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The Relationship Between Subtype, Predominant Polarity, and Response to Positive Affect in a Bipolar Population

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Abstract

Background: Bipolar disorder (BD) is a recurrent and severe psychiatric illness, which is associated with substantial risks of morbidity and mortality. Ineffective emotion regulation strategies can influence the onset and maintenance of BD and can be targeted by psychological interventions. Up to now, research has primarily focused on the regulation of negative affect (NA), but less is known about the regulation of positive affect (PA).

Objective: This study aimed to investigate the relationship between BD subtype, predominant polarity, and response to PA in order to increase knowledge on PA regulation.

Methods: The sample consisted of 77 adult patients (age: M = 38.92 years; SD = 13.15) with a diagnosis of either BD-I or BD-II who were at the beginning of an outpatient treatment. Participants completed the Questionnaire for Bipolar Illness to measure predominant polarity and Responses to Positive Affect Questionnaire to measure responses to PA.

Results: Manic polarity was associated with lower dampening scores than depressive and no polarity. Depressive polarity reduced the negative relationship between BD-II and positive rumination. No other significant results were found.

Conclusion: This research showed a negative association between predominant polarity and response to PA. This implies that predominant polarity may be an explanatory factor for the emotion regulation strategies used within BD and thus may have an effect on the course of this illness. Further research is needed to confirm and reinforce this finding, before more targeted psychological interventions can be implemented.

Keywords: bipolar disorder, subtype, predominant polarity, emotion regulation, response to positive affect

The Relationship Between Subtype, Predominant Polarity, and Response to Positive Affect in a Bipolar Population

Bipolar disorder (BD), also known as manic depressive disorder, is a recurrent and severe psychiatric illness (Grande et al., 2016). Classified as a mood disorder, BD also affects cognition and behaviour and is frequently complicated by psychotic symptoms, like delusions hallucinations, and disorganized thinking (Keck et al., 2001). The lifetime prevalence of 1-2% is irrespective of nationality, ethnic origin, or socioeconomic status (Rowland & Marwaha, 2018) and adoption studies have shown the contribution of genetics to the development of BD (Craddock & Jones, 1999; Grande et al., 2016). Untreated, BD is associated with substantial risks of morbidity and mortality. More research on BD can help in the development of better targeted interventions and thereby reduce these risks (Fountoulakis et al., 2009; Pompili et al., 2009).

Subtypes of BD

In order to make treatments as tailored as possible, variations within the bipolar population need to be considered. For instance, the symptoms experienced by patients with BD vary by subtype, which means that each subtype requires a different treatment focus. Bipolar disorder type I (BD-I) and bipolar disorder type II (BD-II) represent the most common and severe subtypes (Charney et al., 2017). The main difference between these two is the experience of manic (BD-I) or hypomanic (BD-II) episodes, next to the experience of depressive episodes. Both manic and hypomanic episodes involve a sustained and abnormally elevated, expansive, or irritable mood for at least one week (American Psychiatric Association, 2013). However, a manic episode may involve psychotic symptoms as well and may require hospitalisation, while a hypomanic episode is often accompanied by increased instead of impaired functioning. As a result, the manic episodes are often perceived as more distressing

in BD-I, whereas the depressive episodes are considered more distressing in BD-II (Benazzi, 2007; Karanti et al., 2020).

Additional differences between BD-I and BD-II can be found in substance abuse, with BD-I being associated with more substance abuse (Cerullo & Strakowski, 2007) and suicide attempts related to this abuse (Sublette, 2009) than BD-II. However, people with BD-II are younger when the first signs of their illness arise and comorbid psychiatric disorders are more common in this subtype (Karanti et al., 2020). Furthermore, BD-II is found to be associated with higher severity of illness and poorer health related quality of life than BD-I (Maina et al., 2007; Serafini et al., 2019). Psychological factors have a considerable impact on this (Ishak et al., 2012).

