



Brief report

Cognitive processes and attitudes in bipolar disorder: A study into personality, dysfunctional attitudes and attention bias in patients with bipolar disorder and their relatives



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ABSTRACT

Background: Research in cognitive processes and attitudes in bipolar disorder is scarce and has provided mixed findings, possibly due to differences in current mood state. It is unclear whether alterations in cognitive processes and attitudes are only related to the depressive mood states of bipolar patients or also represent a vulnerability marker for the development of future (depressive) episodes. This was investigated in the current study.

Methods: Both implicit (attentional bias for emotional words) and explicit (dysfunctional attitudes and personality characteristics) measures of cognitive processes and attitudes were assessed in 77 bipolar patients with varying levels of depressive symptoms (depressed = 17, euthymic $n = 60$), their healthy first-degree relatives ($n = 39$) and a healthy control group ($n = 61$). Analyses of variance were used to investigate differences between groups.

Results: Mildly depressed patients with bipolar disorder demonstrated an attentional bias away from positive emotional words and showed increased dysfunctional attitudes and higher levels of neuroticism. Euthymic patients were largely comparable to healthy controls and only differed from controls in higher levels of neuroticism. Relatives were similar to controls on all measures, although they significantly differed from bipolar patients in displaying less neuroticism and more extraversion.

Limitations: No firm conclusions regarding causality can be drawn from the associations that were found between cognitive processes and attitudes and the evolution of mood symptoms in bipolar disorder.

Conclusion: Alterations in cognitive processes and attitudes in bipolar patients appear to be mostly related to the expression of mood symptomatology rather than to the vulnerability for bipolar disorder.

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1. Introduction

Although neurocognitive deficits have been demonstrated in symptomatic and euthymic bipolar disorder (BD) patients and also in their healthy relatives (Arts et al., 2008) there has been a comparative neglect of the role of cognitive processes and attitudes in BD. The study of these processes may reveal biases in the way the environment is perceived and interpreted (Teasdale and Dent, 1987), which may not only further the development of therapeutic treatments but also provide important clues regarding the origins of this complex disorder.

The relatively few studies that investigated cognitive processes and attitudes in BD mostly used questionnaires, measuring explicit processes. Several types of (negative) cognitive thinking patterns, including dysfunctional attitudes (Jones et al., 2005; Scott and Pope, 2003), high levels of rumination (Thomas et al., 2007), altered self-esteem (Jones et al., 2005; Knowles et al., 2007) pessimistic explanatory styles (Lyon et al., 1999) and heightened levels of neuroticism (Barnett et al., 2010; Jones et al., 2005; Jylha et al., 2010) have been demonstrated. Some studies used implicit measures of attitudes and processing but results have been inconsistent (Roiser et al., 2009; Lyon et al., 1999; Kerr et al., 2005; Jongen et al., 2007). For example, whereas in one go/no go paradigm mood congruent attentional biases were demonstrated in BD patients (Murphy et al., 1999), this was not replicated in another (Rubinsztein et al., 2006).

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The inconsistencies in finding associations between cognitive processes and attitudes and BD may be partly explained by a relationship with current mood state of patients. It remains largely unclear whether any abnormalities persist during remission and consequently may act as a risk factor for the development of future illness episodes (Jones et al., 2005; Kerr et al., 2005; Scott et al., 2000; Scott and Pope, 2003; van der Gucht et al., 2009). Moreover, even when certain cognitive styles are present during euthymic states of BD this does not indicate whether these constitute a vulnerability marker for the disorder or rather represent a 'scar' of previous illness episodes. This may be elucidated by investigating cognitive processes and attitudes in at-risk groups, for example the healthy first-degree relatives of BD patients. Although neurocognitive abnormalities are found in relatives of BD patients, it is unclear whether this also applies to alterations in cognitive biases and attitudes.

In the current study, it was investigated whether alterations in cognitive processes and attitudes are (i) associated with current depressive symptomatology and (ii) represent trait characteristics of BD that are associated with the vulnerability for the disorder. This was done by measuring both implicit (attentional bias for emotional words) and explicit (dysfunctional attitudes and personality characteristics) measures of cognitive processes and attitudes in mildly depressed and euthymic BD patients, their first-degree relatives and a healthy control group. It was hypothesised that cognitive processes and attitudes are not only related to the presence of a current depressive state but are also altered in euthymic patients and relatives compared to the controls.

