number of past episodes, $F(1, 54) = 8.30, p < .05$.

Baseline mood

The mood variable of interest was sad mood, with an ANOVA indicating group differences for sad mood ratings, $F(1, 77) = 39.93, p < .05$. Post-hoc comparisons revealed that the depressed group reported higher levels of sadness than both the recovered depressed group ($ps < .05$) and the never-depressed group ($ps < .05$), and that these two groups did not differ ($ps > .05$).³ This indicates that depressed participants reported greater levels of sadness at the start of the experiment compared to participants who were in remission or had never been depressed before.

³Happy mood ratings were examined as an additional mood variable of interest, and results indicated the inverse pattern to that of sad mood ratings: lower levels of happy mood ratings for the depressed group, compared to the remitted and never-depressed groups (which did not differ).

TABLE 2
Mood ratings and memory characteristics

	Currently depressed (n = 26)		Recovered depressed (n = 29)		Never-depressed (n = 25)	
	Abstract (n = 14)	Concrete (n = 12)	Abstract (n = 13)	Concrete (n = 16)	Abstract (n = 13)	Concrete (n = 12)
Sad Mood						
Baseline	5.29 (2.05)	6.00 (1.28)	3.08 (1.66)	2.50 (1.63)	1.92 (1.19)	1.92 (1.31)
Post-Induction	4.64 (2.24)	5.58 (1.44)	4.62 (2.26)	5.25 (2.41)	4.77 (2.62)	4.83 (2.21)
Post-Memory Task	5.14 (2.11)	4.92 (2.11)	2.46 (1.56)	2.13 (1.09)	2.15 (1.52)	2.25 (1.14)
Happy Mood						
Baseline	3.36 (1.91)	3.47 (1.70)	5.77 (1.83)	5.44 (2.00)	6.77 (1.59)	6.83 (1.27)
Post-Induction	3.74 (1.77)	4.25 (2.14)	3.54 (1.85)	3.43 (2.00)	4.23 (1.59)	4.17 (1.99)
Post-Memory Task	4.36 (2.24)	4.83 (1.85)	6.00 (1.83)	6.44 (1.96)	6.38 (1.50)	7.00 (1.35)

Values refer to mean (and standard deviation) scores. Baseline = Mood at baseline; Post-Induction = Mood after the induction film clip; Post-Memory Task = Mood after the memory processing task.

TABLE 3
Memory qualities

	Currently depressed (n = 26)		Recovered depressed (n = 29)		Never-depressed (n = 25)	
	Abstract (n = 14)	Concrete (n = 12)	Abstract (n = 13)	Concrete (n = 16)	Abstract (n = 13)	Concrete (n = 12)
Memory Quality						
Valence	8.57 (0.65)	8.08 (1.16)	8.08 (0.76)	8.69 (0.48)	8.76 (0.44)	8.08 (1.16)
Vividness	8.00 (0.88)	6.50 (2.65)	6.84 (2.23)	7.19 (1.97)	7.69 (1.03)	8.42 (0.67)
Vantage Perspective	6.21 (2.49)	6.25 (3.25)	7.85 (1.68)	6.69 (3.20)	7.46 (1.61)	8.42 (1.00)

Values refer to mean (and standard deviation) scores.

Mood induction

To determine whether the mood induction had the intended effect, a 3 (Diagnostic Status: currently depressed, recovered depressed, never-depressed) \times 2 (Condition: abstract, concrete) \times 2 (Time: baseline, post-induction) mixed-model ANOVA with repeated measures on the third factor was conducted with sad mood ratings as the dependent variable. There was a main effect of time, $F(1, 74) = 32.04$, $p < .05$, diagnostic group, $F(1, 74) = 12.06$, $p < .05$, and a time \times group interaction, $F(1, 74) = 14.95$, $p < .05$. There were no other significant effects ($ps > .05$). To deconstruct the time \times group interaction, paired samples t -tests were conducted and indicated an increase in sad mood following the induction for both the recovered depressed, $t(28) = -4.25$, $p < .05$, and never-depressed groups, $t(24) = -6.13$, $p < .05$. In response to the neutral mood induction, depressed individuals did not show a change in mood, $t(25) = 1.64$, $p > .05$. This indicates that, following the mood induction, recovered and never-depressed groups reported worsened mood, while the neutral mood induction did not

change mood in the depressed group. As intended, after the induction there were no differences between the three groups, $F(1, 77) = .10$, $p > .05$.⁴ These results indicate that the mood induction had the desired effect of inducing sad mood in the recovered and never-depressed groups, and these two groups were comparable in mood to those reported by depressed participants following the neutral mood induction (see Table 2).

