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The Effects of Induced and Naturally Occurring Dysphoric Mood on Biases in Self-evaluation and Memory

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Biases in self-evaluation and memory were compared across nondysphoric (ND), experimentally dysphoric (ED), and naturally dysphoric (DYS) subjects. First, subjects judged the self-descriptiveness of a series of negative and positive adjectives, and were then given an incidental memory test. Next, subjects performed an intentional memory task with negative and neutral materials. Across measures of endorsement, judgement latency, and memory, both ED and ND subjects showed positive biases, whereas DYS subjects exhibited "even-handed" processing. These findings suggest that dysphoric mood (at least of brief duration) cannot be solely responsible for the erosion of positive biases that appear to characterise depression.

INTRODUCTION

The association between depression and biases in memory and judgement is well documented. For example, it has been noted in the clinical literature that depressed individuals tend to engage in negative thinking, including excessive self-blame, negative self-evaluation, and selective recall of negative information (e.g. Beck, Rush, Shaw, & Emery, 1979). These anecdotal reports of depressed patients have been corroborated by empirical investigations demonstrating that clinically significant depression is associated with negatively biased cognitive functioning, that is, with a more efficient processing of negative than of positive or neutral information. These biases include better memory for negative than for positive or

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neutral information (Matt, Vazquez, & Campbell, 1992), difficulties retrieving specific positive autobiographical memories (Williams, 1992), and relatively negative self-evaluative judgements (Kuiper & Derry, 1981).

In contrast to this depression-associated negative information-processing, nondepressed persons tend to exhibit positive biases, or "illusions" (cf. Taylor & Brown, 1988). For example, nondepressed persons typically recall a greater proportion of positive than negative stimuli (Matt et al., 1992), and make more positive than negative self-evaluations (Baumeister, Tice, & Hutton, 1989). Interestingly, mildly depressed, or dysphoric, individuals do not consistently demonstrate either the negative biases typical of clinical depression or the positive biases that are characteristic of nondepressed persons. Instead, dysphoric persons tend to exhibit an "even-handed" pattern of processing. Thus, dysphoric individuals have been found to recall equal amounts of positive and negative stimuli (Gotlib, 1983; Matt et al., 1992), to be even-handed in their self-descriptions (Greenberg & Alloy, 1989; Kuiper & Derry, 1982), suggesting that dysphoric individuals have "lost" the positive biases that characterise nondepressed persons.

Despite the consistent evidence of depression-associated biases in cognitive functioning, it is unclear what factors mediate this phenomenon. In particular, the role of mood in producing these biases is not well understood. Are cognitive biases associated primarily with the intensity of concurrent negative mood? And to what extent do other parameters of depression, besides mood, affect cognitive performance? The results of a number of studies suggest that cognitive biases are state-dependent, and return to normal with remission or recovery from depression (e.g. Gotlib & Cane, 1987; McCabe & Gotlib, 1993). Thus, concurrent depressive symptomatology, rather than more stable trait-like characteristics of depressed persons, appears to be critical. Cognitive biases in depression could result, therefore, from a number of sources, including the intensity of dysphoric mood, concentration difficulties, vegetative symptoms, or other concomitants of depression. One way to begin to address this issue is to compare the cognitive functioning of persons in whom a dysphoric mood is temporarily induced with that of naturally dysphoric individuals. Experimental mood manipulations, which obviously do not produce the variety of symptoms involved in naturally occurring dysphoria, can be used to examine the influence on cognitive funtioning of mood *per se*.

To date, studies examining the effects of experimentally induced mood on cognitive biases have yielded mixed results. Findings of some studies indicate that induced mood produces biases in memory and self-evaluation that are similar to, but less pronounced than, those found in clinical depression or in naturally occurring dysphoria (cf. Matt et al., 1992; Nasby, 1994). In contrast, findings of other studies suggest that experimentally induced states produce cognitive consequences that are different from those found in naturally occurring dysphoria. For example, whereas experimentally induced dysphoria reliably leads to deficits in memory for neutral information, naturally occurring mild dysphoria is not consistently associated with this impairment (see Gotlib, Roberts, & Gilboa, 1996). Furthermore, there have been failures to obtain mood-congruent effects with experimental mood induction procedures (e.g. Bradley, Mogg, Galbraith, & Perrett, 1993; Seta, Hayes, & Seta, 1994). Indeed, Matt et al. (1992, p. 244) warned against the "premature interpretation of mood-congruent recall effect for induced depressed subjects based on the published studies alone".

