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Cognitive styles in individuals with bipolar disorders

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ABSTRACT

Background. Published studies of emotional processing and cognitive style in bipolar disorders tend to have small sample sizes or use non-clinical samples. Larger clinically representative studies are needed.

Method. Self-esteem, dysfunctional attitudes and personality style were compared in unipolar ($N=16$) and bipolar disorder ($N=77$); and then investigated in the different phases of bipolar disorder (remitted = 26; depressed = 38; hypomanic = 13). One-year outcome was assessed in 36 bipolar subjects.

Results. Unipolar subjects and bipolar subjects differed significantly in their mean levels of negative self-esteem (unipolar = 15·5; bipolar = 12·7; $P<0·05$). Bipolar subjects with hypomania reported mean levels of dysfunctional beliefs that were higher than individuals in remission but lower than depressed subjects (remitted = 136·7; depressed = 153·8; hypomanic = 144·8; $P<0·05$). Hypomanic subjects recorded the highest levels of negative as well as positive self-esteem. In the exploratory analysis of outcome, negative self-esteem (Exp [B] 1·91; 95% CI 1·11 to 3·32; $P<0·05$) was the most robust predictor of relapse.

Conclusions. There are similarities in the cognitive style of individuals with unipolar as compared to bipolar disorders. Cognitive style in hypomania represents a phase between remission and depression rather than the polar opposite of depression. The implications of these findings are considered for psychological and neural network models.

INTRODUCTION

Recent studies of the neuropsychology of bipolar disorders (BP) demonstrate deficits across a range of areas, particularly executive function and working memory. These data suggest that BP is associated with global rather than specific patterns of impairment that are similar to those seen in schizophrenia and sometimes reported in unipolar disorders (UP). This lack of neuropsychological differentiation may arise because neuropsychology tests map 'cold' cognitive circuits rather than the 'hot' or affective circuits that examine an individual's ability to process emotional information (Alexander *et al*. 1986). The latter are of interest because thinking style; mood congruent biases in information processing and dysfunctional views of the self and others are amenable to change during psychotherapy. However, for therapy to be effective in a particular disorder, it is important to establish which specific psychological vulnerabilities need to be targeted for modification.

There are few empirical studies of cognitive style in BP. Scott *et al*. (2000) have previously demonstrated that, compared with healthy controls, individuals with BP show higher levels of sociotropy (interpersonal dependency) and of dysfunctional attitudes (particularly related to need for social approval and perfectionism). However, research comparing self-esteem, dysfunctional attitudes, and attributional or personality style in UP and BP has produced inconsistent findings. Some studies suggest self-esteem is higher in mania than depression and

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dysfunctional attitudes lower; others found no significant differences between UP and BP (Ashworth *et al*. 1982; Alloy *et al*. 1999). In the majority of these studies, samples were small, selective or included non-clinical subjects. To overcome these problems, we compared three key measures of cognitive style in BP and UP subjects receiving mood stabilizers. We then explored cognitive style in different phases of BP and, in about half the original BP sample, assessed whether cognitive variables predicted outcome at one year. This is the largest clinical study so far undertaken.

METHOD

Sample

With ethical approval, a research psychologist (M. P.) identified from biochemistry laboratory and case records individuals who met the following criteria: (*i*) aged 18 years or over; (*ii*) currently met DSM-IV criteria (American Psychiatric Association, 1994) for a unipolar or bipolar affective disorder; (*iii*) in contact with general adult psychiatric out-patient services; (*iv*) having serum plasma level monitoring of lithium, carbamazepine or sodium valproate and these medications were prescribed specifically as a mood stabilizer. Individuals were excluded if they were: (*i*) currently an in-patient; (*ii*) had an organic brain disorder or other cognitive problem that impeded their ability to give written informed consent or to complete the questionnaires; (*iii*) had significant co-morbidity or substance misuse; (*iv*) had taken part in our previous study of neuropsychological functioning and cognitive style; or (*v*) declined to complete the questionnaires.

Letters were sent to the treating psychiatrists seeking permission to approach the individuals identified. We received permission to contact 146 out of 182 potential subjects. Of this sample, a further 53 individuals were excluded or declined to give written informed consent, so the final sample comprised 16 individuals with UP and 77 with BP. A significant proportion of subjects with BP went on to participate in a pilot study of cognitive therapy and was excluded from the follow-up phase, so we obtained further data about 12 months later (range 11–15 months) on 36 BP subjects (48% of the BP sample).

