Ruminative and Dampening Responses to Positive Affect in Bipolar Disorder and Major Depressive Disorder

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June –July 2017

Abstract

Objective: As the use of ineffective emotion regulation strategies has the capacity to influence the onset and maintenance of affective disorders, they should form targets for psychological interventions. Since a lot of attention has been focused on responses to negative affect, the present study aimed to investigate differences in responses to positive affect (PA) between bipolar disorder (BD), major depressive disorder (MDD), and healthy controls, and among BD patients (between BD-I and BD-II, and predominant polarities). This might be of interest to guide psychological models and treatments for both BD and MDD.

Methods: Groups were derived based on prior clinical diagnosis in outpatient clinics. All participants (96 BD-I, 27 BD-II, 177 MDD, and 275 healthy controls) completed the responses to positive affect (RPA) questionnaire. In the BD sample, current mood status was determined using the Clinical Global Impression for Bipolar Disorders (CGI-BP), whilst the Inventory of Depressive Symptomatology (IDS-SR) was used to determine current mood status in the MDD sample. The control sample completed the Hospital Anxiety Depression Scale (HADS) to determine current mood status.

Results: Patients (BD-I, BD-II, and MDD) were more likely to dampen and ruminate about PA than healthy controls. MDD patients were more likely to engage in dampening, whilst BD patients were more likely to engage in rumination. BD-II patients were more likely to engage in dampening compared to BD-I patients. Medication, current mood status, and predominant polarity were not associated with different PA strategies in the BD sample. In the MDD sample, severity of current mood status was associated with more dampening to PA.

Conclusion: Differences in responses to PA were observed between groups. Further longitudinal research is needed to determine whether these patterns help predict the course of future mood disturbances, before more targeted psychological interventions can be implemented.

1. Introduction

Bipolar disorder (BD), also known as manic-depressive illness, is a pathological mood disturbance which is characterized by recurrent (hypo)manic and depressive episodes, sometimes accompanied by psychotic features (Craddock & Sklar, 2013). Four main clinical subtypes of BD are recognized in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association [APA], 2013). This included BD type I (BD-I; i.e. occurrence of at least one manic episode, often accompanied by depressive episodes), BD type II (BD-II; i.e. occurrence of at least one hypomanic and one depressive episode), cyclothymic disorder (i.e. occurrence of numerous periods of hypomanic, and depressive symptoms for at least two years, in which the criteria of depressive episodes are not fulfilled), and BD unspecified or other specified (i.e. periods of hypomanic and depressive symptoms occur, without meeting the criteria for hypomanic or depressive episodes). Major Depressive Disorder (MDD) is characterized by the presence (recurrent) depressive episodes (APA, 2013). Both BD and MDD have primarily been positioned as having biological underpinnings, due to the high heritability and the existence of neurobiological trait abnormalities (Belmaker, & Agam, 2008; Vasconcelos-Moreno et al., 2016). However, there is increasing recognition of the influence of psychological factors on the illness course of BD and MDD (Fletcher, Parker, & Manicavasagar, 2013; The British Psychological society, & The Royal College of Psychiatrists, 2010). Coping responses, which are defined as "thoughts and behaviours used to manage stressful internal and external demands" (Fletcher et al., 2013), represent one such factor. The coping responses used to respond to affective states, can contribute to the onset and maintenance of an affective disorder (Nolen-Hoeksema, 1991). Emotion regulation is an example of a coping response, and has been conceptualized as "a process through which individuals modulate their emotions consciously and non-consciously to appropriately respond to environmental demands" (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Individuals use emotion regulation strategies to modify the magnitude, type, and duration of emotional experiences or emotion-eliciting events (Gross, 1998). Effective emotion regulation is associated with positive health outcomes, improved interpersonal relationships, and improved academic and work performance (Aldao et al., 2010). On the contrary, ineffective emotion regulation is associated with the onset and maintenance of several psychiatric disorders, including MDD, BD, and anxiety disorders.

Emotion regulation strategies can be categorized into strategies used to respond to negative affect (NA) and in strategies used to respond to positive affect (PA; Feldman, Joormann, & Johnson, 2008). Two examples of dysfunctional emotion regulation strategies

used in response to NA are negative rumination and avoidance or distraction. Negative rumination is defined as "repetitive and passive thinking about one's symptoms of depression and the possible causes and consequences of these symptoms". Avoidance or distraction are defined as "the purposeful turning of one's attention away from one's symptoms of depression and its possible causes and consequences to pleasant or neutral activities" (Nolen-Hoeksema, 1991). Several studies have indicated that the use of these dysfunctional emotion regulation strategies in response to NA predicts the onset and maintenance of depression (Aldao et al., 2010; Feldman et al., 2008; van der Gucht, Morriss, Lancaster, Kinderman, & Bentall, 2009). Individuals who have experienced one or more depressive episodes have been shown to use these dysfunctional strategies more frequently compared to healthy controls, even during euthymic states (Ehring, Fischer, Schnülle, Bösterling, & Tuschen-Caffier, 2008). Similar effects have been found in individuals with BD-I, where more frequent use of dysfunctional regulation strategies in response to NA is associated with more depressive symptoms (Green et al., 2011; Johnson, McKenzie, & McMurrich, 2008).