Unfortunately, few investigators have examined cognitive biases across both naturally occurring and experimentally induced dysphoric conditions in a single study. Although these two groups of subjects have been examined in *different* studies, it is clear that a *single* study examining different groups on identical tasks is more informative than are cross-study comparisons. Specifically, it is possible that the mixed pattern of results emerging from the previous studies is due, at least in part, to differences in the tasks employed. Moreover, investigators have not typically examined performance on multiple domains of cognitive functioning, but have focused on either memory or self-evaluation. Yet, to provide a more complete picture of the mechanisms that may mediate cognitive biases in depression, multiple measures of cognitive processing must be examined.

The two tasks most commonly associated with biased processing of valenced information in depression are the self-descriptiveness judgement task and the incidental memory task (Gotlib et al., 1996). Although studies assessing incidental memory for valenced stimuli are frequently preceded by a self-referent encoding task in which subjects are requested to assess the self-descriptiveness of the to-be-recalled stimuli (e.g. Denny & Hunt, 1992), the judgement data are seldom analysed. Combining the incidental recall measures and judgement measures (e.g. endorsement and decision-latency data) within the same study can elucidate the parameters associated with biases in memory and judgement.

Finally, it is important to note that different memory tasks require varying degrees of control over the initiation of cognitive strategies. For example, whereas incidental memory tasks require a spontaneous intitiation of cognitive strategies, intentional memory tasks involve more directed, effortful processing. According to the "cognitive initiation" hypothesis, depressed persons fail to initiate spontaneously strategies that facilitate learning, but can make use of such techniques if and when they are explicitly instructed to do so (cf. Channon, Baker, & Robertson, 1993; Hertel, 1994; Hertel & Hardin, 1990). The inclusion of two measures of memory functioning in the present study, incidental and intentional, permits a comparison of the nature and extent of memory biases in various dysphoric states.

In sum, the main questions addressed in the present study concern the role of mood in the elicitation of cognitive biases. First, do individuals with similar levels of dysphoric mood, but who differ with respect to other depressive symptomatology, exhibit similar patterns of cognitive performance? If they do not, it is likely that other components of depression, such as persistence of dysphoric mood, physiological disturbances, and motivational deficits, affect the nature and extent of cognitive biases. Second, does mood play a similar role in the elicitation of biases in both memory and judgement? To address these questions, biases in self-evaluation and memory were assessed in nondysphoric, experimentally dysphoric, and naturally dysphoric individuals. Participants completed three cognitive tasks: (1) a self-descriptiveness judgement task; (2) an incidental memory task; and (3) an intentional memory task. In the self-descriptiveness task, participants were requested to decide whether each of a number of positive and negative trait adjectives described their personality. Subjects' endorsements and decision-latencies on this task were assessed. Next, subjects participated in an incidental memory task, recalling as many words as they could from the stimuli presented in the self-descriptiveness task. Finally, using a different set of stimuli, subjects participated in an intentional memory task.

METHOD

Subjects and Design

A total of 126 students participated in this experiment as part of a course requirement. In a prescreen testing session held approximately six to nine weeks before the experimental session, participants completed the Inventory to Diagnose Depression (IDD: Zimmerman, Coryell, Corenthal, & Wilson, 1986). The IDD was used to determine whether subjects met *Diagnostic and Statistical Manual*, 3rd edition, revised (DSM-III-R: American Psychiatric Association, 1987) symptom criteria for a major depressive disorder. The IDD classification corresponds well with diagnoses based on the Diagnostic Interview Schedule ($k = 8$, Zimmerman & Coryell, 1988). Individuals were classified as dysphoric if they met the symptom criteria for a major depressive disorder, regardless of whether they met the two-week duration criteria. Individuals who were classified as nondysphoric were randomly assigned to either a neutral mood induction condition (nondysphoric) or a negative mood induction condition (experimentally dysphoric). Dysphoric individuals all were assigned to the neutral mood induction condition. Thus, group (nondysphoric, experimentally dysphoric, and naturally dysphoric) was the between-subjects factor in our design. Subjects were tested individually in experimental sessions that lasted about 30 minutes. Data from three subjects were lost due to equipment failure.