Assessments

Individuals initially participated in a semi-structured interview (Scott *et al*. 2001) that collates basic demographic and illness information including DSM-IV diagnosis, age of onset of affective disorder, duration and severity of disorder, frequency of recurrences (including data of onset and duration of episode) and duration and type of treatment. This information can be supplemented by data from the case notes.

At baseline and follow-up interviews, the participants completed the following four self-ratings.

(*i*) *Internal State Scale* (*ISS*) (Bauer *et al*. 1991)

The ISS was developed to allow simultaneous assessment of manic and depressive symptoms. It is a 16-item scale, with each question rated on a 0–100 mm Likert scale. The scale was developed on an inpatient sample with BP and UP disorders, and a control group of healthy subjects. Four factors were produced: Activation, Perceived Conflict, Well-being and Depression. Results showed that Activation scores were significantly higher for the manic group than for the depressed or control groups. Scores on this subscale also correlated significantly with an established interview measure of mania (e.g Young Mania Rating Scale $r=0{\cdot}55$, $P<0{\cdot}03$). The Depression subscale correlated significantly with the Hamilton Depression Rating Scale ($r=0{\cdot}84$, $P<0{\cdot}0001$). In test–retest evaluations, the ISS was found to be sensitive to changing affective states. Furthermore, combining the ratings on each subscale, it is possible to classify subjects as depressed (Well-being score <125), in remission (Well-being >125, Activation <200), or hypomanic/manic (Well-being score >125, and Activation score >200). In our study, we have used the term hypomanic to describe individuals in the latter group. Subjects in a full-blown episode of mania were excluded until their symptoms subsided sufficiently for them to be unable to give written informed consent and they could participate in the assessments.

(*ii*) *Rosenberg Self-Esteem Questionnaire* (*SEQ*) (Rosenberg, 1965)

The SEQ was developed to measure trait self-esteem. It is a short 10-item questionnaire,

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comprising five positive and five negative statements each rated on a 1–4 scale. The positive self-esteem subscale is rated on a positive scale, whilst the negative self-esteem subscale is rated on a negative scale (−5 to −20). Combining these subscale ratings produces a total SEQ score, but obviously this is likely to give a low positive or low negative overall score. Alpha internal consistencies on previous samples of UP and BP subjects are generally good (0·80–0·94).

(*iii*) *Dysfunctional Attitudes Scale* (*DAS*) (Weissman, 1978)

This scale is widely used to measure underlying beliefs and attitudes. We used the 40-item version of the DAS. Each item is rated on a 1–7 scale measuring the individual's agreement with the stem statements. As well as a total score, the scale gives two subscale ratings (Need for Social Approval and Perfectionism). A number of studies have shown good internal consistency, with a coefficient α of 0·89–0·92. Reliability has also been good, with coefficients >0·80.

(*iv*) *Sociotropy Autonomy Scale* (*SAS*) (Beck *et al.* 1983)

The SAS measures two largely independent personality characteristics that may influence an individual's cognitive and emotional response to life events. Scores for each construct range from 0–120 with higher scores indicating higher levels of that particular trait. A recent revision of the SAS has identified two subscales for each dimension (Bieling *et al.* 2000). The factors for Sociotropy are: Fear of Criticism and Rejection (16 items that measure sensitivity and neediness) and Preference for Affiliation (12 items that measure attachment and desire to be with others). Both measures are correlated with psychopathology, but Fear of Criticism shows a stronger association than Preference for Affiliation. The factors for Autonomy are: Sensitivity to Others' Control (17 items) and Independent Goal Attainment (8 items). Sensitivity to Others' Control has a demonstrable but weaker association with psychopathology than the Sociotropy subscales. Independent Goal Attainment is distinguished by being inversely correlated with psychopathology. As such it is seen as a measure of resilience and may function as a buffer against stress. The Sociotropy and Autonomy scales have good internal consistency, with a coefficient α of 0·90 and 0·83 respectively. The subscales also have good internal consistency ranging from 0·60–0·86.