2. Methods

2.1. Participants

The individuals in this study were participants in the BIPOLCOG study, a study on cognitive functioning in BD in which three groups were investigated (i) patients with BD, (ii) healthy first-degree relatives of patients with BD, and (iii) healthy control participants (for a more elaborate description of the sample see Arts et al., 2011; Jabben et al., 2009). The risk set for the current study consisted of 77 patients with the lifetime prevalence of BD according to the Research Diagnostic Criteria (Spitzer et al., 1978), 39 relatives and 61 controls. In the group of relatives, 8 had a history of diagnosis of major depression and one of hypomania. Three controls had a major depression in the past. Some of the patients in the BIPOLCOG study also participated in the previous study of Jongen and colleagues (Jongen et al., 2007) but the attentional bias data in both the studies are non-overlapping.

2.2. Assessment of cognitive processes and attitudes

2.2.1. Attentional processing

A dot probe task based on the original paradigm of MacLeod et al. (1986) was designed to investigate selective attention. The specific nature of positive and negative biases in BD was investigated using 36 positive-neutral, 36 negative-neutral and 72 neutral-neutral word pairs. Preceded by a fixation cross (600 ms), a wordpair was presented with one word above and the other below the central fixation point. After 500 ms a dot probe consisting of a small dot replaced either preceding word and subjects were instructed to respond as fast as possible by pressing the space bar of the laptop. Dot probe task RTs were checked for outliers and values were truncated at the 95th percentile. A summary attentional bias score was calculated for both positive and negative conditions: $\text{attentional bias score} = [(RT \text{ incongruent up} + RT \text{ incongruent low}) - (RT \text{ congruent up} + RT \text{ congruent low})] / 2$ (Bradley

et al., 1997). This score captures a word position X dot position interaction effect on RTs. Positive attentional bias scores are indicative of an attentional bias towards the emotional words whereas negative scores are indicative of attentional bias away from the emotional words.

2.2.2. Questionnaires

The short version of the Dysfunctional Attitude Scale (DAS) consisting of 24 items was used to measure rigid, negative and perfectionistic attitudes (Power et al., 1994). Three subscale scores previously found to be elevated in BD were generated (Lam et al., 2004): goal attainment, dependency, and achievement. The abbreviated form of the Revised Eysenck Personality Scale (Francis et al., 1992) was used to assess personality characteristics. A weighted neuroticism and extraversion score was calculated.

2.3. Mood interviews

Subjects' current depressive symptomatology was assessed using the 21-item Hamilton Rating Scale for Depression (Hamilton, 1960). For purpose of the current analyses, patients were split according to current mood state into a euthymic ($n=60$: HDRS < 8) and a mildly depressed ($n=17$: HDRS \geq 8) group. Current manic symptomatology was measured by the Young Mania Rating Scale (Young et al., 1978) and the Brief Psychiatric Rating Scale (Lukoff et al., 1986) was used to assess general psychiatric symptomatology in subjects.

2.4. Statistical analyses

Data were analysed with SPSS version 17.0 (SPSS Inc; Chicago, Illinois). Groups were compared for demographic and symptom variables using analyses of variance for continuous variables and χ^2 statistics for categorical variables with the Tukey post-hoc procedures. A 4 (group status: control, relative, euthymic BD patients, depressed BD patients) \times 2 (word type: negative, positive) mixed design analysis of variance was used to compare the groups on the attentional bias scores. Group was used as the between subjects factor and Word type as the within subjects factor. Any Group \times Word type interaction was further investigated by examining group differences for positive or negative words separately. Analyses were adjusted for age, sex and education.

3. Results

Between-group comparisons on demographic characteristics indicate that patients scored higher on depression, mania and psychiatric rating scales than both relatives and controls, and relatives obtained a higher score on the BPRS compared to controls (see Table 1).