Psychological Factors

Most research to date has been done on the biological underpinnings of BD. From these studies, heredity has been shown to play a major role in the manifestation of BD (Gordovez & McMahon, 2020; McGuffin et al., 2003) and the existence of neurobiological trait abnormalities in people with BD has been found (Vasconcelos-Moreno et al, 2016). Psychological mechanisms associated with BD have been studied less, although during the last decade there seems to be increasing attention to psychological factors and their impact on the onset and illness course of BD (Dodd et al., 2017; Kemner et al., 2015; McKinnon et al., 2013; Mezes et al., 2021). This shift in focus is of great importance for the development of psychological treatments (Fletcher et al., 2014).

Emotion regulation (ER) is one of the psychological factors that plays a role in the onset and persistence of BD. ER has been defined as: “The strategies that people use to decrease, maintain, or increase their emotions” (Gross, 2007). These strategies can be subdivided into two categories: (1) strategies used to respond to negative affect (NA) and (2) strategies used to respond to positive affect (PA; Feldman et al., 2008). A common, maladaptive ER strategy

used in response to NA is negative rumination. This strategy is well-studied and described by Nolen-Hoeksema and colleagues (1994) as “the thoughts and behaviours that focus one's attention on one's depressive symptoms and the meaning of those symptoms”. Negative rumination is found to predict the onset and maintenance of depression and anxiety disorders (Aldao et al., 2010; McLaughlin & Nolen-Hoeksema, 2011) and is associated with depressive symptoms in individuals with BD as well (Johnson et al., 2008; Kovács et al., 2020).

Response to Positive Affect

Since research to date has primarily focused on ER strategies used in response to NA, this study will focus on those ER strategies used in response to PA. Few studies have been done in this specific field, while both positive and negative emotion regulation can be seen as relevant targets for psychological interventions (Fletcher et al., 2014). Better knowledge about positive emotion regulation can therefore help to increase the effectiveness of these interventions.

The two ER strategies which are used in response to PA, are dampening and positive rumination (Feldman et al., 2008). Dampening 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” (Nelis et al., 2016). Dampening of positive affect is associated with more depressive symptoms in both clinical (Feldman et al., 2008) and non-clinical samples (Raes et al., 2012). Positive rumination can be further subdivided into two strategies: self-focused rumination, which are strategies that focus on the self, positive self-qualities, and goal pursuit, and emotion focused rumination, which are strategies that focus on one’s positive emotional state (Nelis et al., 2016). Positive rumination is expected to amplify high moods and is therefore associated with the onset and maintenance of manic symptoms (Feldman et al., 2008; Raes et al., 2012).

Considering the differences in response to positive affect between bipolar subtypes, little research has been done. Edge and colleagues (2013) found that BD-I patients reported more dampening responses to PA than the non-clinical control group did, but a comparison between the two subtypes was missing in this study. A direct comparison between BD-I and BD-II patients was made by Hanssen and colleagues (2018), who found that BD-II patients were more likely to engage in dampening responses to PA than BD-I patients. The study lacked an explanation for this result. A possible explanation might be the presence of predominant polarities within the BD sample.

Predominant Polarity

When patients with BD present a predominant polarity, this means that most of their episodes are restricted to one of the two poles of BD: the depressive and (hypo)manic poles (Colom et al., 2006; Rosa et al., 2008). It has been suggested that either manic or depressive polarity can be found in 50% of the bipolar patients. Regarding the association between predominant polarity and subtype, studies have shown that manic polarity is more often associated with BD-I, while depressive polarity is more often associated with BD-II (Colom et al., 2006; Popovic et al., 2014).

However, looking at the relationship between predominant polarity and response to PA, research is scarce. Gruber and colleagues (2011) studied differences in positive and negative rumination between polarity types and found that depressive polarity was associated with both negative and positive rumination, while manic polarity was associated with positive rumination only. However, dampening responses were not examined within this study. Feldman et al. (2008) did examine both dampening and positive rumination but compared these responses between manic vulnerability groups instead of polarity groups. They found that individuals with manic vulnerability used both dampening and positive rumination more frequently compared to individuals with less manic vulnerability. The study of Hanssen and colleagues

(2018) seems the only one conducted so far on the relationship between predominant polarity and responses to PA. They found that patients with manic polarity were less likely to engage in dampening responses compared to patients without a predominant polarity, but found no other significant differences in response to PA. So, results are incongruent and too limited research is available to be able to make a firm statement about the relationship between predominant polarity and response to PA.

