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Induced Mood Change and Dysfunctional Attitudes in Remitted Bipolar I Affective Disorder

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This study investigated the possibility that, in remitted bipolar I affective disorder, dysfunctional attitudes are mood-state dependent. Participants were 120 individuals with remitted bipolar I disorder, remitted unipolar depression, or no history of affective disorder. The Dysfunctional Attitudes Scale (DAS; Weissman, 1979) was completed before and after positive or negative mood challenge. Following mood increase, the bipolar group changed significantly less in DAS total score than did the other 2 groups, and in goal-striving and achievement attitudes relative to the unipolar group. These findings did not provide clear support for the mood-state dependency theory in bipolar disorder, arguing instead for the presence in bipolar I disorder of dysfunctional cognitions that show characteristic resilience in the face of minor positive mood increase.

Recent success in treating bipolar disorder with cognitive behavioral therapy (CBT; Lam et al., 2000; Lam et al., 2003; Scott, Garland, & Moorhead, 2001) suggests a possible role for cognitive factors in the development of bipolar episodes. In contrast to the focus of psychological research into unipolar depression, few studies have investigated the types of cognitions that may confer vulnerability to bipolar illness. The following study represents an early step in the investigation of one area of cognition—dysfunctional attitudes—that might play a role in the development of bipolar episodes.

Beck's (1967, 1976) cognitive theory of depression postulates the existence of underlying schema in the form of core beliefs and dysfunctional attitudes. Depression is hypothesized to result from the activation of negative core beliefs and dysfunctional attitudes by life events relevant to the idiosyncratic content of the schema. Evidence that dysfunctional attitudes may play a role in the development of unipolar depression is provided by studies which demonstrate higher levels of dysfunctional attitudes in depressed individuals as compared with never-depressed individuals. Miranda and Persons (1988) have hypothesized that dysfunctional attitudes exist as stable, trait-like structures, but the ability of the individual to access and report them is mood-state dependent. To test this hypothesis, Miranda, Gross, Persons, and Hahn (1998) exposed remitted-depressive and never-depressed women to a negative mood induction procedure, with dysfunctional attitude level measured before and after mood induction with the Dysfunctional Attitudes Scale (DAS: Weissman, 1979). As predicted, negative mood increase led to increased scores on the DAS in the remitted-depressive group only. Furthermore, in a study of individuals with remitted unipolar depression, Segal and colleagues found DAS score change following negative mood induction to be predictive of depressive relapse (Segal, Gemar, & Williams, 1999). Such findings have implications for psychological interventions in depression, particularly in terms of the potential importance of addressing dysfunctional attitudes in recurrent depression.

A growing body of research points to the value of investigating dysfunctional attitudes within bipolar disorder. These have been found to be elevated in individuals with a history of bipolar disorder relative to nonaffectively disordered individuals (Scott, Stanton, Garland, & Ferrier, 2000), and, furthermore, to be elevated in hypomanic and bipolar depressed individuals as compared with individuals in remission from bipolar disorder (Scott & Pope, 2003). Thus there is evidence that bipolar disorder is associated with elevated levels of dysfunctional attitudes, particularly during the active phase of the illness. This raises the question of whether, as has been hypothesized to be the case in unipolar depression, dysfunctional attitudes are mood-state dependent in bipolar disorder.

Yet why should a set of dysfunctional beliefs traditionally associated with depression also be of relevance to mania? Looking beyond the presence of extreme attitudes to examine their content may help to address this issue. Several studies suggest that particular dysfunctional cognitions—namely those reflecting achievement and goal-striving beliefs—are linked to a propensity to mania. Increases in manic symptoms have been found to be predicted by achievement-striving scores (Lozano & Johnson, 2001), while a study of life events in bipolar disorder found those events linked to goal-attainment to be predictive of manic symptoms, despite more general positive life events failing to predict the same (Johnson et al., 1999). There is evidence that some of these attitudes are captured by the DAS: With a version of the DAS that

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had been factor-analyzed by using data from a bipolar population, Lam, Wright, and Smith (2004) found bipolar participants to obtain elevated scores on a subscale comprising "goal-striving" attitudes relative to unipolar individuals. This subscale was found to be positively correlated with (a) past number of hospitalizations due to manic episodes and (b) number of previous bipolar episodes.