The present study will focus on emotion regulation strategies used in response to PA. This is a growing area of interest. Two emotion regulation strategies used in response to PA are dampening, which refers to "mental strategies that downgrade the intensity and duration of positive affect by minimizing the significance of a positive event and positive affect or by directing attention to less fortunate aspects of life", and positive rumination (Nelis et al., 2016). Positive rumination is subdivided into two strategies: self-focused rumination, which is a strategy that focusses on positive self-qualities (e.g. "It makes me think I am achieving a lot in my life"), and emotion-focused rumination, which is a strategy that focusses on the current emotional state (e.g. "I feel full of energy"). Several studies have indicated that individuals with MDD use dampening strategies more and positive rumination less frequently in response to PA compared to healthy controls (Bryant, 2009; Feldman et al., 2008). Raes, Smets, Nelis, and Schoofs (2011) have found that dampening of PA is associated with more depressive symptoms in a non-clinical sample as well. More frequent use of rumination in response to PA has been associated with the onset and maintenance of manic symptoms (Feldman et al., 2008; Raes et al., 2011). Limited research on the differences between responses to PA and MDD and BD has been conducted. One study, by Fletcher et al. (2013), has indicated a difference in the use of emotion regulation strategies in response to PA. In that study, the authors examined coping style differences between the bipolar subtypes (BD-I; $N = 94$ and BD-II; $N = 114$), MDD ($N = 109$), and healthy controls ($N = 100$), using several questionnaires, including the Responses to Positive Affect (RPA), the Responses Styles Questionnaire, the Coping Inventory for

Prodromes of Mania, and the Cognitive Emotion Regulation Questionnaire. The outcomes of this study showed that individuals with BD were more likely to ruminate about PA compared to individuals with MDD, without controlling for current mood status. No differences in responses to PA between the BD-subtypes were found (Fletcher et al., 2013).

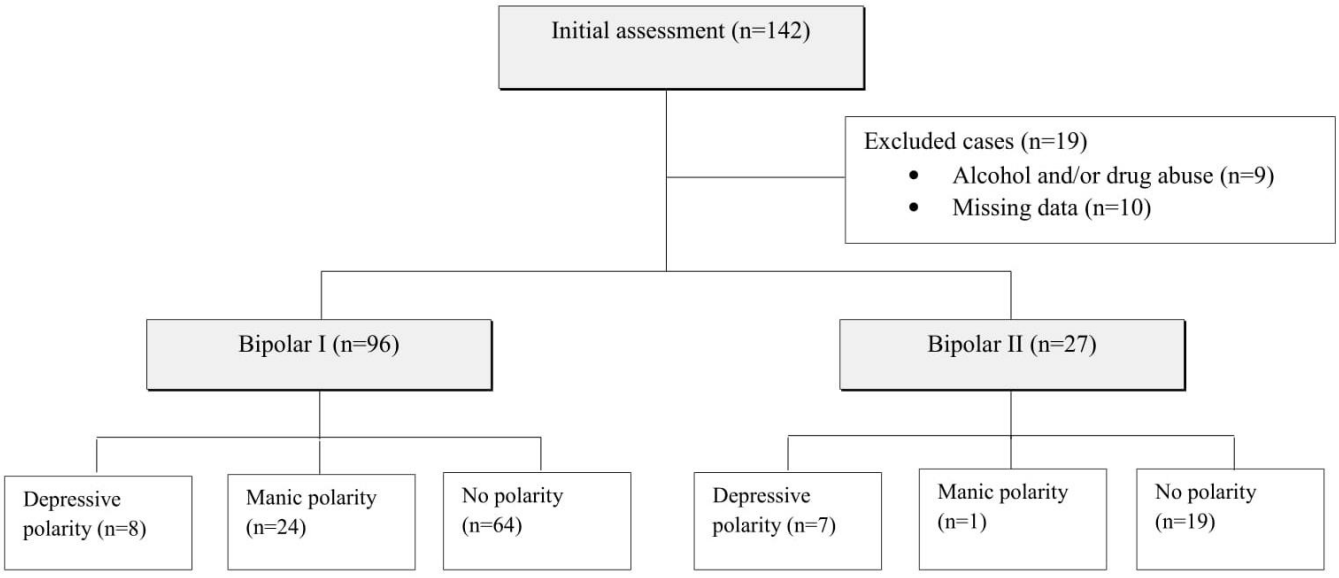
Another growing area of interest is the association between polarity of BD and the use of emotion regulation strategies in response to PA. The term polarity refers to the two poles characteristic for BD, which are the depressive and (hypo)manic poles. The predominant polarity of an individual with BD is determined by the number of past depressive and (hypo)manic episodes (Colom, Vieta, Daban, Pacchiarotti, & Sánchez-Moreno, 2006). Depressive polarity is defined when at least 75% of past episodes fulfil the DSM-5 criteria for a depressive episode. Manic polarity is defined when at least 75% of past episodes fulfil the DSM-5 criteria for a (hypo)manic episode. Several studies have shown that depressive polarity is more prevalent amongst individuals diagnosed with BD-II, while manic polarity is more prevalent amongst individuals diagnosed with BD-I (Colom et al., 2006; Daban, Colom, Sánchez-Moreno, García-Amador, & Vieta, 2006; Popovic et al., 2014). The polarity at onset of BD is a good predictor of the life-time polarity (Daban et al., 2006). A depressive onset of BD is strongly related with life-time depressive polarity, while a (hypo)manic onset is more strongly associated with life-time manic polarity. Limited research on the association between polarity of BD and responses to PA has been conducted. The study of Gruber, Eidelman, Johnson, Smith, and Harvey (2011) indicated that depressive polarity was associated with both negative and positive rumination, while manic polarity was associated with positive rumination only. On the other hand, the study of Feldman et al. (2008) indicated that individuals with manic vulnerability more frequently used dampening as well as positive rumination in response to PA compared to individuals with less manic vulnerability.