Materials

The stimuli for the self-descriptiveness and the incidental memory task were 21 positive (e.g. "talented") and 21 negative (e.g. "tactless") personality traits used by Pratto and Oliver (1991). In that study subjects first rated the social desirability and act-frequency of 131 traits. Then, selected subsets of positive and negative trait-words were selected that were equated on these measures. The stimuli for the intentional memory task were 21 negative (e.g. "separation") and 21 neutral (e.g. "trumpet") nouns. These words were equated on frequency and length based on Francis Kuçera's (1982) norms.

Procedure

Experimental stimuli and the instructions were presented on an Apple Macintosh IIci computer. The controlling software handled the administration of mood induction procedures (MIPs) and the presentation of memory stimuli. It also recorded subjects' mood ratings, self-descriptiveness judgements, judgement latencies, and recalled words. The six phases of the experiment were mood induction, self-descriptiveness judgements, incidental memory, mood re-induction, intentional memory, and depression assessment.

Mood induction. After a brief introduction to the experiment, subjects were asked to rate their current mood on seven visual analogue scales: *sad*, *frustrated*, *anxious*, *happy*, *hopeful*, *cheerful*, and *overall mood*. The first six scales were anchored by not at all (coded as intensity rating of 0) and extremely (coded as intensity rating of 100). The overall mood scale was anchored by extremely negative (coded as intensity rating of – 50) and extremely positive (coded as intensity rating of +50). These mood ratings represented subjects' baseline affective states. Next, subjects were asked to recall and describe either a neutral (for subjects in the neutral mood induction condition) or a sad or distressing (for subjects in the negative mood induction condition) experience. Participants were instructed to concentrate on the details of the recalled experience, and to try to re-experience feelings and thoughts they had at the time (see Salovey, 1992, for complete instructions). Finally, before proceeding to the self-descriptiveness judgement task, subjects were again asked to rate their current mood on the seven visual analogue scales. These ratings were used to assess the effectiveness of the mood manipulation.

Self-descriptiveness judgement task. During the judgement task, subjects were instructed to decide whether trait adjectives dispayed on the computer screen described their personality. They indicated their decisions by pressing either the "Yes" or the "No" keys (marked by appropriate labels) on the computer keyboard. Each of the trait adjectives was presented for two seconds, regardless of the subjects' response latencies. The inter-trial interval was 500msec. The computer software recorded the subjects' latencies for making these judgements.

Incidental memory task. Following the completion of the rating task, subjects were requested to recall as many words as they could remember from the previously presented stimuli. They were given three minutes to complete this task.

Mood re-induction. After completing the incidental memory task, mood was re-induced by having subjects concentrate and re-experience the event they had recalled in the mood-induction phase. Following the re-induction, subjects again rated their mood on the seven visual analogue scales.

Intentional memory task. In the intentional memory task, subjects viewed 21 negative and 21 neutral nouns, presented in random order. Each word was presented on the computer for two seconds. Subjects were then given three minutes to recall as many of these words as they could.

Depression assessment. At the end of the experiment, subjects completed the Beck Depression Inventory (BDI: Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The BDI has been demonstrated to be a valid measure of depressive symptoms in college students (Bumberry, Oliver, & McClure, 1978), and correlates well with ratings of depression severity made by independent clinicians (Beck, Steer, & Garbin, 1988; see Gotlib & Cane, 1989, for a review of this literature).