The studies just mentioned do not directly suggest the route by which heightened achievement-striving and goal-attainment concerns may lead to the development of mania. However, there is some evidence that dysfunctional attitudes interact with the presence of negative life events to predict not only increases in depressive symptoms but also increases in manic symptoms in bipolar individuals (Reilly-Harrington, Alloy, Fresco, & Whitehouse, 1999). Another possibility consistent with Goodwin and Jamison's (1990) instability model, is that these concerns promote a hectic and punishing routine, leading to erratic or reduced sleeping patterns. Such behavior may increase the likelihood that a manic episode will develop (Wehr, Sack, & Rosenthal, 1987).

One subtype of dysfunctional attitude with no theoretical or empirical links to the manic state is that which reflects extreme beliefs related to interpersonal dependency. Instead, these attitudes are hypothesized to be strongly linked to depressed mood, and this is supported by studies that report high levels of sociotropic and dependent thinking to be present in the depressed state (e.g., Hirschfeld et al., 1983). Therefore, in bipolar individuals, elevated levels of this type of attitude would be expected to be restricted to within the depressed mood state, as is the case in unipolar individuals.

If the mood-state dependency theory of dysfunctional attitudes is to be applied to bipolar disorder, the findings described previously suggest several predictions concerning the way in which dysfunctional attitudes should respond to mood change in bipolar individuals. First, we would expect bipolar individuals to show a pattern of change in dysfunctional attitudes in response to negative mood change similar to that found in individuals with unipolar depression by Miranda et al. (1998), in terms of both total DAS score and the dependent subscale score. Second, on the basis of the findings of Scott and Pope (2003), we would expect bipolar individuals to show an increase in DAS total score in response to an elevated mood state, as compared with unipolar and nonaffectively disordered individuals. We would expect this effect to be strongest in terms of those attitudes relating to achievement and goal attainment, as the findings of Lozano and Johnson (2001) and Lam et al. (2004) suggest that dysfunctional attitudes in these domains may be linked to a propensity to mania.

In this study, a laboratory-induced change in mood provided a basis for a comparison of three groups of participants—individuals in remission from bipolar affective disorder, individuals in remission from unipolar depressive disorder, and individuals with no history of affective disorder—in terms of change in level of dysfunctional attitudes expressed. Participants were assigned to one of two mood conditions, to test different hypotheses:

Hypothesis 1. Following high mood induction the bipolar group shows an increase in DAS total score—and in the Goal Attainment and Achievement subscales in particular—relative to the unipolar and control groups.

Hypothesis 2. Following low mood induction, both the bipolar and unipolar groups show increase in DAS total score—and in the Dependent subscale score in particular—relative to the control group.

Method

Design

There were two between-subjects variables (three groups: bipolar, unipolar, control; two conditions: high induced mood, low induced mood) and one within-subject variable (two times: before mood induction and after mood induction).

Procedure

Potential clinical participants who expressed an interest in taking part in research projects were contacted by letter. Newspaper and magazine advertisements and an advertisement placed in the Employment Direct Database were also used to recruit controls from the London area. Informed written consent was obtained by post prior to the initial screening assessment, which is described below. The consent procedure was then repeated in person on the day of the experiment.

To ascertain the suitability of potential participants a screening interview was carried out using the Structured Clinical Interview for *DSM–IV* (SCID-IV; American Psychiatric Association, 1994). This facilitates identification of any previous mood episodes, as well as other Axis I psychiatric disorders as defined by *DSM–IV*.

On the day of testing, participants were administered the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the Mania Rating Scale (MRS; Bech, Rafaelson, Kramp, & Bolwig, 1978) to measure current depressive and hypomanic symptomatology respectively. These instruments were used to identify any participants who may be experiencing significant mood symptoms despite not meeting *DSM–IV* criteria for an episode of mood disturbance. Participants were randomly allocated to one of two conditions: high or low mood change. The condition determined which induction material was presented.

Prior to the mood induction procedure, subjects completed the DAS, the Behavioral Engagement Measure (BEM; Krauss, Depue, Arbisi, & Spoont, 1992) and a visual analogue scale (VAS) indicating current mood level. Following mood induction mood, ratings were taken again, and the same version of the DAS was completed again. Participants who—according to postinduction VAS scores—did not respond to the mood challenge were asked to repeat the induction procedure.

