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The associations between illness perceptions and social rhythm stability on mood symptoms among patients with bipolar disorder

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Abstract

Background: The association between illness perceptions and the effectiveness of patients' illness-management strategies has been supported across a range of medical and psychiatric disorders. Few studies have examined these variables or their association in bipolar disorder (BD). This study examined the main and interactive associations between illness perceptions and one important illness management strategy - social rhythms stability on mood symptom severity in adults with BD.

Methods: A cross-sectional study with 131 patients with BD in Taiwan was conducted using clinician- and patient-rated mood symptoms, self-reported illness perceptions, and a measure of daily and nightly social rhythms.

Results: Illness perceptions were associated with mood symptom severity, but social rhythms were not. Unfavorable illness perceptions (e.g., beliefs of experiencing more BD symptoms, having stronger emotional responses to the illness) were associated with more severe mood symptoms. Favorable illness perceptions (e.g., beliefs of being able to understand and control the illness) were associated with less severe mood symptoms, with personal control as the strongest

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correlate of mood symptom severity. Finally, social rhythm stability moderated the relationship between unfavorable illness perceptions and clinician-rated manic symptoms.

Limitations: The cross-sectional design limits our ability to make causal conclusions. Also, the effects pertain to patients in remission and may not generalize to more severely ill or hospitalized bipolar patients.

Conclusions: This study indicates that in patients with BD, illness perceptions are associated with symptom severity. Interventions to enhance favorable IPs and reduce unfavorable IPs may improve mood outcomes, particularly when patients have adopted regular social rhythms.

Keywords

Bipolar disorder; Illness perception; Social rhythm; Depression; Mania

1.   Introduction

Illness perception (IP) refers to patients' beliefs about their health problem(s). The concept of IP was derived from Leventhal's self-regulatory model, which proposes that people develop both cognitive and emotional representations to actively understand and overcome the impact of their health challenges and, in turn, generate problem-based and emotion-focused coping strategies (Leventhal et al., 1997; H. 2001). Patients' beliefs about their illness can be favorable or unfavorable, which are associated with better or poorer health outcomes, respectively (Sawyer et al., 2019). Favorable IPs include beliefs that the individual can understand and control the illness by their personal effort or by engaging in treatments that manage their illness (Miceli et al., 2019; Sawyer et al., 2019; Wisting et al., 2019). Unfavorable IPs include beliefs about having a deleterious symptom course, or that the illness or illness label will have irreversible functional consequences.

IPs are associated with patients' illness management strategies in a range of different conditions, including hypertension (Yang et al., 2018), diabetes (Wisting et al., 2019), heart disease (Mosleh and Almalik, 2016), rheumatoid arthritis (Berner et al., 2018), cancer (Miceli et al., 2019), chronic obstructive and pulmonary disease (Tiemensma et al., 2016), schizophrenia (Lobban et al., 2004), and other mental illnesses or problems (Scerri et al., 2019; Subramaniam et al., 2018). These studies have indicated that IPs play a critical role in approaches to treatment and disease outcomes, including treatment adherence, symptom control, perceived stress, and quality of life. For example, patients' beliefs about their ability to control the illness may affect their adherence to pharmacological and psychosocial treatments, which then affect treatment outcomes.

Illness beliefs and perceptions have not been adequately explored in patients with mood disorders. Subramaniam et al. (2018) surveyed the IPs among patients with a range of mental illnesses using a multi-ethnic Asian sample ($N = 400$), and concluded that age, education, and knowledge about illness were positively associated with favorable IPs. Only two studies have examined IPs in bipolar disorder (BD). Averous et al. (2018) found that patients with BD with more favorable IPs and fewer unfavorable IPs showed better adherence to medications. In a study of group psychoeducation, improvements in patients'

IPs, rather than knowledge of the illness or medication adherence, mediated treatment-related improvements in social functioning (Etain et al., 2018). However, the relationship between IPs and mood symptoms in BD is unknown.

Elucidating the associations of IPs, and specifically what beliefs are associated with mood symptoms in BD can have important implications for treatment in this population. For example, favorable IPs about one's personal understanding of an illness and its controllability might be associated with better mood outcomes, while unfavorable IPs about illness chronicity might be associated with worse mood outcomes. This evidence would have important implications for how treatments that target IPs, such as cognitive-behavioral therapy or psychoeducation, could be improved to provide greater clinical benefits.