Thus, not only is there limited research available concerning differences in responses to PA between BD-I, BD-II, MDD, and healthy controls, there are incongruences between studies as well. In addition, the association between polarity and responses to PA is also relatively understudied and there are incongruences in these available results as well. Therefore, it is important to conduct more research on this topic. Medication is currently positioned as the first-line treatment of BD and MDD, although in MDD the use of evidence-based psychotherapy is gaining popularity (Davidson, 2010; Fletcher et al., 2013). When the present study finds a clear distinction in responses to PA between the bipolar-subtypes and MDD, then this might be of interest to guide psychological models and treatments for both BD and MDD. Psychological interventions focused on changing dysfunctional emotion regulation strategies might then be

implicated for preventing or attenuating depressive and (hypo)manic episodes.

The present study aims to determine any differences in responses to PA among BD patients (between the bipolar subtypes and predominant polarities), and between BD, MDD, and healthy controls. Firstly, in line with the study of Fletcher et al. (2013), it is expected that patient groups (MDD, BD-I, and BD-II) use more dampening and positive rumination compared to the control group. Secondly, it is hypothesized that individuals with MDD use more dampening and less positive rumination compared to individuals with BD. Thirdly, a positive association between current mood in BD and MDD patients and responses to PA is expected, where a current depressed mood results in the use of more dampening responses and a current manic mood in the use of more ruminative responses. Fourthly, it is hypothesized that BD-I is associated with more positive rumination, whilst BD-II is associated with more dampening. Fifthly, it is expected that a predominance of depressive polarity is associated with more dampening and less positive rumination compared to a predominance of manic polarity. Finally, it is hypothesized that there is an association between the last episode in de BD sample and responses to PA. It is expected that patients whose last episode has been depressed use more dampening responses, while patients whose last episode has been manic or mixed use more ruminative responses to PA.

Figure 1. Flow-chart of BD participants



2. Method

2.1. Participants

The BD sample consisted of participants diagnosed with either BD-I or BD-II. Data of 71 participants already were gathered in the context of previous research (March 2016). However, this data did not include the study-specific questionnaire, which measured the predominant polarity and medication use of the participants. The present study only included participants when they were still able to complete the study-specific questionnaire (N = 61). Furthermore, the present study added 71 participants to this sample. The new participants were recruited from an outpatient clinic for bipolar disorders in the Netherlands, Altrecht 'Bipolair' (Altrecht Bipolar), using flyers and one-to-one approach during their scheduled appointments. Participants were eligible to participate if they had received a prior clinical diagnosis (BD-I or BD-II) and with an age of 18 years or older. Exclusion criteria were current psychosis, alcohol and/or substance abuse, neurological disorders, severe suicidality, and poor Dutch comprehension. BD participants were divided into groups regarding their polarity. There are several ways to determine predominant polarity of BD (Colom, Vieta, & Suppes, 2015). The present study chose to use the stricter, more time-stable definition of polarity. This definition indicates a predominant polarity when at least 75% of the total number of past episodes have been from the same polarity. Mixed episodes are not included in this definition. The flow-chart of BD participants is shown in Figure 1. The study was approved by the Ethical Committee of Altrecht.

The MDD sample consisted of participants who had received MDD as a prior clinical diagnosis (N = 177). Data for this sample were made available by an outpatient clinic for depressive disorders in the Netherlands, Altrecht 'Stemmingsstoornissen' (Altrecht Mood Disorders). This division collects data from incoming clients as part of the regular intake process. The data of clients who signed an informed consent is available for research. Incoming clients between March 2014 and February 2016 were potential participants. The present study only included participants who had completed the Responses to Positive Affect questionnaire (RPA) and the Inventory of Depressive Symptomatology (IDS).

The control sample consisted of healthy controls (N = 275). Data for this sample were gathered in an ongoing research among bereaved individuals conducted by Boelen et al. from Utrecht University (e.g. see Boelen, Reijntjes, & Smid, 2016). The present study included participants only when they had completed the RPA and Hospital Anxiety and Depression Scale (HADS), and when they showed no signs of mood disturbances (HADS-score below 10).

2.2. Measures

2.2.1 .Clinical Global Impression-Bipolar (CGI-BP). The present study used the CGI-BP to determine global illness severity and severity of depressive and (hypo)manic episodes in the BD sample (Spearing, Post, Leverich, Brandt, & Nolen, 1997). Clinicians use the CGI-BP to objectify the current mood status and to monitor mood fluctuations over time. The CGI-BP consists of two subscales, on which clinicians are asked to quantify the severity of depressive and/or (hypo)manic symptoms. Quantification of these symptoms occur at a 7-point scale (where 1 = normal and 7 = extremely ill). The current mood status of participants was designated as stable with a CGI-BP score of one on both the depressive and (hypo)manic scales. The current mood status of participants was designated as depressed, mixed or (hypo)manic when the CGI-BP score was two or higher (where 2-3 = mild, 4-5 = moderate, and 6-7 = severe) on either the depressive and/or (hypo)manic scales. The distribution of the BD-sample according to current mood status is displayed in Figure 2.