Memory characteristics

To examine the characteristics of participants' memories, the groups were compared in terms of memory valence, vividness, and vantage perspective (see Table 3). The average rated positivity of self-defining memories was high, and there were no differences between groups or conditions

⁴ Again we repeated the analysis examining happy mood ratings as the dependant variable, and obtained the exact same pattern of means: a decrease in happiness for both recovered-depressed and never-depressed groups, but no change in happiness for the depressed group.

($ps > .05$), although there was a group \times condition interaction, $F(2, 74) = 5.16$, $p < .05$. Post-hoc comparisons indicated that, in the concrete condition, the groups did not differ based on the degree to which their positive memories were rated as positive ($ps > .05$). However, in the abstract condition recovered depressed participants recalled memories that were rated as less positive than never-depressed participants, $p < .05$. Accordingly, in the crucial processing-mode analysis, memory positivity was entered as a covariate.

Self-defining positive memories were rated as highly vivid, and there were no differences in vividness according to diagnostic group, condition, nor was there an interaction (all $ps > .05$).

For vantage perspective there was a main effect of group, $F(2, 74) = 3.28$, $p < .05$, but no other effects ($ps > .05$). Post-hoc comparisons indicated that depressed individuals reported memories that were less from a field perspective than those who had never experienced depression before ($p < .05$), with the recovered group not differing from either the depressed or never-depressed groups ($ps > .05$). Therefore, despite explicit instruction to recall positive memories from a field perspective, depressed individuals recalled memories less from a field perspective than those recalled by never-depressed participants. Due to this difference, vantage perspective was entered as a covariate in the critical processing mode analysis. It is important to note that, despite the difference in vantage perspective, the mean vantage rating was still 6.23 (out of 9) for the depressed group meaning these memories were still closer to the field anchor (i.e., score of 9) than the observer anchor (i.e., score of 1).

Memories were defined as specific if they contained events that lasted for less than 1 day and occurred at a particular time and place (Williams & Broadbent, 1986). If general memories were provided, participants were prompted to retrieve a specific memory for the purpose of the subsequent memory task. Accordingly, the proportion of specific memories was high (97.5%)⁵ and did not differ between groups ($ps > .05$).

⁵ To obtain an estimate of inter-rater reliability, an additional rater blind to group membership re-rated 10% of the memories. For both specificity and content there was perfect agreement between the two assessors.

Mode of processing

To ensure that the mode of processing task was effective in inducing the intended processing mode a 3 (Diagnostic group: currently depressed, recovered depressed, never-depressed) \times 2 (Condition: abstract, concrete) ANOVA with ratings of abstract/concrete thinking as the dependent variable was conducted. There was no main effect of diagnostic group, nor a group \times condition interaction ($ps > .05$). Importantly, there was the critical effect of condition, $F(1, 74) = 24.69$, $p < .05$, such that participants who were allocated to the abstract condition reported thinking about their memory more abstractly ($M = 6.19$, $SE = 0.31$) than those allocated to the concrete processing condition ($M = 4.03$, $SE = 0.31$). This confirms that the processing mode manipulation induced the mode of processing intended. An identical pattern of results was obtained for the two additional manipulation check items administered (see the Appendix for more details).

To examine the effect of the processing mode intervention on mood, a 3 (Diagnostic Group: currently depressed, recovered depressed, never-depressed) \times 2 (Condition: abstract, concrete) \times 2 (Time: after mood induction, after processing task) mixed-model MANOVA was conducted, with repeated measures on the third factor and mood ratings (sad and happy) included as dependent variables. For sad mood ratings there were main effects of time, $F(1, 73) = 47.13$, $p < .05$, and group, $F(1, 74) = 7.95$, $p < .05$, and a time \times group interaction, $F(1, 73) = 10.61$, $p < .05$. There were no other significant effects ($ps > .05$). The exact same pattern of results was detected for happy mood ratings, with a main effect of time, $F(1, 73) = 63.29$, $p < .05$, and group, $F(1, 74) = 3.71$, $p < .05$, and a time \times group interaction, $F(1, 73) = 7.49$, $p < .05$.

To deconstruct the time \times group interaction for sad mood ratings, follow-up paired samples t -tests were conducted. Regardless of the processing mode adopted during memory recall, a reduction in sadness was reported by both recovered, $t(28) = 6.02$, $p < .05$, and never-depressed groups, $t(24) = 5.91$, $p < .05$. However, the currently depressed group did not report any change in sad mood following the processing mode memory manipulation, regardless of condition, $t(25) = 1.64$, $p > .05$.