The Present Study

Altogether, both the relationship between BD subtype and response to PA and the relationship between predominant polarity and response to PA are relatively understudied. Results of the studies conducted to date are inconsistent and cannot be clearly explained. Therefore, more research is needed to gain more knowledge on this topic. Greater knowledge about the relationship between BD subtype, predominant polarity and response to PA can contribute to a better understanding of psychological factors that can play a role in the illness course of patients with BD. This might help in improving appropriate psychological interventions, in order to prevent or reduce depressive and (hypo)manic episodes.

The purpose of this study was to examine the relationship between subtype, predominant polarity and response to PA in a bipolar population. First of all, in line with the study of Hanssen and colleagues (2018) it was expected that BD-I was associated with positive rumination, whilst BD-II was associated with dampening responses (hypothesis 1). Secondly, as shown in previous studies (Colom et al., 2006; Popovic et al., 2014), it was expected that BD-I was associated with a predominance of manic polarity, whilst BD-II was associated with a predominance of depressive polarity (hypothesis 2). Thirdly, when comparing with no predominant polarity, a predominance of manic polarity was expected to be associated with more positive rumination and less dampening, as found by Hanssen and colleagues (2018), while on the other hand, a predominance of depressive polarity was expected to be associated

with more dampening and less positive rumination (hypothesis 3). Finally, predominant polarity was examined as the explanatory factor for the relationship between subtype and response to PA. It was expected that the positive relationship between BD-I and positive rumination should be strengthened by a predominance of manic polarity (hypothesis 4a; see Figure 1), while the negative relationship between BD-II and positive rumination should be weakened by a predominance of depressive polarity (hypothesis 4b; see Figure 2) and that the positive relationship between BD-II and dampening should be strengthened by a predominance of depressive polarity (hypothesis 4c; see Figure 3) while the negative relationship between BD-I and dampening should be weakened by a predominance of manic polarity (hypothesis 4d; see Figure 4).

Figure 1

Hypothesis 4a: Relationship BD-1, Manic polarity and Positive Rumination.

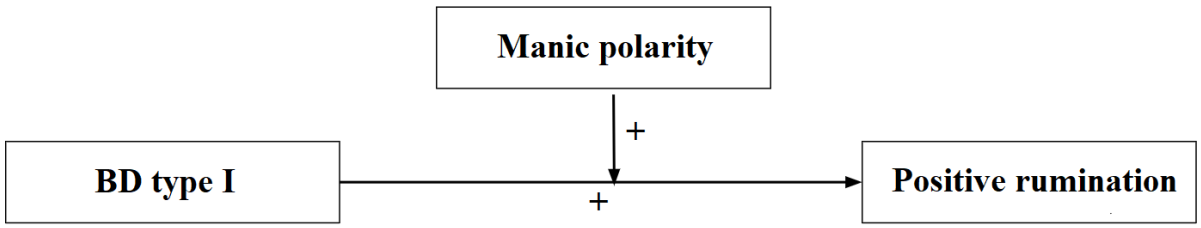


Figure 2

Hypothesis 4b: Relationship BD-II, Depressive polarity and Positive Rumination.

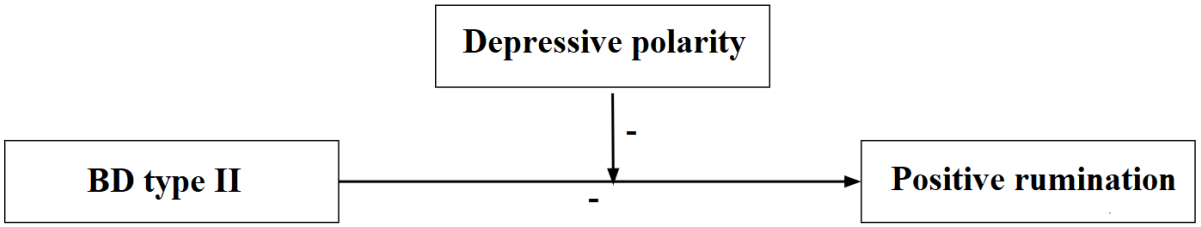


Figure 3

Hypothesis 4c: Relationship BD-II, Depressive Polarity and Dampening.