Statistical analysis

All analyses were undertaken using SPSS (version 10.0). The BP and UP groups were compared on cognitive measures using separate multivariate analyses of variance (MANOVA), with age, gender, age at onset of first affective episode, number of previous affective episodes and symptom ratings on the four ISS subscales as covariates (as all these variables may be associated with differences in cognitive style). Following the MANOVAs, univariate comparisons were conducted for each measure using one-way analyses of variance (ANOVA). The same approach was used to explore differences between BP subjects who were currently hypomanic, depressed or remitted (with *post hoc t* tests as appropriate). Regression analyses were used to determine which baseline variables best predicted the clinical status (depressed, manic or remitted) of the 36 BP subjects followed-up at 1 year. Backward conditional logistic regression was used to explore which variables correctly classified individuals into 'currently in episode' *v.* 'in remission' groups. Poisson regression analysis was then used to explore which variables predicted mental state at final follow-up (no change, depressed, manic, remitted). The follow-up analyses must be regarded as preliminary.

RESULTS

As shown in Table 1, the sample was aged about 43 years (range 18–70) and 60% (56/93) were female. Subjects had been ill for about 16 years (range 2–22) and had experienced a median of about five affective episodes (range 1–23). The sample had been on their present mood stabilizer for about 5 years, 85% were taking lithium. On the ISS, BP subjects scored non-significantly higher on three of the four subscales (Activation, Perceived Conflict, Depression), with UP subjects having a non-significantly higher mean Well-Being score.

When current symptoms and other demographic and clinical characteristics were controlled for, UP and BP subjects showed more

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Table 1. *Basic demographic and clinical features of unipolar and bipolar groups*

	Unipolar group ($N=16$)	Bipolar group ($N=77$)
Age in years, mean (S.D.)	45·7 (12·3)	41·4 (11·4)
Gender		
Male	5 (31%)	32 (42%)
Female	11 (69%)	45 (58%)
Age at onset in years, mean (S.D.)	30·1 (13·9)	23·9 (11·3)
Previous episodes, median N (25th, 75th quartile)	4 (3, 7)	6 (3, 10)
Mood stabilizer, years (S.D.)	4·1 (3·2)	5·8 (4·9)
Internal State Subscales, mean score (S.D.)		
Depression	58·3 (55·1)	72·1 (56·6)
Well-being	150·3 (75·1)	124·2 (74·4)
Activation	149·3 (103·7)	152·2 (103·1)
Perceived Control	129·0 (99·2)	142·4 (98·3)

Table 2. *Mean scores (S.D.) on cognitive style measures of unipolar and bipolar groups*

	Unipolar group ($N=16$)	Bipolar group ($N=77$)
Rosenberg Self-Esteem Scale		
Total score	−2·7 (4·9)	1·4 (6·2)
Negative scale score[a]	15·5 (2·9)	12·7 (3·7)
Positive scale score	12·6 (3·3)	14·3 (2·9)
Dysfunctional Attitude Scale		
Total score	143·9 (44·3)	146·5 (41·0)
Need for Approval scale	47·3 (13·7)	47·5 (13·4)
Perfectionism scale	52·9 (24·1)	53·2 (20·2)
Sociotropy – Autonomy Scale		
Sociotropy total	64·8 (20·6)	69·6 (17·8)
Sociotropy – Fear of Criticism subscale	39·5 (14·1)	39·8 (12·6)
Sociotropy – Preference for Affiliation subscale[b]	25·3 (8·3)	29·7 (7·9)
Autonomy total	65·3 (12·9)	68·4 (15·0)
Autonomy – Independent Goal Attainment subscale	28·4 (7·5)	27·8 (7·1)
Autonomy – Sensitivity to Others' Control subscale	36·93 (8·34)	40·63 (9·98)

Univariate tests of between group differences: [a] Negative Self-Esteem subscale scores $F=3{\cdot}99$, (1, 9, 82), $P=0{\cdot}03$; [b] Preference for Affiliation subscale scores $F=5{\cdot}3$, (1, 9, 79), $P=0{\cdot}02$.

similarities than differences in cognitive style (see Table 2). Overall scores on the SEQ, DAS and SAS did not show any significant differences on the MANOVA. Univariate tests demonstrated that, on subscale scores, UP and BP subjects differed on only two measures of cognitive style: Negative Self-Esteem (mean BP = 12·7 < mean UP = 15·5; $F=3{\cdot}99$, $P=0{\cdot}03$) and Preference for Affiliation (mean BP = 29·7 > mean UP = 25·3; $F=5{\cdot}2$, $P=0{\cdot}02$).