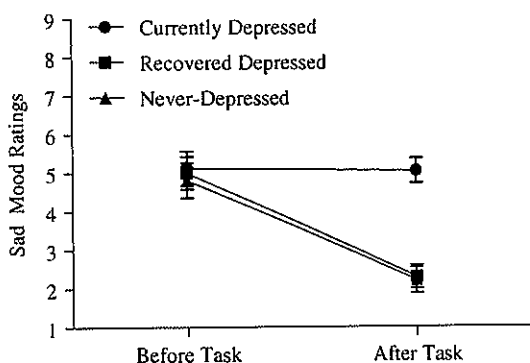


Figure 1. Mean and standard error for sad mood ratings prior to, and following, the memory processing mode task.

(see Figure 1).⁶ Similarly, follow-up tests for happy mood ratings showed happiness ratings increased following memory recall regardless of processing mode for both recovered depressed, $t(28) = -6.11, p < .05$, and never-depressed, $t(24) = -5.89, p < .05$, but not currently depressed participants, $t(25) = -1.71, p > .05$.

Taken together, these results indicate that never-depressed and recovered depressed individuals benefited emotionally from positive memory recall irrespective of whether an abstract or concrete processing mode was induced. However, for depressed individuals, mood did not improve in either condition.

DISCUSSION

We investigated the utility of a brief processing mode manipulation to improve mood after positive memory recall. As predicted, never-depressed individuals experienced improved mood following the recall of a positive self-defining memory, irrespective of whether an abstract or concrete processing mode was induced. On the basis of previous research (e.g., Werner-Seidler & Moulds, 2012), we expected that concrete processing would improve mood in both clinical groups, while an abstract processing mode was predicted to maintain low mood. The results did not support these hypotheses; rather, mood improved for recovered, but not depressed participants, irrespective of processing mode condition.

There are a number of possible reasons as to why the processing mode induction might not

⁶An analysis with vantage perspective and memory positivity included as covariates was also conducted, which yielded an identical pattern of results. Unadjusted statistics are reported in the text.

have led to differential changes in mood in the recovered and depressed groups as expected. The finding that formerly depressed individuals experienced improved mood regardless of processing mode might have been due to an artefact of the self-defining memory task itself. In this task participants are instructed to recall a positive memory that has played some role in their development and remains relevant to their identity. By definition, these kinds of memories are viewed as contributing to an individual's current sense of self. Therefore recalling a memory of this nature might not be easily amenable to being processed in a way that draws attention to a discrepancy in how the individual currently views themselves, as compared to previous times. This reduction in an opportunity to engage in comparative thinking might explain why recovered individuals reported improved mood following memory recall, even in the abstract condition. Interestingly, there is support for this suggestion from the social psychology literature, with one study showing that framing a compliment from a partner in an abstract way (as opposed to a concrete way) led participants to feel more positive about themselves and their relationship (Marigold, Holmes, & Ross, 2007). In this study the authors speculated that, in the abstract condition, the recipient of the compliment viewed the praise in terms of an ongoing experience, rather than as a single example of praise. While there are substantial differences between this and the current study (e.g., clinical focus, content of the material), these results nonetheless suggest that, at least in some circumstances, the abstract processing of positive material might not have a negative impact on emotion.

An alternative possibility is that improved mood simply reflected a return to baseline for the recovered depressed participants. That is, the effects of a sad mood induction are designed to be transient, and so without the inclusion of a no-memory recall control group the possibility that improved mood is simply a consequence of the natural dissipation of the induction cannot be ruled out. Related to this point is that the mood states of recovered and depressed individuals were fundamentally different during this experiment. Essentially, for previously depressed participants, improvement in mood following positive memory recall would reflect a return to their natural baseline mood prior to the administration of the mood induction (i.e., mood repair). However, for depressed participants, improved mood

following positive memory recall would be an enhancement in mood beyond baseline level (i.e., mood improvement). Presumably, mood repair and mood improvement recruit different cognitive processes. This may account for why the processing mode induction did not have the same effect for recovered and currently depressed participants—although we note that in our earlier work (Werner-Seidler & Moulds, 2012) in which we employed identical mood induction procedures, mood changed comparably in the abstract and concrete conditions for depressed and formerly depressed participants. Nonetheless, we acknowledge that comparing the effectiveness of recalling a positive memory to protect against further mood deterioration following an induced sad mood is very different from the use of autobiographical memory to improve mood in clinical depression. Even though these groups reported comparable intensity of the relevant mood states prior to memory recall, they remain fundamentally different in nature and so comparison across these mood states is not equivalent. A challenge for future research will be to separate out the processes involved in mood repair as compared to mood improvement and take into account the nature of the mood state being regulated (e.g., induced vs naturally occurring).