In addition to cognitive factors (like IPs), there is considerable evidence that behavioral characteristics, such as disturbances in social rhythms (habitual patterns of sleeping, waking, eating, exercising, and socializing), are associated with the severity of mood symptoms in BD (Alloy et al., 2015; Grandin et al., 2006; Harvey, 2008; Jones et al., 2005; Malkoff-Schwartz et al., 1998, 2000; Shen et al., 2008). The social zeitgeber theory proposes that life events trigger mood episodes and vulnerability to bipolar spectrum disorders by causing disruptions in a person's social routines, which in turn affect circadian rhythms (e.g., physical or behavioral changes that following daily light/dark cycles; Ehlers et al., 1988). Increasing evidence suggests that circadian dysregulation, activity patterns, and disrupted social rhythms characterize individuals with or at risk for BD (Melo et al., 2017; Murray and Harvey, 2010; Nováková et al., 2015). Patients diagnosed with cyclothymic or bipolar II disorder report significantly more irregular daily routines than healthy controls (Shen et al., 2008). In college students at risk for BD, social rhythm regularity significantly predicts time to first prospective onset of major depressive, hypomanic and manic episodes (Alloy et al., 2015). Two reviews of this literature concluded that both endogenous irregularities in the biological clock's pacemaking function and external disruptions in circadian rhythms caused by physical and social cues are associated with the onset and course of bipolar spectrum disorders (Abreu and Braganca, 2015; Alloy et al., 2017).

Thus, current theories regarding psychological factors that affect the onset of BD symptoms have emphasized the role of negative cognitions that become activated by stress or reward hypersensitivity (Alloy et al., 2006, 2015; Lima et al., 2018) and social rhythms as predictors of symptom severity and potential targets for psychosocial interventions (Abreu and Braganca, 2015; Alloy et al., 2017; Kato, 2019). There is support for the use of cognitive-behavioral therapy in BD, which focuses on modifying cognitions and behaviors to improve symptom severity (Gonzalez-Isasi et al., 2014; Jones et al., 2015; Lauder et al., 2015). Furthermore, according to the Leventhal's self-regulatory model, in the context of life stressors, negative IPs may interact with certain personal traits (e.g., circadian rhythm regularity) and specific coping strategies (e.g., ability to challenge beliefs or life styles) could moderate the effects of the IPs on concurrent illness states or outcomes (Hagger et al., 2017; Krok et al., 2019; H. Leventhal et al., 2001). For example, individuals with negative illness beliefs may have a lower probability of depressed mood if they are maintaining stable sleep schedules. A patient who has both negative beliefs (e.g., 'I cannot control my illness") and poor sleep/wake regularity may be particularly vulnerable to manic episodes when

stressful events disrupt his/her routines. Better understanding of the interplay between such cognitive and behavioral characteristics would support more personalized treatment efforts for patients with BD (Haynes et al., 2016). No study to date has investigated the interaction between IPs, and social rhythm stability on manic and depressive symptoms in adults with BD. In the present study, we examined the main effects and interactions of IPs and social rhythm stability on manic and depressive symptoms in patients with BD. We hypothesized that both favorable IPs and lower social rhythm disturbances would be associated with lower clinician- and patient-rated mood symptoms among patients with BD, while unfavorable IPs and greater social rhythm disturbances would be associated with more severe mood symptoms. Additionally, we hypothesized that better social rhythms would buffer against the negative effects of unfavorable IPs on mood symptoms.

2. Material and methods

2.1. Research design, setting, and procedures

We used a cross-sectional research design to recruit patients in the psychiatric department of a 1200-bed medical center in southern Taiwan. The human rights protection protocols and all other ethics protocols were approved by the hospital's Institutional Review Board [IRB #: B-ER-103–222] before any patients were recruited. Eligible participants were given written and oral explanations of the study's details, including the purpose of the study and their right to withdraw at any time without affecting their treatment. We obtained signed written consent from all participants. Participants were provided instructions for how to use the self-reported daily Social Rhythm Metric-5 (SRM-5) and asked to record their daily and nightly activities for one week. After one week, participants returned the completed SRM-5. We then conducted structured interviews to assess their mood symptoms, and patients completed questionnaires concerning their IPs and mood symptoms (see below).