As shown in Table 3, when BP subjects were classified as depressed ($N=38$), hypomanic ($N=13$) or remitted ($N=26$), some interesting subgroup differences emerged. There was a fairly consistent pattern of remitted BP subjects having the highest mean score for self-esteem, and the lowest for dysfunctional attitudes, sociotropy and their subscales. This pattern was reversed for depressed BP subjects. The mean scores for hypomanic BP subjects lay between those of the other subgroups. A MANOVA demonstrated these differences to be statistically significant ($F=5{\cdot}1$; $P=0{\cdot}05$) and univariate tests showed the key differences were for mean total SEQ ($F=2{\cdot}9$, $P=0{\cdot}05$) and DAS scores ($F=3{\cdot}2$, $P=0{\cdot}04$). It was noteworthy that while total SEQ scores followed the same pattern (scores for hypomania falling between remission and depression), hypomanic BP subjects recorded the highest mean scores on both the Negative and Positive SEQ subscales.

Mean scores for each group on the Sociotropy Scale of the SAS showed the same non-significant increase in scores from remitted to hypomanic to depressed BP subjects, but mean scores on the Autonomy Scale did not differ across the groups. Univariate analysis of subscale scores demonstrated one statistically significant between group difference. Mean scores on the Autonomy subscale measuring resilience, the Independent Goal Attainment scale ($F=3{\cdot}8$, $P=0{\cdot}05$), were lower in hypomanic (mean = 24·4, S.D. = 7·6) as compared to depressed BP subjects (mean = 28·9, S.D. = 7·4). However, the significant co-variate was number of previous episodes of BP rather than mental state: currently hypomanic BP subjects had a past history of more affective episodes than currently depressed subjects.

Thirty-six BP subjects participated in the follow-up interview. At baseline, 14 of these individuals were in remission, 18 met criteria for depression and four for hypomania. During the follow-up period, five subjects remained in remission whilst nine were continuously depressed. Three subjects recovered from depression but then relapsed. Binary logistic regression demonstrated that subjects with high baseline scores on the Negative Self-Esteem subscale were significantly more likely to experience an affective relapse during follow-up (Exp [B] 1·91; 95% CI 1·11–3·32; $P=0{\cdot}04$) independent of mental state

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Table 3. *Mean scores (S.D.) on cognitive style measures of remitted, hypomanic and depressed bipolar subjects*

	Remitted ($N=26$)	Hypomanic ($N=13$)	Depressed ($N=38$)
Rosenberg Self-Esteem Scale			
Total score[a]	2·3 (5·1)	1·4 (6·7)	0·9 (6·9)
Negative scale score	12·2 (2·8)	13·00 (4·1)	12·6 (4·1)
Positive scale score	14·3 (2·9)	14·5 (2·7)	13·6 (3·2)
Dysfunctional Attitude Scale			
Total score[b]	136·7 (29·1)	144·8 (43·1)	153·8 (44·1)
Need for Approval scale	44·6 (11·4)	47·3 (13·7)	49·6 (14·1)
Perfectionism scale	46·8 (14·2)	54·5 (19·8)	58·2 (21·9)
Sociotropy – Autonomy Scale			
Sociotropy total	67·3 (17·5)	70·4 (17·8)	72·6 (20·3)
Sociotropy – Fear of Criticism subscale	38·5 (12·1)	39·9 (13·0)	42·0 (13·4)
Sociotropy – Preference for Affiliation subscale	28·7 (8·0)	30·4 (8·2)	30·6 (7·9)
Autonomy total	68·5 (13·5)	68·3 (13·9)	68·7 (16·7)
Autonomy – Independent Goal Attainment subscale[c]	27·2 (6·1)	24·4 (7·6)	28·9 (7·4)
Autonomy – Sensitivity to Others' Control subscale	41·2 (10·0)	42·9 (7·9)	39·3 (10·7)