RESULTS

Subjects who changed dysphoria status between the prescreen testing session and the experimental session were reclassified according to their new status. Specifically, subjects who were originally classified as naturally dysphoric, but who obtained BDI scores of 9 or less during the experimental session, were reclassified as nondysphoric ($n = 3$). Individuals originally classified as nondysphoric, but who scored higher than 9 on the BDI during the experimental session ($n = 5$), were reclassified as naturally dysphoric. (Excluding the eight subjects who were not classified in the same category at both the prescreen and experimental sessions did not alter any of the results reported later.) Five subjects who were reclassified as naturally dysphoric and who also participated in the negative mood induction condition were dropped from the analyses. Mean BDI scores for the nondysphoric (ND, n = 39), the experimentally dysphoric (ED, n = 42), and the naturally dysphoric (DYS, n = 37), subjects were 3.86, 4.13 and 19.80, respectively. The numbers of males in these groups were 14, 17, and 12, respectively. All the analyses were also conducted with gender as a between-subjects variable. However, because the effects of gender and its interactions with other variables were not significant, it was not included as a factor in the subsequent analyses.

Manipulation Checks

To examine differences in mood intensities at a various stages of the experiment for the three dysphoria groups, participants' self-ratings of their overall mood were analysed.[1] Mean mood ratings at baseline, immediately after the MIP, and after the re-induction are presented in Table 1. A 3 × 3 analysis of variance (ANOVA) was conducted with group (ND, ED, DYS) as a between-subjects variable, and time (baseline, after the MIP, after re-induction) as a within-subject factor. This analysis yielded significant main effects for group [$F(2,115) = 5.85$, $P < .01$], and time [$F(2,230) = 62.14$, $P < .001$]. These effects were qualified, however, by a significant interaction of group and time [$F(4,230) = 9.64$, $P < .01$]. To examine this interaction, specific comparisons were conducted to insure: (a) the appropriateness of the group selection in terms of baseline mood; (b) the appropriateness of post-induction moods (e.g. MIP efficacy, the

TABLE 1
Group Mean Overall Mood Ratings at Baseline, After the Mood Induction Procedures and After Mood Re-induction

Time of Rating	*Nondysphoric* (n = 39)	*Experimentally Dysphoric* (n = 42)	*Naturally Dysphoric* (n = 37)
Baseline	16.85_a	16.67_a	-3.38_b
After MIP*	1.08_a	-8.10_b	-7.10_b
After re-induction	1.33_a	-8.38_b	-8.00_b

Note: within each row, different subscripts indicate significant differences ($P < .05$).
* The mood induction procedure (MIP) was neutral for the nondysphoric and naturally dysphoric groups, and negative for the experimentally dysphoric group.

[1] Analyses using individual mood scales produced similar, and sometimes stronger, results (stronger, in particular, for the "sadness" scale). For the sake of simplicity, however, we present analyses using the only the "overall" mood measure.

comparability of the ED and DYS subjects' moods); and (c) the efficacy of the re-induction procedure.

First, to verify that the DYS subjects were significantly more dysphoric than were the ED and ND subjects before the MIP, subjects' baseline mood ratings were analysed using a one-way ANOVA. This analysis yielded a significant effect for group [$F(2,115) = 15.14$, $P < .01$]. Planned follow-up comparisons indicated that, as expected, DYS subjects rated their baseline mood as more negative than did both ND [$t(77) = 4.73$, $P < .01$] and ED subjects [$t(74) = 4.68$, $P < .01$]; ND and ED subjects did not differ in their baseline mood ratings [$t(79) < 1$].

Second, to examine the effectiveness of the MIP, subjects' post-induction mood ratings were analysed using a one-way ANOVA. This analysis yielded a marginally significant effect for group, [$F(2,115) = 2.68$, $P < .07$]. As expected, planned comparisons indicated that, compared with ND subjects, both ED subjects [$t(79) = 1.96$, $P < .05$] and DYS subjects [$t(74) = 2.20$, $P < .01$], rated their mood as more negative; DYS and ED subjects did not differ in their post-induction mood-ratings [$t(74) < 1$]. Furthermore, to verify the effectiveness of the MIP *per se*, ND and ED subjects' mood ratings at baseline and immediately after the MIP were analysed using a 2×2 ANOVA, with group (ND, ED) as a between-subjects factor and time of rating (baseline, immediately after the MIP) as within-subject factor. This analysis yielded a significant main effect for time of rating [$F(1,79) = 81.38$, $P < .01$], such that subjects' mood ratings after the MIP were lower (i.e. more negative) than were their baseline ratings. The main effect for group was not significant [$F(1,79) = 1.6$, $P > .05$]. Most importantly, attesting to the effectiveness of the MIP, the interaction of group and time of rating was significant [$F(1,79) = 4.01$, $P < .05$], such that ED subjects' mood ratings decreased more following the MIP than did the mood ratings of ND subjects. Surprisingly, the neutral MIP decreased ND and DYS subjects' overall mood ratings. One possible explanation for this finding is that the neutral MIP acted as a self-focus manipulation, which tends to be associated with an increase in negative affect (Ingram, 1990).