At the end of the experiment, participants were allowed time for their mood to return to normal levels. Participants were debriefed, paid £15, and thanked for their help.

All measures were administered by a researcher trained in the use of the SCID–IV and MRS, and with two years' experience of using these instruments, gained while working on a trial of cognitive behavioral therapy for bipolar I disorder (Lam et al., 2003). In the initial training, full agreement between the above researcher and another researcher trained in the use of the SCID–IV was found for the first three cases. Because data were gathered by one person only in this study, it was not possible to calculate interrater reliability for the observer-rated measures (SCID–IV and MRS) for all participants.

Participants

All participants were required to be between 18 and 70 years of age. Participants currently meeting *DSM–IV* (American Psychiatric Association, 1994) criteria for substance disorder, or with a

DSM–IV diagnosis of schizoaffective disorder, were excluded from the study.

All participants were currently euthymic (BDI score less than 15 and MRS score less than 6). In addition, participants in the bipolar group (BD) were required to meet *DSM–IV* criteria for bipolar I disorder. Participants in the unipolar depression group (UD) were required to meet *DSM–IV* criteria for lifetime major depressive disorder. Participants in the control group were required to have no history of affective disorder according to *DSM–IV* criteria.

In order that the sample being tested be euthymic, potential participants meeting the criteria for an episode of mood disturbance within the last month were postponed from taking part until 2 months free of episode had elapsed.

Materials

Measures

VAS. Momentary mood state was measured by using a visual analog scale measuring 10 cm, labeled *low* on the left side and *high* on the right, with a mark at the central point. Participants were asked to place a cross at the point that best described their mood as it was at that moment. This technique of ascertaining current mood level has been used in previous studies (e.g., Clark & Teasdale, 1985; Teasdale & Fogarty, 1979; Teasdale & Russell, 1983) and has the advantage of providing a quantitative measure of mood change, which may be important when considering correlations between mood change and change in cognitions (Martin, 1990).

BDI (Beck et al., 1961). This is a 21-item self-report questionnaire, with higher scores corresponding to higher levels of depression. The internal consistency of the BDI has been found to be good for both psychiatric and nonpsychiatric populations (Cronbach's alpha = .86 and .81, respectively; Beck, Steer, & Garbin, 1988). This measure was used as an estimate of the extent to which depressive symptoms were present in participants at the time of testing.

MRS (Bech et al., 1978). The MRS is an 11-item observer-rated instrument, with higher scores corresponding to higher levels of hypomania or mania. This scale has been shown to have good internal consistency (Cronbach's alpha = .90; Bech, 2002). This measure was used as an estimate to which manic symptoms were present in participants at the time of testing.

BEM (Krauss et al., 1992). This measure contains five items designed to correspond to behavioral, cognitive, and emotional correlates of the behavioral engagement system (or behavioral activation system) as described by Depue and colleagues in this area (e.g., Depue et al., 1987). Investigations of this system suggest a correspondence between the state of the system and the manifestation of depressive or manic symptoms (Goplerud & Depue, 1985; Meyer, Johnson & Carver, 1999). The five items, rated on 10-point fully anchored scales, address energy, optimism, mood, liveliness of thought, and interest in or excitement about the environment. This measure was selected because it was considered to access several aspects of what one might consider to constitute mood state, as well as including a specific "mood" item that is fully anchored and, therefore, allows qualification of each participant's mood rating. The purpose of including this scale was to confirm that the primary mood measure used—the VAS—was measuring mood along a dimension that could be considered relevant to the study of bipolar affective disorder.

DAS–24 (Lam et al., 2004; Power et al., 1994). The DAS-24 consists of statements that may represent implicit rules and conditions for self-acceptance held by an individual. If such rules were to be held in their extreme version, they would constitute inflexible and unrealistic standards—for example, "I should be happy all the time," or "I am nothing if a person I love does not love me." High scores on the DAS correspond to endorsement of such dysfunctional attitudes. In this study, the 24-item DAS was used to measure the extent to which participants endorsee extreme beliefs as characterized by three subscales: Achievement, Goal Attainment, and Dependent Relationships with Others (Lam et al., 2004). These correspond approximately to the Achievement, Control, and Dependency subscales derived by Power and colleagues (Power et al., 1994). The Lam et al. (2004) version of the DAS was developed through principal components analysis of data from 140 individuals with remitted bipolar I disorder who completed the Power et al. (1994) version. The three new subscales have good internal consistency (Cronbach's alpha = .79, .78, and .80 for Goal Attainment, Dependent and Achievement subscales, respectively). It was selected for use within this study because its subscales were thought to more accurately reflect the dysfunctional cognitions that may become elevated in bipolar disorder (Lam et al., 2004).