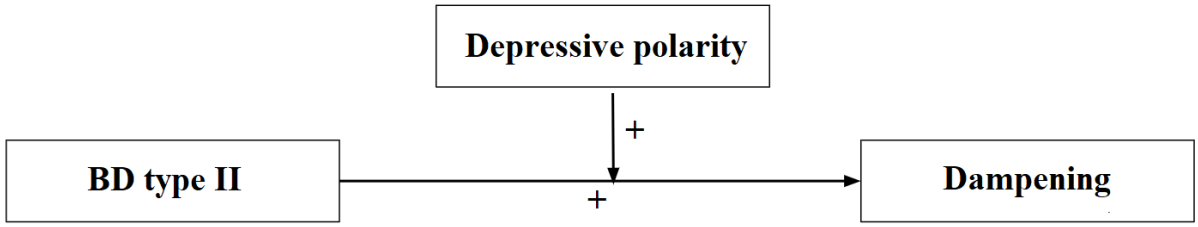
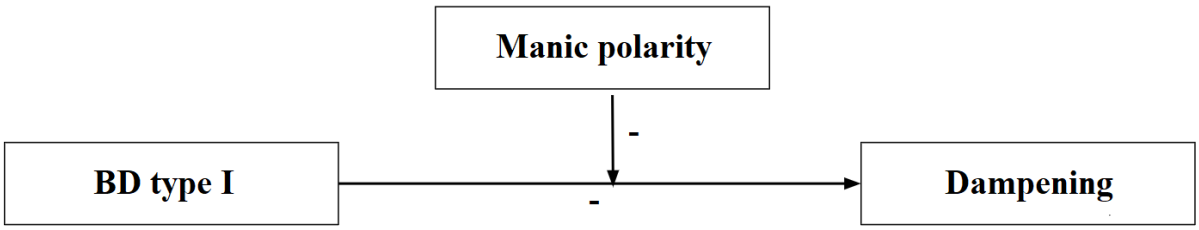


Figure 4

Hypothesis 4d: Relationship BD-I, Manic Polarity and Dampening.



Method

Procedure

This study focused on a population of adult patients with a bipolar disorder. Data were obtained at Altrecht Bipolar, an outpatient clinic for specialized mental health care for patients with BD, from February 2017 till January 2021. Data collection took place during the intake procedure. Patients were first interviewed by a psychiatrist and then seen for a diagnostic interview by a research assistant to set a DSM-5 diagnosis. After this, participants were asked to complete two sets of online questionnaires, including the Questionnaire for Bipolar Disorder (QBP) and the Responses to Positive Affect (RPA) Questionnaire. Two emails were sent, an initial email and a reminder email, asking if the participant would like to complete questionnaires through a link attached to the email. It was emphasized that it was important to fill in these questionnaires in order to assess the effect of the treatment. Participants did not receive compensation for their participation. Completion of the questionnaires was voluntary

and took 90 minutes. Anonymity of the data was ensured by assigning a random number to each client, in order of time of completion. Participants who received a diagnosis of either BD-I or BD-II and completed both the QBP and RPA questionnaire were included in this study.

Participants

The original dataset contained 241 participants. After excluding 96 participants whose diagnosis was unknown and 68 participants who had not completed the RPA questionnaire, a sample of 77 participants remained. Age ranged from 19 to 62 (M = 38.92 years; SD = 13.149) and the sample consisted of 48 women (62.3%) and 29 men (37.7%). 56 participants received a diagnosis of BD-I (72.7%) and 21 participants received a diagnosis of BD-II (27.3%).

Measures

Demographic Data. Gender and age were collected from all participants.