2.2.2. Responses to Positive Affect Questionnaire (RPA). The present study used the Dutch version of the RPA (RPA-NL) in the BD, MDD, and healthy control samples. The RPA is a 17-item questionnaire developed by Feldman et al. (2008) to measure self-reported levels of dampening and rumination in response to PA. Responses are quantified on a 4-point Likert scale (where 1 = almost never and 4 = almost always). The questionnaire assesses three processes related to the regulation of PA, which include dampening (e.g. ”My streak of luck is going to end soon”), self-focused rumination (e.g. “It makes me think I am achieving a lot in my life”), and emotion-focused rumination (e.g. “I feel full of energy”). The RPA-NL has been found to have a satisfactory internal consistency for each of the subscales in a sample of 528 independent respondents, with Chronbach’s alphas of .80, .80, and .72 for dampening, self-focused rumination, and emotion-focused rumination, respectively (Raes, Daems, Feldman, Jonhson, & Van Gucht, 2009). The present study found a satisfactory internal consistency for each of the subscales of the RPA-NL as well, with Chronbach’s alphas of .83, .85, and .82 for dampening, self-focused rumination, and emotion-focused rumination, respectively.

2.2.3. Inventory of Depressive Symptomatology-Self-Report (IDS-SR). The present study used the IDS-SR in the MDD sample. The IDS-SR is a 30-item, self-report measure of depression (Trivedi et al., 2004). It is a measure of symptom severity and includes all nine criterion symptoms for MDD based on the fourth edition of the DSM (DSM-IV; American Psychiatric Association, 1994), and other commonly associated symptoms for MDD. The total score ranges from 0 to 84. Scores of 13 or lower identify non-depressive cases, and scores of 14 to 25, 26 to 38, 39 to 48, and 49 or above identify mild, moderate, marked, and severe cases,

respectively (Trivedi et al., 2004). The IDS-SR has shown a satisfactory internal consistency in a sample of 544 participants diagnosed with MDD, with a Chronbach's alpha of .92. The distribution of the MDD-sample according to current mood status is displayed in Figure 3.

2.2.4. Hospital Anxiety and Depression Scale (HADS). The present study used the HADS in the healthy control sample. The HADS is a 14-item, self-report measure of anxiety and depression (Crawford, Henry, Crombie, & Taylor, 2001). The HADS contains two 7-item scales: one for anxiety and one for depression, both with a score range of 0 to 21 (Spinhoven et al., 1997). The present study used cut-off scores recommended by Zigmond and Snaith (1994). Scores of 8 to 10 identify mild cases, scores of 11 to 15 identify moderate cases and scores of 16 or above identify severe cases. The present study only included participants in the healthy control group with a total HADS score of 10 or lower, to be certain no participants in the healthy control group were experiencing any mood disturbances. The HADS shows a satisfactory internal consistency in a sample of 199 independent respondents, with Chronbach's alphas of .79 and .84 for the depression and anxiety scales, respectively (Spinhoven et al., 1994).

2.2.5. Study-specific Questionnaire. The course of illness in the BD sample was determined using a self-report questionnaire specifically designed for this study, recording age of the first episode, polarity of first episode, life-time number of depressive, (hypo)manic, and mixed episodes, type of medication and use of alcohol and/or drugs.