Mood-Induction Material

Mood-induction material consisted of two sets of three film and TV clips lasting approximately 5 min. Presentation of visual material has been used by several groups if researchers to elicit high and low mood change, and Martin (1990) reported this technique to have been successful in around 75% of cases. The clips were selected from a set of 40 originally collected for use in a separate mood-challenge study (Newsom-Davis, 2004). This set was shown to a pilot group of five bipolar individuals, who were asked to rate their mood level after each clip (positive and negative clips alternated with neutral clips). The three clips most effective in eliciting high mood, and the three most effective in eliciting low mood, were selected. The chosen high mood clips featured themes of comedy. The chosen low mood clips featured themes of separation and bereavement. Neither set of clips was judged to involve scenarios that emphasized goal attainment or achievement.

Results

In total, 257 individuals were sent information about the study. Of these, 147 respondents returned consent forms and were assessed. Of these, 123 were found suitable. Three participants (1 from each group) did not complete the experimental stage, leaving a total of 40 participants in each group. The demographic characteristics and clinical features of the sample are given in Table 1.

The three groups did not differ significantly in terms of age, sex, highest educational level attained, or employment status.

In terms of clinical characteristics, there were no significant differences between the BP and UP groups with the exception that the BP group had a significantly higher number of admissions for depression ($z = -3.03$, $p < .005$).

Mood and Cognition at Baseline

One-way analyses of variance (ANOVAs) were used to check for intragroup differences in mood level at baseline. No significant differences were found between the three groups in terms of score on the MRS or BEM. However, a significant difference in the BDI scores of the three groups was found, $F(2, 119) = 5.58$, $p = .005$. Post hoc comparison revealed that this difference was due to the fact that UP had significantly higher mean BDI scores than did the other two groups (BP = 4.65, $SD = 4.23$; UP = 7.18, $SD = 4.11$; CL = 4.43, $SD = 3.92$). The difference between the three groups in VAS score was also close to the significance level of $p = .05$, $F(2, 119) = 2.91$, $p = .058$; BP = 53.06, $SD = 11.66$; UP =

Table 1
Demographic Characteristics and Clinical Features of the Sample

Variable	Bipolar group	Unipolar group	Control group
Mean age (*SD*) in years	44.0 (10.6)	46.7 (11.6)	43.6 (10.6)
Sex (male/female)	16/24	8/32	16/24
No. attaining A-level stage (equivalent to U.S. high school diploma)	27	31	29
No. employed	17	18	26
Mean age (*SD*) at first depressive episode	25.47 (12.61)	28.75 (10.08)	
Mean age (*SD*) at first manic episode	28.03 (9.20)		
Mean no. (*SD*) of previous depressive episodes	5.50 (6.02)	7.70 (12.59)	
Mean no. (*SD*) of previous manic episodes	4.20 (3.11)		
Mean no. (*SD*) of previous hospital admissions for depression	1.18 (2.04)	0.25* (0.87)	
Mean no. (*SD*) of previous hospital admissions for mania	3.08 (3.23)		
Mean no. (*SD*) of months since last depressive episode	39.07 (43.13)	59.93 (89.50)	
Mean no. (*SD*) of months since last manic episode	40.09 (45.83)		
Mean no. (*SD*) of months since last admission for depression	76.63 (76.05)	142.80 (91.23)	
Mean no. (*SD*) of months since last admission for mania	37.48 (52.47)		

*$p < .005$.

55.29, $SD = 15.33$; CL = 60.14, $SD = 12.98$). Therefore, BDI and VAS baseline scores were included as covariates in all subsequent analyses of between-groups differences.

Baseline VAS score and BDI score were entered as covariates in analysis of covariance tests, with DAS total and subscale scores as dependent variables and group as a fixed factor. No significant differences in baseline DAS scores were found between the three groups. Table 2 displays the mean scores obtained by the groups for mood and DAS scores both before and following mood induction.