In attentional bias scores no main effects of Group or Word type were found in attentional bias scores measured by the dot probe task. The interaction between Group and Word type, however, was significant ($F_{3,169}=2.70$, $p=0.05$, $\eta^2=0.05$). When separate analyses of variance were conducted with attentional bias for positive and negative words as the outcome measure, the 4-level group variable as the between-subject factor and demographic variables as covariates, a trend towards a main effect of group was found for positive [$F_{3,169}=2.62$, $p=0.05$, $\eta^2=0.05$] but not for negative words [$F_{3,169}=0.83$, $p=0.48$, $\eta^2=0.02$]. Planned contrasts indicated that depressed BD patients had significantly lower (more negative) attentional bias scores for positive words compared to controls ($p=0.02$, relatives $p=0.013$) and euthymic patients ($p < 0.01$), indicating that depressed patients had their attention directed away from the positive words (see Fig. 1).

Table 1
Patients characteristics and cognitive style variables.

	Controls (C)		Relatives BD (R)		BD euthymia (BD-e)		BD depressed (BD-d)		F	p	Tukey HSD
	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)			
Age	61	45.3 (8.7)	39	40.7 (12.2)	60	43.9 (8.2)	17	46.4 (6.7)	2.50	0.06	–
Sex (% female)	61	62.3	39	48.7	60	55.0	17	47.1	2.36 ^a	0.50	–
Educational level	61	5.8 (1.7)	39	6.3 (2.0)	60	5.6 (2.1)	17	5.4 (2.3)	1.26	0.29	–
HDRS	61	0.23 (0.85)	39	1.05 (2.1)	60	2.19 (2.1)	17	12.1 (4.3)	147.8	< 0.001	C, R < Bd-e, BD-d; BD-e < BD-d
YMRS	61	0.07 (0.31)	39	0.28 (0.89)	60	1.55 (2.3)	17	1.00 (1.9)	10.6	< 0.001	C, R < BD-e
BPRS	61	25.1 (1.7)	39	27.4 (4.3)	60	31.4 (5.4)	17	38.0 (5.2)	52.9	< 0.001	C < R, BD-e, BD-d; R < BD-e, BD-d; BD-e < BD-d
Eysenck											
Neuroticism	56	2.41 (2.7)	38	2.95 (2.9)	54	5.65 (3.8)	13	8.31 (3.8)	18.4	< 0.001	C, R < BD-e, BD-d; BD-e < BD-d
Extraversion	56	7.88 (3.1)	38	8.55 (3.0)	54	7.30 (3.3)	13	5.77 (3.6)	2.91	0.03	R > BD-d
DAS											
Goal attainment	56	22.2 (7.6)	38	23.5 (6.9)	55	23.7 (6.9)	13	29.0 (6.1)	3.21	0.03	C < BD-d
Dependency	56	11.8 (3.7)	38	12.1 (3.5)	55	12.4 (4.8)	13	14.9 (3.8)	2.13	0.10	–
Achievement	56	12.6 (5.0)	38	13.1 (5.2)	55	14.1 (6.7)	13	19.9 (6.1)	5.83	< 0.01	C, R, BD-e < BD-d

HDRS: Hamilton Depression Rating Scale; YMRS: Young Mania Rating Scale; BPRS: Brief Psychiatric Rating Scale; DAS: Dysfunctional Attitude Scale; Eysenck: Revised Eysenck Personality Scale.

^a χ^2 statistic.

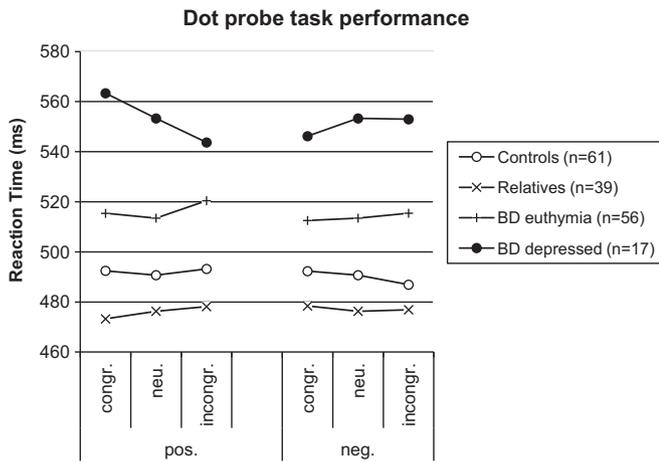


Fig. 1. Attentional bias performance for positive and negative words per group.