Finally, to verify the effectiveness of the re-induction, mood ratings assessed immediately following the MIP were compared with ratings taken after the re-induction separately within each of the three groups of subjects. Paired *t*-tests revealed no significant changes between post-MIP mood ratings and post-re-induction mood ratings for any of the three groups (all *t*s < 1). Thus, the re-induction procedure was effective in maintaining stable levels of mood across all groups.

Analytic Overview

There were five dependent measures in this study: (1) number of trait adjectives judged as self-descriptive (i.e. number of positive and negative trait endorsements); (2) latency to make affirmative self-descriptiveness judgements (i.e. latency to answer "yes" on the self-descriptiveness task); (3) latency to make nonaffirmative self-descriptiveness judgements (i.e. rejection latency, or latency to answer "no" on the self-descriptiveness task); (4) number of adjectives recalled on the incidental memory task (negative and positive); and (5) number of words recalled on the intentional memory tasks (negative and neutral).

To simplify data analysis, bias scores for each of these measures were computed such that scores with a positive sign reflected a positivity bias (i.e. enhanced processing of positive stimuli), and scores with a negative sign reflected a negativity bias (i.e. enhanced processing of negative stimuli). First, we examined group differences on each of the cognitive bias scores. Second, we examined the direction of these bias scores in each group by conducting a series of *t*-tests, in which bias scores were compared to zero (i.e. no bias). Bias scores that were significantly greater than zero indicated the operation of positivity biases, bias scores that did not differ from zero indicated even-handed processing, and bias scores that were significantly less than zero indicated the presence of negativity biases.

Self-evaluation Judgement Biases

Endorsement. To examine whether dysphoric mood affects the endorsement of personality traits, we computed processing bias scores by subtracting the number of affirmative responses to negative traits from the number of affirmative responses to positive traits. (Because the number of affirmative plus the number of non-affirmative words in each trait category sums to 21, only the affirmative ratings were analysed. Analyses of the reciprocal nonaffirmative judgements would, of course, yield identical results.)

Decision latencies greater than 3000msec and less than 500msec were excluded from the analysis. Excluded responses occurred on 5% of the trials, and their number did not differ as a function of stimulus-type or experimental group. For presentation consistency, mean number of endorsements was calculated only for the "included" responses. For this reason, the number of "yes" and "no" responses in each adjective category does not sum exactly to 21. Analysis of the "uncorrected" data yielded virtually identical results.

Endorsement bias scores were analysed by a one-way ANOVA, with group (ND, ED, and DYS) as the between-subjects factor. The analysis

TABLE 2
Group Means and (Standard Deviations) of Processing Bias Scores for Judgement and Memory Measures

Type of Task	Nondysphoric (n = 39)	Experimentally Dysphoric (n = 42)	Naturally Dysphoric (n = 37)
Endorsement	13.0_a* (5.9)	12.5_a* (7.1)	1.2_b (9.9)
Affirmation Latency (msec)	269_a* (78)	203_a* (75)	117_b (72)
Rejection Latency (msec)	450_a* (56)	399_a* (54)	-57_b (54)
Incidental Memory	0.8_{ab}* (2.4)	1.3_{a*} (2.7)	-0.1_b (2.7)
Intentional Memory	1.5* (4.2)	1.6* (3.5)	1.1 (4.4)

yielded a significant effect for group [$F(2,115) = 27.9$, $P < .01$]. As can be seen in Table 2, pairwise Tukey comparisons of group means indicated that the DYS subjects' positive bias scores were significantly smaller than those of the ND [$t(74) = 6.31$, $P < .01$] and the ED subjects [$t(77) = 5.85$, $P < .01$], who did not differ significantly from each other [$t(79) < 1$].