Univariate tests: [a] differences in Total SEQ $F=2·9$, (2, 5, 69), $P=0·05$; [b] differences in Total DAS $F=3·2$, (2, 5, 64), $P=0·04$; [c] differences in Independent Goal Attainment subscale score $F=3·8$, (2, 5, 63), $P=0·05$ – number of previous episodes was a significant covariate.

at baseline. There was also a trend for baseline score on the Activation subscale of the ISS to predict group membership ($P=0·06$). This analysis correctly classified 78% of subjects into the correct outcome group ($\chi^2=15·01$, df$=8$, $P=0·02$). The Poisson regression analysis correctly classified 84% of subjects into four outcome groups (no change, depressed, manic, remitted), but the χ^2 statistic failed to reach significance. There were trends for higher baseline scores of Negative Self-Esteem ($P=0·06$) and depression ($P=0·07$) to predict relapse.

DISCUSSION

General comments

There have been disappointingly few attempts to explore cognitive models of BP in clinical populations. This is partly explained by the emphasis on the biological aspects of aetiology and treatment (Prien & Potter, 1990). However, the interest in the use of cognitive therapy, interpersonal therapy and family therapy suggests that studies of psychological factors are overdue (Frank *et al.* 1994; Lam *et al.* 2000; Scott *et al.* 2001). Without greater clarity about underpinning theoretical models, these interventions will be viewed as non-specific supportive approaches rather than targeted and specific psychological treatments.

The present study is the largest so far undertaken on a representative sample of individuals with BP and the only one to carefully select an appropriate comparison group with UP disorders. This is important, as it cannot be assumed that the cognitive style of individuals with mild depression is identical to that of individuals with severe UP disorders. By selecting a UP group receiving mood stabilizers we hoped to control for some aspects of illness severity and chronicity and the potential effects of treatment on ratings of cognitive style. However, the strengths of the study need to be viewed in the context of a number of potential weaknesses. First, although we attempted to identify a representative sample, there were relatively small numbers in each subgroup and only 50% of BP subjects were included in the follow-up phase of the study. The latter means that predictors of 12-month outcome must be viewed with considerable caution.

The assessments used can also be criticized. First, there is evidence that ratings of self-esteem in BP may vary depending on whether implicit or explicit measures are employed (Lyon *et al.* 1999). Also, while we wished to look at measures that may assess emotional processing we cannot be certain that these exclusively tap into the affective circuits we wished to explore. The current assessment tools did not use

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structured interviews to establish diagnosis and this may explain why we failed to identify any individuals who met criteria for a mixed state. Finally, we used a single self-rating of manic and depressive symptoms rather than combined subjective and observer measures.

The findings

Despite the above concerns, our findings require review and comment. We have demonstrated that, when demographic characteristics, current symptoms, mental state at interview and past history are controlled, there are many similarities between individuals with UP and BP disorders on ratings of self-esteem, dysfunctional attitudes and personality style. The only statistically significant differences were that UP subjects report increased levels of negative self-esteem, while BP subjects scored higher on one aspect of sociotropy (a personality measure) that indicated a greater desire to be in the company of others. These findings reflect previous studies in smaller or mixed clinical and non-clinical samples. For example, Pardoen *et al.* (1993) demonstrated that euthymic UP subjects had significantly lower self-esteem than healthy control subjects, while the self-esteem of BP subjects was non-significantly lower than the healthy controls. Hollon *et al.* (1986) reported that, compared to healthy control subjects, individuals with UP and BP both showed higher levels of dysfunctional attitudes and negative automatic thoughts. However, there were no significant differences between UP and BP subjects when either were in a depressed phase, or UP and BP subjects when either were in remission. Alloy *et al.* (1999) and Hammen *et al.* (1989, 1992) report similar studies.

Within the BP group, there were differences in cognitive style during euthymia, depression and hypomania. Total scores on the DAS suggested that hypomanic subjects had increased levels of dysfunctional attitudes in comparison to those in remission, but that subjects who were currently depressed showed the greatest level of dysfunction. Total self-esteem score showed significant differences between depressed or remitted groups, with the mean score for hypomanic subjects falling in between. However, the subscale scores on the SEQ suggested that hypomanic subjects reported a complex combination of high levels of both positive and negative self-regard. Taken together these findings suggest that there is a relative preservation of positive self-esteem in subjects with BP, but that increasing levels of negative self-esteem predict relapse, particularly into BP depression (Johnson *et al.* 2000).