There was a significant group difference on all of the cognitive style questionnaire variables with the exception of the DAS dependency subscale (see Table 1). Depressed patients differed consistently from controls whereas euthymic patients scored higher than controls only on the Eysenck neuroticism scale. Relatives did not significantly differ from healthy controls on any of the questionnaire variables.

Repeating all analyses excluding the 8 relatives and 3 controls with a history of major depression, did not change the results.

4. Discussion

A depression related state alteration in cognitive processing and attitudes was present as mildly depressed BD patients, but neither euthymic patients nor healthy relatives, demonstrated attentional bias away from positive words. This suggests that depressed BD patients do not profit from the vigilance towards positive words as much as non-depressed people do, but this bias is not related to the vulnerability for BD. A previous dot probe study investigating emotional attentional processing in BD found a bias away from positive words not only in depressed but also in euthymic patients (Jongen et al., 2007). This bias, however, was relatively small in both depressed and euthymic patients

(approximately 5 ms), and groups were created using a self-report scale as opposed to the HDRS that was used in the current study. In most other studies investigating attentional bias in depression, stimulus duration times over 1000 ms were used (Gotlib et al., 2004; Shane and Peterson, 2007) as it has been suggested that in depression there is a problem mainly in later stages of processing that can only be shown with longer stimulus durations. However, the current study found that depressed BD patients had an attentional bias away from positive words also at a shorter stimulus duration, which implies the presence of alterations also in earlier stages of information processing.

The occurrence of dysfunctional attitudes was related to the presence of a current depressive state, as depressed but not euthymic BD patients or their relatives were characterised by dysfunctional attitudes with regard to achievement and goal attainment. The finding of dysfunctional attitudes in depressed BD patients is fairly consistent across the studies (Scott and Pope, 2003; Jones et al., 2005), although some previous studies also found residual dysfunctional attitudes in remitted patients suggesting that these may contribute to the vulnerability to future mood episodes. Higher neuroticism was associated with the presence of BD regardless of the symptomatic status, as both euthymic and depressed BD patients displayed higher neuroticism scores compared to controls. This suggests that higher neuroticism may constitute a trait characteristic of BD that perhaps may characterises a course prone to depressive episodes similar to previous findings in unipolar depression (Barnett et al., 2010). In a previous study investigating a student sample, it was found that neuroticism was associated with reduced positive information processing (Chan et al., 2007), but our data clearly demonstrate that heightened neuroticism per se is not sufficient for this bias to occur, since we found it to be highly specific for the BD-depressed patients. This suggests that depressed state rather than neurotic trait is associated with reduced processing of positive information.

Since relatives were similar to the healthy controls on all measures, the hypothesis that alterations in cognitive processes and attitudes may constitute a marker of the genetic vulnerability for BD could not be confirmed. High risk research investigating cognitive styles in BD is scarce and, to our best knowledge, this is the first study in healthy first-degree relatives. In one study investigating non-bipolar students that were classified as ‘high risk’ based on the presence of significant mood-elevation symptoms (Rock et al., 2010), positive biases in emotional processing

were demonstrated, specifically enhanced recognition of surprised and neutral faces. Based on these findings, it can be hypothesised that relatives have 'protective cognitive processes and attitudes' instead of vulnerabilities shared with their BD probands. However, no direct evidence for this notion was found in the current study and the hypothesis remains to be further investigated.

Some limitations need to be mentioned. First, the variation in severity of depressive symptomatology in the sample was limited. Second, the cross-sectional nature of the study makes it impossible to draw conclusions on the causality of findings. Third, possible effects of medication on attentional processing could not be adjusted for.

In conclusion, alterations in cognitive processes and attitudes in BD are related to the expression of symptomatology and not to the vulnerability for the illness. Nevertheless, the presence of dysfunctional attitudes and attentional bias associated with the presence of bipolar depression suggests a possible beneficial effect of therapeutic interventions in addition to the pharmaceutical treatment of BD.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.jad.2012.04.022>.

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