Diagnosis. Two different diagnostic interviews were conducted to set a diagnosis. Until December 2019, the Structured Clinical Interview for DSM-5 Disorders (SCID-5; First & Williams, 2016) was used. This interview assesses Axis-I psychiatric DSM-5 disorders and provides information about the mood symptoms that are present within an individual. The completion time of the SCID-5 was approximately 90 minutes. Research has shown that the SCID-5 presented excellent reliability and high specificity and the clinical validity of the instrument is confirmed (Osório et al., 2019).

From January 2020, the participants have been diagnosed with help of the Mini-International Neuropsychiatric Interview (M.I.N.I.; Sheehan et al., 1998). This diagnostic interview has been used as a substitute, because of its shorter completion time of approximately 45 minutes. The M.I.N.I. has been developed to explore disorders according to the DSM-5 as well. Reliability and validity of the M.I.N.I. are supported by comparisons between this interview and other diagnostic interviews, including previous versions of the SCID (Sheehan et al., 1997; Sheehan et al., 1998).

Predominant Polarity. The characteristics and history of the bipolar disorder (amount and type of episodes) were assessed using the Dutch version (QBP-NL 2.0-SF; Akkerhuis et al., 2005) of the Questionnaire for Bipolar Illness (Leverich et al., 2001). Validity and reliability of this questionnaire have not been studied yet. Predominant polarity was determined by comparing the score on the item "Can you estimate how often you have experienced *(hypo)manic episodes* in your life?" with the score on the item "Can you estimate how often you have experienced *depressive episodes* in your life?" Both items were rated on an 8-point Likert scale (0 = *none*; 7 = *more than 20*). A higher score on the number of (hypo)manic than on depressive episodes was scored as "manic polarity", while a higher score on the number of depressive than on (hypo)manic episodes was scored as "depressive polarity". When scores on depressive and (hypo)manic episodes were equal, the score "no polarity" was assigned.

Responses to Positive Affect Questionnaire. To measure the different responses to PA, the Dutch version of the RPA (RPA-NL) was used. This self-report measure is developed by Feldman et al. (2008) and consists of 17 items. The questionnaire examines three processes related to the regulation of PA, including self-focused rumination (e.g. "I am living up to my potential"), emotion-focused rumination (e.g. "I feel full of energy"), and dampening thoughts (e.g. "I don't deserve this"). Responses are quantified on a 4-point Likert scale (1 = *almost never*; 4 = *almost always*). Research supported both validity and reliability of the RPA (Kraiss et al., 2019; Raes et al., 2009) and the present study found satisfactory internal consistency for each of the subscales of the RPA-NL. Cronbach's alphas were .90 for the positive rumination, .83 for self-focused rumination, .82 for emotion focused rumination, and .76 for dampening.

Statistical Analyses

Data were processed and analysed by using the Statistical Package for the Social Sciences (SPSS) version 22 (IBM Corporation, 2013). The independent variables researched in this study (BD subtype, predominant polarity) were of categorical measurement level, while

the dependent variables (positive rumination and dampening scores) were of ratio measurement level. Gender, age and diagnosis of the excluded participants were checked to determine if there was a systematic deviation from the remaining sample, but no significant differences between these groups were found.

The required sample size for this study was determined with the statistical power analysis program size G*Power (Faul et al., 2009) and the a priori test indicated that, to ensure the sample is large enough, at least 174 responses were needed to perform the T-test and one-way between-group ANOVA's ($1\text{-}\beta = .95$). With a power of 0.8, which is also acceptable according to Field (2003), 102 responses were needed.

Statistical assumptions were checked and descriptive statistics were computed. The association between BD subtype and predominant polarity (hypothesis 1) was measured using chi-square statistic for categorical dependent variables. Two independent samples T-tests were performed to examine the relationship between subtype and responses to PA (hypothesis 2). One-way between-group ANOVA's were performed to examine differences in responses to PA between predominant polarities (hypothesis 3) with three planned groups: (1) no polarity, (2) manic polarity and (3) depressive polarity. When significant main effects were found, Tukey post-hoc comparisons were conducted. Finally, by using Process macro for SPSS (Hayes, 2013), a moderation analysis was performed to measure the influence of BD subtype on responses to PA and the moderating effect of predominant polarity (hypothesis 4). To perform this moderation analysis, the dummy variables "depressive polarity vs. no polarity" (DP vs. NP) and "manic polarity vs. no polarity" (MP vs. NP) were created.