2.3. Procedure

Participants in the BD sample who were already approached in the context of the

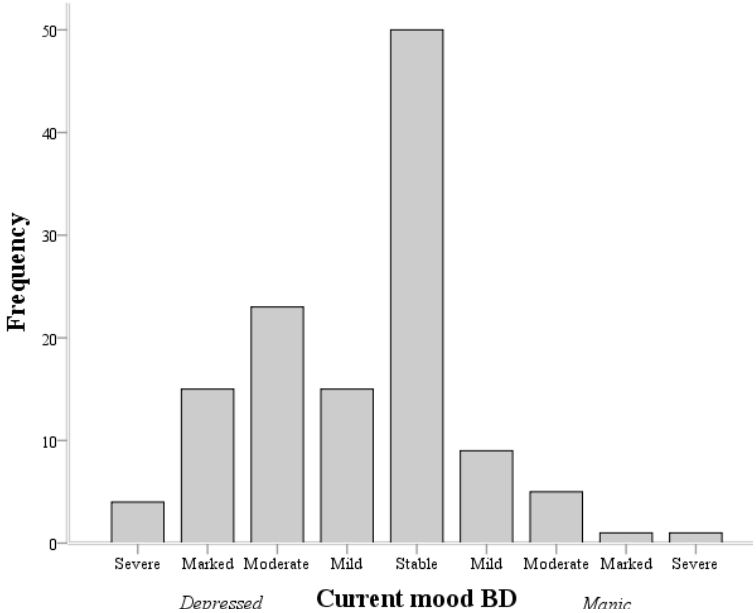


Figure 2. Distribution of current mood status in BD-sample

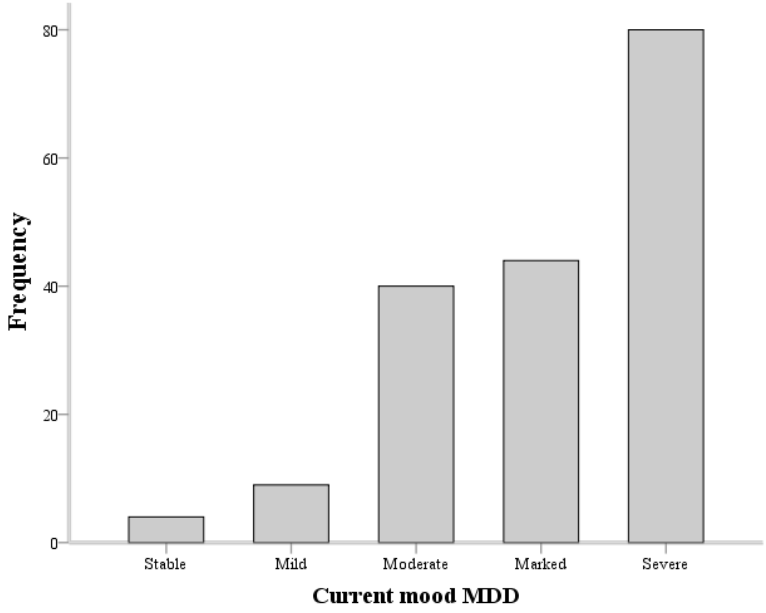


Figure 3. Distribution of current mood status in MDD-sample

previous research (March 2016), were approached again by their clinicians during scheduled appointments. The participants were informed about the follow-up to the study of 2016. After obtaining written consent, the participants received the study-specific questionnaire and were asked to complete the questionnaire directly after their appointment. When participants indicated they wanted to complete the questionnaire at home, they received a self-addressed envelope. New participants in the BD sample were approached by their clinicians during scheduled appointments as well. The participants were provided with a description of the study and written informed consent was obtained. Next, the participants received the RPA and study-specific questionnaire. Participants were given the choice to complete the questionnaires at home or directly after their appointment. Finally, the clinicians quantified the participant's current mood status by means of the CGI-BP. Afterwards, participants were divided into categories according their clinical diagnosis and predominant polarity. Furthermore, type of medication was assigned to a certain polarity as well, since the use of antidepressants, mood stabilizers and/or antipsychotics might have an influence on the way individuals respond to PA. Therefore, a distinction was made between three types of medication; medication for manic polarity, depressive polarity or no predominant polarity. Table 1 provides an overview of the assignment of medication types to predominant polarities.

Table 1. Overview of medication types to predominant polarities

Depressive polarity	**Manic polarity**	**No polarity**
- Citalopram	- Aripiprazole	- Lithium
- Escitalopram	- Olanzapine	- Carbamazepine
- Fluoxetine	- Haloperidol	- Valproic acid
- Paroxetine	- Bromperidol	- Topiramate
- Clomipramine	- Flufenazine	- Fluoxetine + Olanzapine
- Amitriptyline	- Clozapine	- Quetiapine
- Venlafaxine	- Pimozide	- Antipsychotic + antidepressant
- Sertraline	- Risperidone	
- Lamotrigine	- Zuclopentixol	
	- Chlorpromazine	
	- Perfenazine	
	- Fluspirilene	

2.4. Statistical analyses

Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 23.0. Outliers outside the 1.5 interquartile range (1.5xIQR) were replaced by the highest or lowest non-deviating scores. In the BD sample, three outliers were found in the life-time depressive episodes and four outliers were found in the life-time manic episodes. Missing data in RPA scores were replaced by the mean of the corresponding scale.

The four samples (i.e. BD-I, BD-II, MDD, and healthy controls) were compared on socio-demographic and clinical variables using one-way between-groups analyses of variance

(ANOVAs), and using chi-square statistic for categorical dependent variables. One-way between-group ANOVAs were used to examine differences in responses to PA between predominant polarities, with three planned groups (1 = depressive polarity; 2 = (hypo)manic polarity; 3 = no polarity). One-way between-group ANOVAs were used to examine differences in responses to PA between groups, with three planned contrasts (contrast 1 = patient (BD-I, BD-II, and MDD) vs. control; contrast 2 = MDD vs. BD-I and BD-II; contrast 3 = BD-I vs. BD-II). When significant main effects were found, Tukey post-hoc comparisons were conducted. Pearson correlations were used to determine associations between responses to PA and severity of current mood episodes.

Table 2. Demographic and clinical characteristics of BD and MDD patients and healthy controls

	BD-I (*N* = 96) Mean (SD)	**BD- II** (*N* = 27) Mean (SD)	**MDD** (*N* = 177) Mean (SD)	**Control** (*N* = 275) Mean (SD)	*F*-value	*p*-value
Age	43.49 (12.86)	42.37 (10.73)	40.02 (10.15)	57.28 (12.12)	91.928	**.000**
Age of onset	28.65 (10.60)	24.67 (9.91)	-	-	3.051	.083
Total number of episodes	9.97 (10.93)	14.32 (10.27)	-	-	3.210	.076
Depressed	4.93 (7.57)	8.04 (5.90)	-	-	3.640	.059
(Hypo)manic	4.18 (3.55)	4.80 (4.14)	-	-	0.559	.456
Mixed	0.86 (2.42)	1.48 (3.14)	-	-	1.133	.289
	N (%)	*N* (%)	*N* (%)	*N* (%)	Chi-square	*p*-value
Gender					39.623	**.000**
Female	54 (56.3)	15 (55.6)	97 (54.8)	220 (80)		
Male	42 (43.7)	12 (44.4)	80 (45.2)	55 (20)		
Medication					11.552	**.009**
Depressive polarity	17 (17.7)	11 (40.7)	-	-		
Manic polarity	30 (31.2)	1 (3.7)	-	-		
No polarity	40 (41.7)	13 (48.2)	-	-		
No medication	9 (9.4)	2 (7.4)	-	-		