Table 2
Mean Scores for Cognitive and Mood Variables Before and After Mood Induction, by Group and Condition

	Preinduction						Postinduction					
	Bipolar		Unipolar		Control		Bipolar		Unipolar		Control	
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
All participants												
MRS	0.30	0.57	0.40	0.50	0.40	0.68	—	—	—	—	—	—
BDI	4.90	4.04	8.15	3.41	4.65	3.50	—	—	—	—	—	—
Low mood condition												
VAS[b]	50.95	9.05	57.30	13.73	61.85	11.35	25.50	11.75	36.50	12.83	39.80	17.29
DAS-T	80.48	20.30	81.30	21.62	74.12	11.45	82.22	21.02	85.33	24.46	74.10	14.51
DAS-A	16.99	5.72	18.15	7.31	15.70	4.08	17.01	6.10	18.75	7.93	14.45	3.95
DAS-D	13.40	3.98	13.65	5.10	10.85	3.15	13.90	3.97	14.50	5.80	11.65	3.98
DAS-G	22.41	20.30	21.15	7.67	22.72	6.59	22.50	8.93	21.25	8.36	21.90	7.97
MRS	1.05	1.05	0.60	0.75	0.40	0.75	—	—	—	—	—	—
BDI	4.40	4.51	6.20	4.60	4.20	4.37	—	—	—	—	—	—
High mood condition												
VAS[b]	55.18	13.71	53.28	16.90	58.43	14.51	65.70	13.94	69.05	18.86	76.15	14.91
DAS-T[c]	84.60	25.13	88.76	24.27	83.50	18.62	83.30	26.14	77.79	21.86	78.25	15.81
DAS-A[d]	16.60	7.54	19.00	7.23	16.25	6.20	17.05	8.32	15.75	6.53	15.63	6.88
DAS-D	13.80	4.86	14.25	6.17	11.75	4.58	13.30	5.37	11.85	5.12	10.48	3.31
DAS-G[c]	22.80	7.22	22.97	6.65	25.35	8.39	23.40	8.10	21.00	6.23	25.19	8.56

Note. MRS = Mania Rating Scale (Bech et al., 1978); BDI = Beck Depression Inventory (Beck et al., 1961); VAS = visual analog scale; DAS = Dysfunctional Scale-24 (Power et al., 1994); DAS-T = DAS total score; DAS-A = DAS achievement score; DAS-D = DAS dependency score; DAS-G = DAS goal-attainment score.
[a] Significant difference between groups ($p < .01$). [b] Significant difference within groups following mood induction ($p < .001$). [c] Significant difference between groups following mood induction ($p < .05$). [d] Significant difference between groups following mood induction ($p < .01$).

Degree of Mood Change Between Groups

Chi-square tests revealed the three groups not to differ in either mood condition terms of the number of individuals requiring the mood induction procedure to be repeated.

Repeated measures ANOVAs were carried out for each group in both mood conditions to check whether significant change in mood (measured by using both the VAS and the BEM) had been obtained. All groups showed highly significant changes in mood as measured by both VAS and BEM in the expected direction in both conditions. In the low mood induction condition, the mean changes in VAS score were BP = −25.45, *SD* = 13.29, $F(1, 19) = 73.30$, $p = .000$; UP = −20.80, *SD* = 11.48; $F(1, 19) = 65.63$, $p = .000$; CL = −22.05, *SD* 13.63; $F(1, 19) = 52.33$, $p = .000$. In the high mood-induction condition, the mean changes were BP = 10.53, *SD* 8.40; $F(1, 19) = 31.41$, $p = .000$; UP = 15.78, *SD* = 9.56, $F(1, 19) = 54.45$, $p = .000$; CL = 17.73, *SD* = 14.29; $F(1, 19) = 30.78$, $p = .000$.

Repeated measures ANOVAs were used to assess whether the three groups differed significantly in the extent to which reported mood changed following the induction procedure, taking pre- and postinduction VAS scores as within-subject factors. No interaction between time point and group was found for either mood condition, indicating that the groups changed in reported mood to a similar extent. This analysis was repeated by using the scores for the mood item from the BEM as the within-subject factor. Again, the groups were found not to differ.