We examined the direction of endorsement bias in each group by conducting a series of *t*-tests, comparing the bias scores to zero. These analyses indicated that whereas both the ND and ED subjects exhibited a positivity bias [$t(39) = 13.7$, $P < .01$, and $t(42) = 11.4$, $P < .01$, respectively], (i.e. they endorsed a greater number of positive than negative adjectives), the DYS subjects were even-handed in their ratings [$t(37) < 1$].

Affirmation Latencies. Bias scores for affirmation latencies were computed by subtracting subjects' latencies for affirming positive adjectives from their latencies for affirming negative adjectives.[2] A one-way ANOVA conducted on these scores yielded a nonsignificant effect of group [$F(2,98) = 1.03$, $P > .05$]. However, consistent with our previous within-group analyses, ND and ED subjects exhibited significant positivity biases [$t(31) = 4.4$, $P < .01$, and $t(34) = 2.6$, $P < .05$, respectively], whereas DYS subjects were even-handed in their processing [$t(36) = 1.4$, $p > .05$].

[2] Some subjects ($n = 17$) did not endorse any negative traits. Because these subjects did not have endorsement latencies for negative adjectives, their data were excluded from this analysis.

Rejection Latencies. Bias scores for rejection latencies were computed by subtracting subjects' latencies for rejecting negative adjectives from their latencies for rejecting positive adjectives.[3] A one-way ANOVA yielded a significant effect for group [$F(2,109) = 24.2$, $P < .01$]. As can be seen in Table 2, pairwise Tukey comparisons of group means indicated that the bias scores of the DYS subjets were smaller than were those of the ND [$t(72) = 5.73$, $P < .01$], and the ED subjects [$t(73) = 6.7$, $P < .01$], who did not differ significantly from each other [$t(79) < 1$]. Further, within-group analyses indicated that whereas both the ND and the ED subjects exhibited positive biases [$t(37) = 6.3$, $P < .01$, and $t(38) = 8.9$, $P < .01$, respectively], the DYS subjects were even-handed in their processing [$t(37) = 1.1$, $P > .05$].

Memory Biases

Incidental Memory. We computed an incidental memory bias score by subtracting the number of negative trait words recalled from the number of positive trait words recalled. A one-way ANOVA yielded a significant effect of group [$F(2,115) = 3.65$, $P < .05$]. Pairwise Tukey comparisons indicated that the DYS subjects had smaller bias scores than did the ED subjects [$t(77) = 3.74$, $P < .01$]; no other comparisons were significant. Consistent with our previous findings, the ND and ED subjects exhibited significant positivity biases [$t(39) = 2.1$, $P < .05$, and $t(42) = 3.2$, $P < .01$, respectively], whereas the DYS subjects were even-handed in their incidental recall [$t(37) < 1$].

Intentional Memory. As with incidental memory, we computed an intentional memory bias score by subtracting the number of negative words recalled from the number of neutral words recalled. A one-way ANOVA yielded a nonsignificant effect for group [$F(2,115) < 1$]. However, consistent with our previous findings, within-group analyses revealed that whereas both the ND and ED subjects exhibited positivity biases, in the sense of recalling fewer negative than neutral words, [$t(39) = 2.3$, $P < .05$, and $t(42) = 3.1$, $P < .01$, respectively], the DYS subjects were even-handed in their intentional recall [$t(37) = 1.1$, $P > .05$].

[3] Some subjects ($n = 6$) did not reject any positive traits. Because these subjects did not have rejection latencies for positive adjectives, their data were excluded from this analysis.

DISCUSSION

The results of the present study indicate that nondysphoric subjects exhibit positive biases in both self-evaluation and memory; in contrast, naturally dysphoric individuals seem to lack these biases, instead demonstrating even-handed processing of positive and negative information. Positive biases were apparent in the greater efficiency with which nondysphoric subjects processed, judged, and recalled both positively valenced self-relevant material and neutral stimuli, relative to negatively valenced material. Interestingly, initially nondysphoric subjects who were exposed to an experimental dysphoric mood induction procedure retained these positive biases, despite reporting negative mood levels equivalent to those reported by naturally dysphoric subjects.