3. Results

3.1. Demographic and clinical variables

The total sample consisted of 575 participants (96 BD-I, 27 BD-II, 177 MDD, and 275 healthy controls), with an over-representation of females (67.1%) and a mean age of 48.96 (SD = 14.11). As shown in Table 2, patients (BD-I, BD-II, and MDD) and controls differed in age distribution. There is, however, no evidence that age has a confounding effect on the association

between mood and PA regulation (Nelis et al., 2016). Therefore, the results were not corrected for age. Gender distribution between groups differed as well, where the control sample showed an over-representation of females (80%). Gender, however, showed to have minimal effects on the use of responses to PA strategies (Table 3). In the bipolar sample, females were significantly more likely to ruminate over PA compared to males. In the control sample, females significantly used more emotion-focused rumination to PA compared to males. No further differences between gender and responses to PA were found. Furthermore, no differences between BD-I and BD-II regarding age of onset or total number of previous episodes (depressed, manic, or mixed) were found (Table 2). Regarding medication, BD-I patients received more medication for the manic polarity, while BD-II patients received more medication for the depressive polarity.

Table 3. Differential scores of responses to positive affect between gender

	Female Mean (SD)	**Male** Mean (SD)	*t*-value	*p*-value
		Bipolar - BD-I + BD-II (*N* = 123)		
RPA Dampening	13.94 (3.85)	14.19 (3.53)	0.369	.713
RPA Rumination	22.47 (4.74)	20.80 (4.51)	1.980	**.050**
Emotion-focused	13.49 (2.62)	12.54 (2.68)	1.970	.051
Self-focused	8.99 (2.88)	8.26 (2.42)	1.477	.142
		Major Depressive Disorder (*N* = 177)		
RPA Dampening	17.91 (5.17)	16.71 (4.80)	1.578	.116
RPA Rumination	18.15 (6.48)	17.18 (5.94)	1.039	.300
Emotion-focused	10.81 (3.49)	10.10 (3.36)	1.379	.170
Self-focused	7.34 (3.26)	7.08 (2.98)	-0.560	.576
		Control (*N* = 275)		
RPA Dampening	10.85 (2.95)	10.87 (2.71)	0.041	.967
RPA Rumination	24.14 (4.81)	22.85 (5.47)	1.734	.084
Emotion-focused	14.28 (2.71)	12.96 (3.14)	2.845	**.006**
Self-focused	9.81 (2.71)	9.67 (3.01)	-0.337	.736

As shown in Table 4, 12.2% (*N* = 15) of the BD patients were classified as depressive polarity, whilst 20.3% (*N* = 25) were considered manic polarity. No predominant polarity was found in 67.5% of the patients (*N* = 83). Manic polarity was more prevalent amongst BD-I patients and was strongly associated with manic onset of BD. Depressive polarity was strongly associated with depressive onset of BD. BD patients with depressive polarity more frequently received medication for the depressive polarity, whilst BD patients with manic polarity more frequently received medication for the manic polarity.

Table 4. Differential clinical qualitative features between patients with depressive polarity, manic polarity and no predominant polarity

		Depressive polarity (*N* = 15) *N* (%)	**Manic polarity** (*N* = 25) *N* (%)	**No polarity** (*N* = 83) *N* (%)	Chi-square	*p*-value
Gender					0.643	.725
	Female	7 (46.7)	14 (56.0)	48 (57.8)		
	Male	8 (53.3)	11 (44.0)	35 (42.2)		
Subtype					10.093	**.006**
	Bipolar I	8 (53.3)	24 (96)	64 (77.1)		
	Bipolar II	7 (46.7)	1 (4)	19 (22.9)		
Onset					31.552	**.000**
	Depressive	12 (85.7)	1 (3.7)	45 (54.9)		
	(Hypo)manic	2 (14.3)	24 (88.9)	32 (39.0)		
	Mixed	0	2 (7.4)	5 (6.1)		
Medication use for					17.084	**.009**
	Depressive polarity	5 (33.3)	2 (8.0)	21 (25.3)		
	Manic polarity	0	13 (52.0)	31 (25.2)		
	No predominant polarity	9 (60.0)	9 (36.0)	53 (43.1)		
	No medication	1 (6.7)	1 (4.0)	11 (8.9)		

3.2. Differences in responses to PA between predominant polarities in BD

Table 5 shows the differences between manic polarity, depressive polarity and no predominant polarity regarding responses to PA scores. When dealing with positive affect, patients with manic polarity were significantly less likely to engage in dampening responses compared to patients without a predominant polarity (p = .013). No significant differences between predominant depressive or manic polarity in dampening (p = .436) or ruminative (p = .870) responses to PA were found.