Explanations of the findings in bipolar disorders

One possible interpretation of the findings is that they represent artefact. Previous research (e.g. Hollon *et al.* 1986) has demonstrated that high scores on measures of cognitive style, such as the DAS may occur in individuals with other mental disorders such as schizophrenia. The ratings may be a general marker of psychopathology rather than a specific marker of affective disturbance. Alternatively, as self-esteem ratings were not undertaken when subjects were manic, it might be argued that the ratings obtained reflect a different mental state or indicate that they had switched into depression. However, this notion is undermined by ISS ratings, which showed that the subjects still met criteria for hypomania.

Two other explanations of the differences in self-esteem ratings are worthy of exploration. First, the reported hypothesis that subjects with BP demonstrated biases in self-report measures associated with beliefs about the need for social conformity. Secondly, there is a growing literature suggesting that mania is not the polar opposite of depression, but is a syndrome primarily characterized by motor activation and a simultaneous increase in positive and negative affect.

In a highly influential article, Winters & Neale (1985) hypothesized that although subjects with BP do not usually report impaired self-esteem, they possess a cognitive schema of low self-worth. Their study showed that, although subjects with BP and healthy controls showed higher levels of self-esteem than individuals prone to UP, the BP group scored higher than either the UP or the healthy control group on measures of social desirability and self-deception. Winters & Neale concluded that subjects with BP might have negative feelings about the self that are not revealed on the typical, explicit self-report measures employed in research settings. Two studies confirm that BP subjects show high levels of social desirability and social conformism (Pardoen *et al.* 1993;

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Scott *et al*. 2000). Likewise, Lyon *et al*. (1999) demonstrated that on implicit measures of views of the self, manic and depressed BP subjects demonstrate a 'depressive' style. However, on explicit measures, manic subjects were more likely than depressed subjects to endorse positive words as true of themselves. Neale (1988) argues that these abnormalities in implicit style of cognitive processing and the self-serving biases in explicit style are compatible with the notion of a 'manic defence'. He argues that 'threats to the vulnerable self-esteem of the patient lead to grandiose ideas that keep distressing thoughts at bay, but lead to mood elevation'. Although the hypothesis of a manic defence has always been considered a weak one, embedded within this concept is the notion also described in cognitive theory that the individual makes a pro-active response to the threat of or actual loss of reinforcement (Newman *et al*. 2001).

The data on self-esteem and dysfunctional attitudes may also provide a further challenge to the conventional view that mania is the polar opposite of depression. There is a considerable body of literature (reviewed by Goodwin & Jamison, 1990) suggesting that the most commonly reported mood states during a manic phase are irritability (reported by 80% subjects) and depression/dysphoria (72%). A recent factor analytic study of mania demonstrated five clinically relevant independent factors of which the most prominent was dysphoric mania (Cassidy *et al*. 1998). The finding on cognitive style offer support Cassidy *et al*.'s model and this is also compatible with the proposal of Watson *et al*. (1988). Watson and colleagues suggest that there are two independent neural circuits defined as 'Positive Activation or Affect' (PA) and 'Negative Activation or Affect' (NA) that control cognition and emotion. Positive Affect reflects the extent to which an individual feels enthusiastic, active, and alert. High PA is thus a state of high energy and pleasurable engagement, while low PA is characterized by lethargy and sadness. In contrast, high NA subsumes a number of aversive mood states (anger, fear, disgust, etc.), while low NA represents a state of calm. Positive Affect and NA are not necessarily correlated. The theory predicts that high levels of PA and NA would characterize mania, while low PA and high NA would characterize depression. Although the PA/NA model is unproven in BP, it could explain our SEQ findings.

Conclusions

Cognitive style in individuals with BP disorders shows similarities to that found in individuals with recurrent UP depression. The findings on cognitive style across different phases of BP may be explained by existing psychological and neural network theories of depression and mania. While this study does not provide evidence that the abnormalities in BP individuals are trait vulnerabilities that specifically predispose to onset of BP, it highlights that abnormalities in cognitive style may be a cause or effect of BP relapse.

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