Results

Descriptive Statistics

Assumptions were checked before running the statistical analyses. The histograms showed that the variable dampening was slightly positively skewed, which indicates that most

values are clustered around the left tail of the distribution. The variable positive rumination was normally distributed. Based on the Shapiro-Wilk test, both dampening (W = .93, p = .001) and positive rumination (W = .95, p = .006) violated the assumption of normality, which suggests that the assumption of normality has not been met. However, this was not considered as a problem for this data analysis, since Field (2013) described that normality can be assumed if the sample size is bigger than 30. Furthermore, Levene's test for equality of variances was not significant, which means that the assumption of homoscedasticity was met. Finally, the Durbin Watson statistics were 2.21 for dampening and 2.04 for positive rumination, which indicates that the residuals are independent (Field, 2013).

Descriptive statistics were computed for all variables, including the exploratory variables of gender and positive rumination subscales. An overrepresentation of females (62.3%) was identified, but gender showed to have no significant effect on responses to PA (see Table 1). No predominant polarity was found in 28.5% of the participants (N = 22), whilst manic polarity was determined in 20.8% (N = 16) of the sample and 50.6% (N = 39) of the participants was classified having a depressive polarity. Table 2 shows the responses to PA for BD subtypes and predominant polarities.

Table 1

Differences in Scores on Responses to Positive Affect Subscales Between Gender

Response to PA	**Female** (N= 48) M (SD)	**Male** (N=29**)** M (SD)	t-value	p-value	η^2
RPA Rumination	22.10 (5.37)	20.41 (6.42)	1.24	.218	.02
Self-focused	8.81 (2.99)	8.41 (3.30)	.55	.587	.004
Emotion-focused	13.29 (2.89)	12.00 (3.40)	1.78	.080	.04
RPA Dampening	11.96 (3.07)	11.62 (3.79)	.43	.670	.002

Table 2.

Scores on Response to Positive Affect Subscales by BD Subtypes and Predominant Polarities

Response to PA	**BD-I** (*N*=56) *M* (*SD*)	**BD-II** (*N*=21) *M* (*SD*)	**No Polarity** (*N*=22) *M* (*SD*)	**Manic Polarity** (*N*=16) *M* (*SD*)	**Depressive Polarity** (*N*=39) *M* (*SD*)
Rumination	20.52 (5.20)	24.00 (6.67)	22.82 (6.23)	21.88 (5.66)	20.54 (5.60)
Self-focused	8.21 (2.75)	9.86 (3.68)	9.73 (3.03)	8.50 (3.22)	8.13 (3.00)
Emotion-focused	12.30 (2.87)	14.14 (3.48)	13.09 (3.48)	13.38 (3.01)	12.41 (3.01)
Dampening	11.77 (3.43)	12.00 (3.15)	12.82 (3.16)	9.56 (2.06)	12.21 (3.50)

Hypothesis 1: Association Between Subtype and Predominant Polarity

A chi-square test was performed to determine whether predominant polarity differed between BD-I and BD-II. No association between subtype and predominant polarity was found, $X^2(2) = 2.48$, $p = .289$, $V = .18$.

Hypothesis 2: Associations Between Subtype and Response to PA

A first independent samples t-test was conducted to compare positive rumination in BD-I and BD-II conditions. The 56 participants diagnosed with BD-I (M = 20.5; SD = 5.20) demonstrated, compared to the 21 participants diagnosed with BD-II (M = 24.0; SD = 6.67), significantly lower scores on positive rumination, t (75) = -2.42, p = .018. This is not in line with the hypothesis that BD-I is associated with higher positive rumination than BD-II.