Table 5. Differential scores of responses to positive affect between patients with depressive polarity (DP), manic polarity (MP) and no predominant polarity (NP)

	Depressive polarity (*N* = 15) Mean (SD)	**Manic polarity** (*N* = 25) Mean (SD)	**No polarity** (*N* = 83) Mean (SD)	*F*-value	*p*-value	**Contrast 1: DP vs MP** *F*-value (df)	**Contrast 2: DP vs NP** *F*-value (df)	**Contrast 3: MP vs NP** *F*-value (df)
RPA Dampening	13.73 (3.61)	12.28 (3.47)	14.64 (3.64)	4.189	**.017**	1.523 (2,120)	-0.806 (2,120)	**-8.248**** (2,120)
RPA Rumination	20.67 (4.15)	21.44 (4.26)	22.02 (4.92)	0.588	.557	-0.252 (2,120)	-1.051 (2,120)	-0.293 (2,120)
Emotion-focused	12.40 (2.50)	13.00 (2.71)	13.21 (2.72)	0.588	.557	-0.466 (2,120)	-1.153 (2,120)	-0.118 (2,120)
Self-focused	8.27 (2.58)	8.44 (2.42)	8.81 (2.82)	0.367	.694	-0.038 (2,120)	0.510 (2,120)	-0.358 (2,120)

**p* <.05
** *p* <.01

3.3. Differences in responses to positive affect between BD-I, BD-II, MDD and controls

Table 6 shows the differences of responses to positive affect between the four samples. As hypothesized, patients (BD-I, BD-II, and MDD) were significantly more likely than healthy controls to engage in dampening responses and both self-focused and emotion-focused ruminative responses. Furthermore, as hypothesized, post-hoc tests indicated that MDD patients were significantly more likely to engage in dampening responses to PA, whilst BD patients were significantly more likely to engage in both emotion-focused rumination and self-focused rumination. Finally, it was found that BD-II patients were significantly more likely to engage in dampening responses compared to BD-I patients (p = .046). No significant differences in ruminative responses to positive affect were found between BD-I and BD-II patients.

Table 6. Differential scores of responses to positive affect between bipolar I patients, bipolar II patients, MDD patients and control sample

	BD-I (*N*=96) Mean (SD)	**BD- II** (*N*=27) Mean (SD)	**MDD** (*N*=177) Mean (SD)	**Control** (*N*=275) Mean (SD)	*F*	*p*	**Contrast 1: Patients vs controls** *F*-value (df)	**Contrast 2: BD vs MDD** *F*-value (df)	**Contrast 3: BP I vs BP II** *F*-value (df)
RPA Dampening	13.70 (3.67)	15.32 (3.61)	17.37 (5.03)	10.86 (2.90)	105.572	**.000**	**-183.1**** (1,114)	**27.36**** (1,130)	**-4.24*** (1,42)
RPA Rumination	21.75 (4.65)	21.70 (4.95)	17.71 (6.25)	23.88 (4.96)	47.903	**.000**	**50.81**** (1,134)	**32.00**** (1,111)	0.00 (1,571)
Self-focused	8.64 (2.68)	8.78 (2.81)	7.22 (3.13)	9.79 (2.77)	28.651	**.000**	**31.42**** (1,571)	**15.30**** (1,116)	-0.05 (1,571)
Emotion-focused	13.11 (2.69)	12.93 (2.69)	10.49 (3.44)	14.01 (2.85)	49.825	**.000**	**45.09**** (1,147)	**41.82**** (1,571)	0.10 (1,571)

* p <.05
** p <.01

3.4. Associations between responses to positive affect strategies and medication use, current mood, last episode, and number of previous episodes in BD patients

Within the BD sample, no significant associations between medication use and dampening responses (F (3, 119) = 2.073, p = .107), or ruminative responses (F (3, 119) = 1.113, p = .347) to PA were found. Furthermore, no significant associations between the number of previous episodes and dampening (r = 0.173, p = .061), self-focused rumination (r = 0.023, p = .807), or emotion-focused rumination (r = 0.057, p = .539) have been found. However, a significant association between the last episode and emotion-focused rumination (F (2, 120) = 4.580, p = .012) was found, which indicated that BD patients whose last episode had been (hypo)manic (M = 13.56, SD = 2.66) or mixed (M = 14.94, SD = 2.40) used more emotion-focused rumination in response to PA compared to BD patients whose last episode had been depressed (M = 12.54, SD = 2.60). No significant associations between the last episode and

dampening (F = 2.501, p = .086) or self-focused rumination (F = 2.254, p = .109) were found.

As displayed in Table 7, no significant associations between the severity of current mood symptoms and responses to PA in the BD sample were found. However, significant associations between severity of current depressive symptoms and both dampening and emotion-focused rumination were found in the MDD sample, which indicated that MDD patients engaged in more dampening and less emotion-focused rumination with increasing severity of their depressive symptoms.

Table 7. Associations between responses to PA and severity of current mood episodes

	BD		**MDD**
	Depressive (N=57)	**Manic** (N=16)	(N=177)
RPA Dampening	-0.039	-0.27	**0.359****
RPA Rumination	0.043	0.033	**-0.231****
Emotion-focused	0.223	-0.123	**-0.286****
Self-focused	-0.162	0.178	-0.146

*p <.05
** p <.01

4. Discussion

The present study provides an overview of ruminative and dampening responses to PA between BD, MDD, and healthy controls, and among BD patients (between the BD-subtypes and predominant polarities). The findings are discussed separately below.