With respect to the affective impact of positive memory recall in the currently depressed group, our results indicated unchanged mood in both the abstract and concrete conditions. This was predicted for the abstract condition, but not for the concrete condition and it is unclear as to why depressed participants in the concrete condition did not experience improved mood. One possible reason for this could be due to the vantage from which memories were recalled, with depressed participants adopting less of a field perspective than the never-depressed group—something which has been shown to be associated with lower levels of emotion (Holmes et al., 2008). However, the fact that the findings were unchanged when ratings of vantage perspective were partialled out argues against this possibility.

Based on the aforementioned possibility that the abstract reflection of positive self-defining memories might not have had a detrimental effect on mood, another possibility is that the currently depressed participants actually *did* experience improved mood following abstract ruminative processing. Without inducing any distinct mode of processing, depressed individuals feel worse following positive memory recall (Joormann et

al., 2007). Therefore depressed participants in this study might actually have benefited, and thus reported unchanged mood as a result of the manipulation, rather than worsened mood (as was reported by depressed participants in Joormann et al.'s study). The inclusion of a no-instruction control group in future studies that seek to replicate these results would address this possibility empirically. Furthermore, such a control group that is not given any instruction about how to process and reflect on their memories would offer valuable insight into the default way that depressed individuals think about their positive memories. We (and others) have proposed that comparative-based thinking may comprise the maladaptive aspect of abstract-based thinking, and the inclusion of such a control group would confirm whether this is the case.

A number of limitations warrant consideration. First, temporal information pertaining to the time since the self-defining event occurred was not recorded. It is likely that the degree to which individuals view positive self-defining events as either discrepant or consistent with their sense of self would be in some way related to the amount of time elapsed since the event occurred. Related to this point, as we have hypothesised that comparative-based thinking may contribute to the unhelpful effects of an abstract processing mode, the inclusion of a measure of this construct would be useful. This might also help to elucidate whether a self-defining memory task did not yield differential effects of processing mode on mood because of a failure to engage in discrepancy-based thinking. Further, memory features were not comprehensively assessed and so the influence of additional phenomenological qualities cannot be ruled out. To address these limitations, and clarify the reasons underlying the lack of differential affective impact of manipulating processing mode on positive memory recall, it is recommended that future studies (i) examine temporal information and phenomenological features of the memories recalled, (ii) include a measure of comparative thinking, and (iii) employ a range of memory tasks to delineate whether they produce distinct emotional consequences. Once the relationship among processing mode, positive material, and depressive status is better understood, steps can be taken to design interventions that directly target processing mode in order to improve existing psychotherapies for depression, such as concreteness training (Watkins & Moberly, 2009).

This study examined the utility of an experimenter-delivered processing mode manipulation that was intended to augment the emotional benefits associated with positive memory recall in depressed, recovered depressed, and never-depressed individuals. The key finding was that for never-depressed and previously depressed individuals, memories of positive, self-defining events improved mood, regardless of how the memory was processed. However, for depressed individuals, neither an abstract nor a concrete processing mode facilitated emotional benefits following positive memory recall. Additional experimental work is needed in order to develop clinical strategies that can help depressed patients derive affective benefits from the recall of positive events from their past.

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APPENDIX

Participants were guided through the 4-minute processing mode induction by the experimenter. In the abstract condition prompts were designed to induce an abstract, ruminative style of thinking that was anchored to the memory (e.g., "*Why did the event from the memory occur? What does it mean that the event took place? What are the implications that have followed on as a result?*"). Further, participants in this condition were also encouraged to make self-comparisons between themselves in the present, and themselves from the time that the memory occurred (e.g., "*How did you think things would turn out when this event took place? Have things unfolded in the way that you expected? What has that meant for you?*").

In the concrete condition participants were asked to focus on their memory in a specific, detailed way (e.g., "*Recall what kind of day it was at the time*") and to replay the events of the memory in their mind (e.g., "*Play the sequence of events over and over in your mind as though you are watching a movie of how the events unfolded*").

To ensure that the processing mode manipulation was effective in inducing the processing mode as intended, a number of manipulation check items were included. Two items were taken from Watkins and Teasdale (2001) and, in the first, participants are asked to rate, on a 9-point Likert scale, "*How much you were thinking in an abstract way – that is, thinking about general, hard to pin down, higher-level concepts, themes or ideas (compared to thinking about concrete, physical objects or specific actions, situations or events) during the task. For example, thinking about the meaning of an event would be more abstract than thinking about what you did in a situation*" where 1 = *not at all abstract, completely abstract* and 9 = *extremely abstract/not at all concrete*. In the second question, participants are asked to rate "*How much your thoughts were concerned with trying to understand, explain, or make sense of things during the task you just completed*" where 1 = *not at all trying to understand* and 9 = *trying extremely hard to understand*. A final item was developed specifically for this study that was anchored towards assessing concrete processing and participants were asked to indicate the extent to which they were "*thinking in a specific, detailed way*" where 1 = *not at all* and 9 = *extremely*.