A second independent samples t-test was conducted to compare dampening in BD-I and BD-II conditions. As expected, participants with BD-I (M = 11.77; SD = 3.43) scored lower than those with BD-II (M = 12.00; SD = 3.15), but this difference was not significant, t (75) = -.27, p = .788.

Hypothesis 3: Associations Between Predominant Polarity and Response to PA

A first one-way between-group ANOVA was conducted to compare positive rumination scores between no polarity, manic polarity and depressive polarity conditions. No statistically significant difference between groups was found ($F(2,74) = 1.14$, $p = .326$).

A second one-way between-group ANOVA was conducted to compare dampening scores between no polarity, manic polarity and depressive polarity conditions. There was a statistically significant difference between groups ($F(2,74) = 5.48$, $p = .006$). A Tukey post hoc test revealed that dampening scores were significantly higher for the no polarity ($p = .007$) and depressive polarity group ($p = .017$) compared to the manic polarity group. Between the no polarity and depressive polarity group, no significant difference in dampening scores was found ($p = .748$).

Hypothesis 4: Relationship Between Subtype, Predominant Polarity and Response to PA

To investigate the effect of polarity on the relationship between subtype and response to PA, two simple moderation analysis were performed using PROCESS model number 1 with standardized means. The outcome variable of the first model was positive rumination and the outcome variable of the second model was dampening. The predictor variable for both models was subtype and the moderators for both models were two dummy variables: manic polarity vs. no polarity (MP vs. NP) and depressive polarity versus no polarity (DP vs. NP).

Model 1. The explained variance of the first model was significant, $R^2 = 0.18$, $F(5,71) = 3.14$, $p = .013$. In addition, DP vs. NP moderated the relationship between subtype and positive rumination ($\beta = 7.70$, 95% CI [1.34, 14.06], $p = .018$). However, both subtype ($\beta = -1.35$, $t = -.52$, $p = .604$) and MP vs. NP ($\beta = -.33$, $t = -.18$, $p = .861$) and DP vs. NP ($\beta = -2.66$, $t = -1.83$, $p = .071$) were no significant predictors for positive rumination. Furthermore, MP vs. NP did not moderate the relationship between subtype and positive rumination ($\beta = 5.50$, 95% CI [-4.20, 15.19], $p = .262$).

Model 2. In the second model, MP vs. NP was a significant predictor for dampening, β = -3.27, t = -2.92, p = .005. However, the explained variance of this model was not significant R^2 = 0.13, F(5,71)= 2.11, p = .074 and both subtype (β = -.21, t = -.14, p = .893) and DP vs. NP (β = -.60, t = -.70, p = .488) were no significant predictors for dampening. Furthermore, both MP vs. NP (β = .14, 95% CI [-5.61, 5.89], p = .96) and DP vs. NP (β = .02, 95% CI [-3.76, 3.79], p = .99) did not moderate the relationship between subtype and dampening.

Discussion

The present study explored the relationship between subtype, predominant polarity and response to PA in a bipolar population. Only a few studies have been done on PA regulation in bipolar patients and this was one of the first studies on the effect of predominant polarity on the relationship between bipolar subtype and response to PA. The main results of this study will be described below.

The first main finding was that dampening scores were significantly higher for the no polarity and depressive polarity group, compared to the manic polarity group. This confirmed the assumption that a predominance of manic polarity is associated with less dampening compared with no predominant polarity (hypothesis 3). The second main result was that depressive polarity had a significant reducing effect on the negative relationship between BD-II and positive rumination. This confirmed the assumption that a predominance of depressive polarity weakens the negative relationship between BD-II and positive rumination (hypothesis 4b; see Figure 2, p. 8). Both these main results indicated that predominant polarity had effect on the response to PA and the relationship between subtype and response to PA. However, whereas previous research has shown a positive relationship between predominant polarity and RPA scores (Feldman et al., 2008; Gruber et al., 2011), this study showed a negative relationship between these variables. Manic polarity was not associated with higher positive rumination scores, but associated with lower dampening scores, compared to depressive and

no polarity, and depressive polarity did not increase the relationship between BD-II and dampening (figure 3, p. 9), but decreased the relationship between BD-II and positive rumination (figure 2, p. 8). This negative relationship between predominant polarity and response to PA is a new finding in the area of PA regulation in patients with BD.