The hypotheses regarding differential use of PA strategies amongst groups were largely supported. Results showed that, in response to PA, patients (BD-I, BD-II, and MDD) were significantly more likely to engage in dampening and both self-focused and emotion-focused rumination compared to healthy controls, replicating prior studies (Fletcher et al., 2013; Gruber, et al., 2011; Johnson et al., 2007; Thomas, Knowles, Tai, & Bentall, 2007). Furthermore, congruent with the study of Fletcher et al. (2013), results showed that BD patients were significantly more likely to engage in both emotion-focused and self-focused ruminative responses to PA compared to MDD patients. In addition, the present study showed that MDD patients were significantly more likely to engage in dampening responses to PA compared to BD patients. Finally, a positive association between severity of current depressive symptoms in MDD patients and the use of dampening responses to PA was found, whereas this association was negative for the use of ruminative response to PA. Conversely, no significant associations between the severity of current depressive or (hypo)manic symptoms and responses to PA in

BD patients were found. The lack of significant findings in the BD sample could be explained by the distribution regarding current mood status. While the BD sample lacked severe depressed or (hypo)manic patients, the MDD sample contained many severe depressed patients, even though both samples consisted of outpatients. However, it should be taken into consideration that different instruments were used to measure symptom severity in the MDD and BD samples. Symptom severity in the MDD sample was measured by using the IDS-SR, an extensive self-report measure which includes all MDD symptoms (Trivedi et al., 2004). On the other hand, symptom severity in the BD sample was measured by using the CGI-BP, a global rating instrument quantified by clinicians (Spearing et al., 1997). Therefore, symptom severity in the MDD sample might be more representative for the actual current mood status compared to the BD sample.

The hypotheses regarding differential use of responses to PA strategies amongst the BD-subtypes (BD-I versus BD-II and depressive polarity versus manic polarity) were largely supported as well. Results showed that BD patients with a predominant manic polarity used significantly less dampening responses compared to patients without a predominant polarity. In addition, although non-significant, results showed that BD patients with depressive polarity used more dampening responses to PA, whilst BD patients with manic polarity used more rumination responses to PA. An explanation for the lack of significance might be the small sample sizes, since there were only 15 patients with depressive polarity and 25 patients with manic polarity because the use of the stricter, more time-stable definition of polarity. Furthermore, the present study showed that patients whose last episode had been (hypo)manic used significantly more emotion-focused ruminative responses to PA compared to patients whose last episode had been depressed. No further differences between last episode and dampening or self-focused ruminative responses to PA were found. However, it should be taken into consideration that the present study did not correct for the time passed since patients went through their last episode and their participation in the present study. Therefore, it could be possible that too much time had passed to be able to objectify changes in responses to PA. Finally, in line with the hypothesis, it was found that BD-II patients were significantly more likely to engage in dampening responses to PA compared to BD-I patients. This was expected since, although not confirmed in the present study, BD-II has been shown to be associated with depressive polarity (Colom et al., 2006; Popovic et al., 2014). Depressive polarity, in turn, is associated with more dampening of positive emotions (Gruber et al., 2011). No significant differences between BD-I and BD-II patients in ruminative responses to PA were found, while it was expected that BD-I patients would ruminate more in response to PA. An explanation for

this finding might be that BD-I patients use more self-management strategies to prevent the emergence of a manic episode (Feldman et al., 2008). According to the cognitive model of BD, the use of rumination and dampening strategies largely depends on one's appraisals of changes in internal or external states (Mansell, Morrison, Reid, Lowens, & Tai, 2007). As related to mania, these appraisals are based on beliefs that states of high activation lead to the ability to overcome major life problems and extreme personal success. Prior negative experiences due to mania, such as constraints or hospital admissions, influence one's appraisals of these internal or external states. Therefore, BD-I patients might try to manage their ascent into mania by addressing these extreme appraisals (e.g. actively supress positive rumination).

The present study was strengthened by the use of outpatients samples, inclusion of a healthy control comparator group, and the relatively large sample sizes. Several limitations were the use of retrospective self-report questionnaires, which might be compromised by memory bias, and the use of different instruments to quantify the current mood status between the BD and MDD samples. Furthermore, as applies for all available studies examining responses to PA in mood disorders, the present study was limited by the use of a cross-sectional design. Therefore, no causal relationships between the use of PA strategies and symptoms of mood disorders could be determined. However, the present study found a difference in responses to PA between the MDD and BD samples and showed that the use of PA strategies were mood-dependent for the MDD sample, but not for the BD-sample. These results imply that the increased use of ruminative responses to PA in the BD sample might be a trait, instead of a maladaptive coping style. Future studies on this subject are important to confirm whether rumination to PA can be seen as a trait in BD.

In sum, the most important findings of the present study suggest that MDD and BD patients use more maladaptive strategies in response to PA compared to healthy controls. Furthermore, is was shown that BD is characterized by ruminative response to PA, while MDD is represented by dampening responses to PA. Within the BD sample, BD-II patients were more likely to engage in dampening responses compared to BD-I patients. Longitudinal research is needed to determine whether these patterns help predict the course of future mood symptoms. Clinical considerations based on the present study imply that is important for psychological interventions in BD and MDD to focus on responses to positive affect as well as negative affect. MDD patients might benefit from approaches that emphasize positive emotions and experiences, instead of dwelling on negative thoughts. These approaches would not be beneficial for the BD sample, since a focus on positive emotions could result to the ascent of (hypo)manic symptoms. BD patients, on the other hand, might benefit from approaches focused

on a more balanced use of PA strategies. However, more research needs to be conducted for a better understanding of the role of PA in MDD and BD patients before more targeted psychological interventions can be implemented.

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