More specifically, both nondysphoric and experimentally dysphoric subjects were found to endorse more positive than negative adjectives on a self-descriptiveness task, to reject negative adjectives more quickly than positive adjectives, and to endorse positive adjectives more quickly then negative adjectives. In addition, nondysphoric and experimentally dysphoric subjects recalled more positive (and neutral) words than negative words in both incidental and intentional memory tasks. Considered together, these findings strongly suggest that nondysphoric individuals process positive information more thoroughly and efficiently than they do negative information, and further, that these biases are not neutralised by brief periods of negative mood. These positive biases in self-evaluation and memory are important because they may buffer nondepressed individuals from the affective consequences of negative environmental feedback, even in the face of transient negative mood; consequently, they may help to protect nondepressed persons from the development of more severe depressive symptomatology (Alloy & Clements, 1992).

In sharp contrast to the nondysphoric and experimentally dysphoric subjects, naturally dysphoric subjects did not exhibit positive biases on any of the measures; instead, they were even-handed in their cognitive processing. Naturally dysphoric subjects endorsed as self-descriptive approximately equal numbers of positive and negative adjectives, and were equally quick to accept and reject negative and positive adjectives. Further, naturally dysphoric subjects recalled approximately equal numbers of positive (or neutral) and negative words on both incidental and intentional memory tasks. In previous studies in our laboratory, we have demonstrated that depressed persons lack positive biases in attentional functioning (e.g. Gotlib, McLachlan, & Katz, 1988; McCabe & Gotlib, 1995). Considered collectively, these findings suggest that naturally dysphoric individuals process positive and negative information in a balanced manner, attending equally to positive and negative aspects of their environments (see Schwartz & Garamoni, 1989). Moreover, it appears that this even-handed pattern of processing by naturally dysphoric subjects spans across attentional, self-judgement, and memory processes.

Combined with other findings (e.g. Bargh & Tota, 1988; Greenberg & Alloy, 1989; Kuiper & Derry, 1982), our data suggest that mildly depressed individuals are beginning to develop a negative self-schema that rivals the strength of their positive self-schema. Our data are also consistent with the formulation that naturally dysphoric individuals have a poorly consolidated positive self-schema (Kuiper, Olinger, & MacDonald, 1988). Theoretically, the lack of positive schema consolidation, combined with even-handed processing of positive and negative information, can contribute to a tenuous and unstable sense of self-worth as these individuals are confronted with the vicissitudes of daily life (Roberts & Monroe, 1994). Such persons lack the buffering that is provided by positive biases (cf. Taylor & Brown, 1988). In this regard, a number of studies have found that temporal variability in self-esteem (Roberts & Gotlib, 1995; Roberts & Monroe, 1992), as well as self-esteem that is highly reactive to daily positive and negative events (Butler, Hokanson, & Flynn, 1994), is associated with risk for the development of depressive symptoms following the occurrence of stressful life events. Thus, the lack of positive cognitive biases might not only result from dysphoria, but further, might actively contribute to an individual's vulnerability to dysphoria.

In the present study, individuals who participated in a negative mood induction procedure continued to demonstrate positive biases, similar to those demonstrated by nondysphoric subjects, on measures of self-evaluation and memory. As we noted earlier, the absence of mood-congruent effects in studies using experimental mood induction procedures is not uncommon (e.g. Bradley et al., 1993; Seta et al., 1994). Nevertheless, because our findings deviate from the more frequently obtained mood-congruent pattern of results, they do warrant some elaboration. Why did our experimentally dysphoric subjects fail to exhibit the negative (or even-handed) pattern of processing in incidental memory and judgement that have been found in some previous studies? Although the following explanations are speculative, it is possible that present findings are related to the specific characteristics of our mood-induction and stimulus-exposure procedures.