A third, striking result was that the BD-I group scored significantly lower on positive rumination than the BD-II group did, while it was hypothesised that the BD-I group would score higher on positive rumination than the BD-II group. An explanation for this could be that the BD-I patients used self-calming strategies to prevent themselves from re-experiencing a manic episode (Feldman et al., 2008). It is found that patients' valuations about their internal or external states might play an important role in the use of positive rumination and dampening strategies (Mansell et al., 2007). For example, prior negative experiences due to mania (e.g. family problems, hospitalisation) may influence the valuation of high moods within patients with BD-I. So, the BD-I patients included in this study might have tried to actively supress positive rumination, to prevent the emerge of manic symptoms, and therefore scored lower on positive rumination than the patients with BD-II did.

The fourth and final main result was that no other significant relationships or differences were found, which means that all other hypotheses were rejected. The lack of significant findings could be explained by the limitations of this study, described below.

Limitations

The current study contained a few limitations which should be considered when interpreting the results. First of all, a notable high number of missing data resulted in a small remaining sample. As demonstrated with the power analysis, 102 participants were needed to perform the analyses. This study included only 77 participants, causing a low statistical power and leading to a higher probability of making a Type II error (Akobeng, 2016). So, the small sample might have caused existing effects not to show up in the results. However, sample size

issues like these are common within psychological research, given the focus on more scarce populations (Muth et al., 2016).

A second limitation is that the different predominant polarities could not be determined as precisely as previously described in literature. Research suggests that a predominant polarity exists when over two thirds of the episodes a bipolar patient experienced, are restricted to one of the two poles of BD (Rosa et al., 2008). In this study, both the number of (hypo)manic episodes and the number of depressive episodes were rated on an 8-point Likert scale, which made it impossible to calculate whether ≥ 67% of the episodes were restricted to one of the poles or not. The eventual decision to assign a predominant polarity when there was only a difference between the number of (hypo)manic or depressive episodes, might have led to the overclassification of predominant polarities. This possible overclassification might have influenced the results of this study and therefore explain why the hypotheses regarding polarity could not be confirmed. On the other hand, the determination of the BD diagnosis can be seen as a strong aspect of this study. The inconsistent use of diagnostic criteria when determining bipolar disorder is a noteworthy methodological problem within studies on BD (Smith et al., 2008) and the current study has countered this problem by using the SCID-5.

A final limitation is that the QBP was a retrospective self-report measure. This is a problem since cognitive deficits are shown in patients with BD, both during the acute phase of illness and during remission (Bearden et al., 2001; Quraishi, & Frangou, 2002; Savitz et al., 2005). Memory impairments are consistently reported (Robinson et al., 2006; Bearden et al., 2006) and might have led to unreliable self-report of number of prior episodes. This affected the reliability of this study.

Implications and Future Research

This is the first study that demonstrated a negative association between predominant polarity and response to PA. This implies that predominant polarity may be an explanatory

factor for the ER strategies used within BD and thus may have an effect on the course of this illness. Therefore, predominant polarity might be a considerable factor within the treatment of BD. This finding gives reason to further investigate and specify the effect of predominant polarity on response to PA.

In future research, it is important to examine a larger group of patients, with polarity being determined based on the absolute number of earlier experienced episodes. In addition, it is recommended to measure response to PA with a single questionnaire and not as part of a large set of questionnaires, in order to keep completion time as short as possible and thereby avoid dropout of participants (Fan & Yan, 2010). Furthermore, the influence of current mood on response to PA could be examined to find out whether response to PA is a psychological factor that remains stable or rather fluctuates over time depending on mood status. Finally, longitudinal research may help in determining whether responses to PA predict the course of future mood disturbances. By extending the knowledge about positive affect regulation, psychological interventions focused on changing maladaptive emotion regulation strategies used by patients with BD might be improved.

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