Although no significant between-groups differences in VAS change score were found, theoretically VAS change score is an important source of covariance because, in this study, DAS score change was hypothesized to be strongly linked to mood change in two of the populations studied. Therefore, this score was included as a covariate in all subsequent between-groups analyses.

In the analyses that follow, the VAS rather than BEM scores were used as an index of mood state and change; the former measure has been used within previous studies for this purpose (cf. Martin, 1990). In this study, the two scales were found to correlate significantly, in terms if both baseline mood ($R = -.380$, $p = .000$) and change in mood level following mood induction ($R = -.746$, $p = .000$), confirming that the VAS measures mood along a dimension that is theorized to be particularly relevant to the study of bipolar affective disorder.

Group Differences in Cognitive Change Following Mood Induction

Repeated measures ANOVA models were used to test the ability of the between-subjects factor of group to predict the within-subject factors of DAS score before and after mood induction. Baseline VAS score, BDI score at baseline, and change in VAS score after mood induction were included as covariates. Separate sets of analyses were carried out for each mood condition.

No main effects of time or group were found within either mood condition. In the high-mood condition, there was a significant interaction between time point (before or after mood induction) and group for DAS total score change, $F(2, 52) = 3.83$, $p = .014$; for the Goal Attainment subscale score change, $F(2, 52) = 2.70$, $p = .039$; and for the change in score on the Achievement subscale, $F(2, 52) = 4.74$, $p = .007$. Planned further analysis with repeated measures ANOVAs revealed (a) a significant difference between the bipolar and unipolar groups in DAS score change for Goal Attainment subscale score, for Achievement subscale score, and for total DAS score and (b) a significant difference between the bipolar and control groups in DAS total score change. The difference between the bipolar and control groups on the Achievement and Goal Attainment subscales was in the predicted direction but did not reach significance. Post hoc tests did not reveal any significant differences between the unipolar and control groups in terms of DAS total score change or change in Achievement or Goal Attainment subscale score change.

In the low-mood condition, no significant differences between groups were found for change in DAS total score or for any of the DAS subscale change scores. Instead, a significant interaction between time point and mood change was found in the low condition for DAS total score change, $F(1, 52) = 10.54$, $p = .002$.

Past CBT and Mood-Dependent Cognitive Change

Post hoc analyses were carried out to explore whether previous CBT experience had any effect on mood manipulation on the dysfunctional beliefs. A total of 18 (45%) of the participants with a history of bipolar affective disorder reported having received a course of CBT: mean duration of therapy = 5.46 months (*SD* = 1.39); mean time since last session = 15.06 months (*SD* = 6.96). Using *t* tests and chi-square tests to compare the group who had received CBT with those who had not, we found no significant differences were found between the two groups in terms of age, gender, education level, number of previous episodes, number of previous admissions, age of onset of bipolar illness, mood at baseline or baseline DAS score.

To investigate the possibility that having received CBT in the past may affect the extent to which DAS score changes with mood, post-mood-challenge linear regressions were carried out. The dependent variable was DAS change, with baseline VAS and BDI scores, VAS change score, and baseline DAS score as independent variables in Block 1 and past experience of CBT in Block 2.

In the low-mood condition, 8 of those in the bipolar group had received CBT, and 12 had not. Past experience of CBT significantly predicted change in DAS total score. The group ($n = 8$)who had received CBT showed less increase in DAS total score ($M = 0.63$, $SD = 7.25$) following induction of negative mood than did the group (n = 12) who had not received CBT ($M = 2.48$, $SD = 20.84$). Table 3 gives details of the regression equation. In the high-mood condition 10 of 20 in the bipolar group had received CBT. Past experience of CBT did not predict DAS score change in this condition.