The first explanation involves the nature of the specific mood induction procedure (MIP) that was used in the present study. Whereas we utilised an autobiographical MIP, other studies in the literature have used the Velten procedure or music induction procedures (see Matt et al., 1992, for a review of this literature). The absence of memory biases in the mood-induced subjects in the present study, therefore, could be due to shortcomings of the autobiographical MIP. For instance, subjects could be simply responding to the subjective mood measures in a manner congruent with experimental demands, without being "truly" affected by the mood manipulation. Although it is clear that demand characteristics are a major concern in the experimental induction of affect, we think it is unlikely that our results are due solely to the ineffectiveness of this mood induction. It is important to note, for example, that other studies, conducted both in our laboratory and by other investigators, indicate that the same MIP affects performance on nonself-report measures, such as the Stroop task (e.g. Gilboa, Revelle, & Gotlib, 1996; Salovey, 1992). Furthermore, a meta-analysis of the Velten MIP indicates that, although it may be prone to demand characteristics, subjects' affective state nevertheless appears to be altered by that procedure, as assessed by nonself-report measures, such as writing speed (Larsen & Sinnett, 1991). Although there is no empirical evidence of this question, there is no reason to believe that the demand characteristics of the autobiographical MIP are greater than those of the Velten MIP.

It is also possible that an autobiographical procedure creates a "focused" affective state, whereas the Velten and music procedures create a more "diffuse" affective state (cf. Gilboa, 1993; Martin, 1990). Although diffuse affective states may facilitate the processing of a variety of affect-congruent information (e.g. Isen, 1984), it is possible that more focused states facilitate only the processing of that information that is most closely related to the specific emotional event recalled during the MIP. However, it is also important to note that not all "diffuse" MIPs produce cognitive biases. For example, in a recent study, Whisman (1995) used a music MIP to induce negative mood, but failed to find mood-congruent information-processing biases in subjects exposed to the MIP. Importantly, Whisman *did* find such mood-congruent biases in naturally dysphoric individuals. Although Whisman's results increase the external validity of our findings, a more comprehensive examination of the effects of various MIPs on cognitive processing is clearly warranted.

Second, it is possible that the paramenters of our stimulus exposure procedures in the judgement and intentional memory tasks differentially affected the processing of the ED and DYS subjects. Specifically, our experiment differed from other studies in that it included relatively short exposure times of the to-be-remembered stimuli [e.g. 2 seconds in our study versus 5 seconds in Denny & Hunt's (1992) study, and 10 seconds in Watkins, Mathews, Williamson, & Fuller's (1992) study]. Although our relatively short exposure duration was clearly sufficient to produce valence differences in the naturally dysphoric subjects, it might not have been sufficient to produce biases in memory and judgement in subjects who experienced only temporary induced dysphoria. Interestingly, time-related parameters have also been found to affect the use of chronically accessible constructs (Bargh, Lombardi, & Higgins, 1988). It is possible, therefore, that different durations of exposure are necessary to activate mood-congruent constructs in individuals with experimentally induced versus naturally occurring dysphoria. Further research is required to examine this formulation more explicitly.

Finally, although our results suggest that dysphoric mood (at least of brief duration) cannot be solely responsible for the erosion of the positive biases that appear to be characteristic of depression, it is still possible that some aspects of mood are causally related to the production of these biases. For example, it may be that the *duration* of dysphoric mood, in addition to its *intensity*, affects cognitive processing. In particular, based on the present findings, it is possible that persistent dysphoric mood is more likely to affect self-perception than is more transient dysphoric mood of similar intensity. Thus, persistent dysphoric mood might contribute to the construction and consolidation of negative self-schemata, as well as to the erosion of positive self-schemata. To test this hypothesis, future studies should compare individuals experiencing relatively brief episodes of dysphoria with individuals experiencing more protracted dysphoria. It is also possible that state negative affect, in combination with other stable characteristics related to depression vulnerability, is necessary for the erosion of positive cognitive biases (Hedlund & Rude, 1995).

In sum, we found that subjects in whom a dysphoric mood was induced exhibited positive biases in self-evaluation and memory that were indistinguishable from those demonstrated by nondysphoric subjects. In contrast, naturally dysphoric individuals processed positive and negative information in a symmetrical, even-handed, manner. These findings call for an explicit examination of the effects of mood intensity and persistence, as well as of other, nonmood-related, symptoms of depression, on the consolidation of negative self-schemata and the breakdown of positive self-schemata.

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