Of those individuals in the unipolar group, 8 had received CBT in the past. Using *t* tests and chi-square tests to compare the group who had received CBT with those who had not, we found no significant differences between the two groups in terms of age, gender, education level, number of previous episodes, number of previous admissions, age of onset of depressive illness, mood at baseline, or baseline DAS score. In the high-mood condition, only 2 of 20 individuals had received CBT; therefore, the two groups were not compared. In the low-mood condition, 6 of the unipolar group had received CBT in the past, whereas 14 had not. The

Table 3
Details of Final Regression Equation for CBT's Predicting DAS Change in Low Condition, for Bipolar Group Only

Dependent variable	Independent variable	β	*SE*	*p* (2-tailed)
Change in DAS total score[a]	Baseline VAS score	−0.258	0.345	.466
	BDI score	2.039	0.500	.058
	Change in VAS score	−0.822	−0.632	.006
	DAS total score at baseline	−0.507	−0.624	.018
	CBT in past	−15.845	−0.483	.035

Note. CBT = cognitive-behavioral therapy; DAS = Dysfunctional Attitudes Scale-24 (Power et al., 1994); BDI = Beck Depression Inventory (Beck et al., 1961); VAS = visual analogue scale.
[a] $R^2 = .57$.

majority of those who received CBT (4/6) were unable to recall the duration or date of their treatment.

When the analysis described earlier was carried out by using data from the unipolar group in the low-mood condition, there was a trend for past experience of CBT to predict total DAS score change ($p = .060$), with the group who had received CBT ($n = 6$)in the past showing less change in DAS score (M = 1.00, $SD = 12.74$) than the group ($n = 14$) who had not ($M = 5.33$, $SD = 9.45$).

The analyses of between-groups differences in DAS change in the low-mood condition were repeated, excluding those participants in the clinical groups who had received CBT in the past. The results remained nonsignificant.

Discussion

This study used a laboratory-induced change in mood to investigate the relationship between small changes in mood and change in DAS score in individuals with a history of bipolar disorder who were currently euthymic. Two control groups comprising individuals with a history of unipolar disorder (currently euthymic) and individuals with no history of affective disorder were included.

In line with the mood-state dependency theory, it was hypothesized that following an increase in mood the bipolar group would show an increase relative to the unipolar and nonaffectively disordered groups in DAS total score and in the Goal Attainment and Achievement subscales in particular. This hypothesis was partially supported: High mood appeared to reduce dysfunctional attitudes in the nonbipolar groups to a greater extent than in the bipolar group. However, this effect was weakened when subgroups of dysfunctional attitudes were considered, such that for goal-attainment and achievement-related attitudes, only the unipolar group showed a significant reduction in dysfunctional thinking relative to the bipolar group.

The lack of significant difference between the control and bipolar groups on these subscales may have several explanations. First, DAS total score is calculated from a relatively large number of items, incorporating both the Goal Attainment and Achievement subscales. This can be expected to result in reduced variance within groups, and, therefore, a relatively weak effect may be detected. Second, mood changes in this study were small and may not have been sufficient in all participants to markedly affect cognition.

Taken together, however, the results of this study suggest that bipolar individuals differ from nonbipolar individuals—particularly those with a past history of depression—in terms of attitude change in response to high mood. Interestingly, rather than bipolar disorder being characterized by the activation of dysfunctional attitudes following mood increase, it appears that nonbipolar individuals' dysfunctional attitudes decrease in response to high mood, whilst this response is minimal in bipolar individuals.

The mood-state dependency theory suggests that high mood should activate "manic" schema, of which extreme conditional assumptions are a part. The data from this study do not provide clear support for this prediction. Instead, our data are more consistent with the possibility that bipolar psychopathology is characterized by a failure to relax unhelpful conditional assumptions in response to an increase in mood. Retained dysfunctional assumptions in bipolar individuals may then interact with elevated mood to promote further mood increase. It is not yet clear exactly how mood may interact with such cognitions in the development of a manic episode, but dysfunctional assumptions may provide a potential springboard to further increase in mood. Dysfunctional attitudes represent conditional rules about the self, and, although most frequently discussed with reference to depressed mood, they are in a sense affectively neutral. Strong affect arises only when a rule is perceived to have been, or not to have been, met. Because high positive affect—even in those who do not suffer from an affective disorder—is associated with increased subjective probability of a good outcome (e.g., Johnson & Tversky, 1983), an individual holding conditional assumptions in the face of elevated mood may be more likely to see him-or herself as having fulfilled them or as being able to fulfill them by means of goal-driven behavior. In line with the cognitive model, fulfilling a conditional assumption may raise mood through the generation of positive automatic thoughts—for example, "I am extremely talented." Thus, in bipolar individuals, a positive shift in mood may lead to driven behavior and further mood increase through the impact of retained conditional assumptions, whereas in nonbipolar individuals, relaxation of these assumptions removes a potential trigger for further mood increase. This account bears some similarity to the behavioral activation system account of bipolar disorder, whereby bipolar and nonbipolar individuals do not differ in the initial development of a positive mood state, but are instead

differentiated by the failure of the former group to return mood to baseline levels (Depue et al., 1987; Goplerud & Depue, 1985).

Mood change alone may well be neither sufficient nor necessary to trigger the development of manic symptoms, even if maladaptive schemas are present. The individual may be most at risk when mood change is accompanied by changes in routine and emotional or physiological stress—for example a major life event. Furthermore, life events themselves may directly interact with dysfunctional attitudes to precipitate manic symptoms (Reilly-Harrington, Alloy, Fresco, & Whitehouse, 1999). Therefore the findings of this study, and the possibilities they suggest, should be viewed as small aspects of a much larger—and as yet unelaborated—explanatory system.

No evidence was found to support the second hypothesis of this study, which was that, following a decrease in mood, both the bipolar and unipolar groups—relative to the control group—would show an increase in DAS total score and in the Dependent subscale score in particular. In addition, the absence of between-groups differences in the low-mood condition represents a failure to replicate the results of Miranda et al. (1998). Again, this finding may reflect the relatively small changes in mood elicited by this study. Indeed, in the low-mood condition a, significant interaction was found between mood decrease and DAS score increase, suggesting that, had it been possible to induce more substantial negative shift in mood in all participants, changes in DAS score would have been larger, and between-groups differences may have emerged.

A further factor that may have contributed to the absence of positive findings in the low mood condition and the failure to replicate the findings of Miranda et al. (1998) is our inclusion of participants who had received CBT in the past. This study found that past CBT appeared to offer some protection against DAS score increase in the face of low mood induction in the bipolar group and a trend for this in the unipolar group. A similar finding was reported by Segal et al. (1999), who compared individuals with remitted unipolar depression treated with CBT with a group who had received pharmacotherapy. They found the CBT group increased less in terms of DAS score following negative mood induction than did the pharmacotherapy group. Nevertheless, when the primary analysis in the present study was repeated, excluding those who had received CBT, differences between the three groups remained nonsignificant. However, interpretation of this analysis is complicated by the greatly reduced numbers of individuals in the clinical groups. Also, although many of the bipolar sample had participated in a randomized controlled trial of CBT for bipolar disorder (Lam et al., 2003) and therefore the quality, duration and timing of CBT in this group could be corroborated for most participants, this was not so in the unipolar group. The validity of the outcome of the analysis may thus have been compromised by reliance upon subjective reports of treatment history.

It is interesting to note that past CBT did not predict DAS score change in the high condition. Lam, Hayward, Watkins, Wright, and Sham (2005) found that, although a 6-month course of CBT for bipolar disorder appeared to protect clients against depressive episodes for the duration of the trial period (30 months), protection against mania was limited to the initial 12 months. Given that the mean time since last CBT session was more than 12 months for the participants in the present study, it is possible that the failure of CBT history to predict DAS change was due to reduction in the effectiveness of the treatment received after a certain period.

Theoretical and methodological aspects of the present study merit refinement. First, further research is necessary to more clearly define the concepts of dysfunctional achievement and goal-attainment attitudes as they might relate to bipolar disorder: For example, would the effect be more powerful if the dysfunctional attitudes being measured were tailored to the goals of the individual, or does high mood maintain goal-striving in all areas? Second, because the changes in mood elicited in this study were relatively small, the likely pattern of attitude change following a more substantial mood increase is not clear. On a related point, the mood induction procedure was designed to elicit affective change according to a broad definition. It is possible that mood inductions with a more specific focus—for example, with the aim of increasing focus on reward—would have more specific effects on cognitive processes. Finally, the present study focused on a narrow aspect of cognition, which, despite making suggestions as to how the individual might process information and behave, does not demonstrate that such information-processing biases or maladaptive behaviors occur. For example, are individuals who maintain should goal-striving beliefs when high in mood at increased risk of overactivity? Ideally, future studies should investigate the ways in which extreme conditional beliefs manifest themselves in the face of high mood in cognitive, emotional, and behavioral terms, as well as the implications of this for the development of bipolar symptoms.

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