2.2. Participants

Psychiatrists used the following inclusion criteria to refer participants: > 18 years old, able to speak and read Taiwanese (Hoklo) or Taiwanese Mandarin Chinese, and agreed to accept the following medication therapy as needed during the study: a mood stabilizer (valproic acid or lithium salts), an antidepressant, second generation antipsychotics, anxiolytics (lorazepam [< 8 mg/day]), and medicines to counteract side effects. Potential participants who were current alcohol or drug abusers or had been in the previous year, or who had been diagnosed with an organic psychosis, a neurodegenerative disease, a personality disorder, or impaired cognitive abilities were excluded.

Each patient was assessed using the Chinese version of the Modified Schedule of Affective Disorder and Schizophrenia-Lifetime (SADS-L) (Endicott and Spitzer, 1978) to confirm that they met the DSM-IV criteria for a primary diagnosis of BD. The SADS-L has been widely used in clinical research, and its validity and reliability are considered adequate (Hsiao et al., 2009; Rogers et al., 2003).

2.3. Instruments

2.3.1. Brief illness perception questionnaire (BIPQ)—We used the 8-item BIPQ
(Broadbent et al., 2006) to assess patients' IPs, excluding the open-ended question
pertaining to beliefs about causal factors. Five items assess cognitive illness representations:
consequences ("How much does your illness affect your life?"), *timeline* ("How long do
you think your illness will continue?"), *personal control* ("How much control do you feel
you have over your illness?"), *treatment control* ("How much do you think your treatment
can help your illness?"), and *identity* ("How much do you experience symptoms from your
illness?"). Two items assess emotional representations: *concern* ("How concerned are you
about your illness?") and *emotion* ("How much does your illness affect you emotionally?").
One item assesses *illness comprehensibility* ("How well do you feel you understand your
illness?"). All of the items are self-rated using a 0-to-10 response scale. Unfavorable IPs
are calculated as the mean of the consequences, timeline, identity, concern, and emotion
items, with higher scores indicating more unfavorable IPs. Favorable IPs are calculated as
the mean of the personal control, treatment control, and illness comprehension items, with
higher scores indicating more favorable IPs.

The psychometric quality of the BIPQ has been tested and found to be internally reliable
(Broadbent et al., 2006). The Chinese version of the BIPQ has been assessed with adequate
reliability and construct validity in patients with breast cancer (Zhang et al., 2017) and
coronary heart disease (Lin et al., 2011). The instrument showed acceptable internal
consistency in the current study (Cronbach's $\alpha = 0.66$).

2.3.2. Social rhythm metric (SRM)—The self-reported SRM-17 was originally
developed to quantify a person's daily social rhythm pattern (Monk et al., 1990). Bipolar
spectrum patients have been found to have lower SRM regularity scores – meaning less
consistency in daily and nightly routines- than healthy controls (Jones et al., 2005; Shen
et al., 2008). Further, lower scores are associated with higher frequencies of recurrence
of mood episodes in bipolar spectrum individuals (Shen et al., 2008). A brief-version, the
SRM-5, was developed to minimize participant burden (Monk et al., 2002). The SRM-5
has demonstrated strong sensitivity and specificity compared to the SRM-17 (sensitivity =
74%; specificity = 95%; overall $\kappa = 0.7$), and is highly correlated with the SRM-17 in both
between-subject and within-subject comparisons over time (Monk et al., 2002).

The SRM-5 is a diary-like instrument with one page per day; the seven sheets constituting
one week are then scored as a unit. In the present study, we used the SRM-5 to capture the
frequency and timing of five activities that are part of a person's daily routine by recording
the time that these activities occurred: getting out of bed, going to bed, mealtimes, first
social contact of the day, and starting work or school (Monk et al., 2002). The habitual time
for each activity is calculated, and then the number of activities that occur within 45 min
of the habitual time in the week is counted. Activities counted three times in one week are
scored 1, and those that occur < 3 times are scored 0. The total scores range from 0 to 5; the
higher the score, the more regulated the social rhythms. Subjects who completed less than 5
days of SRM tracking ($n = 8$) were not included in the analyses.

2.3.3. Assessments for mood symptoms

a) **Hamilton Depression Rating Scale (HDRS):** The 17-item HDRS is a widely used clinician-rated depression assessment scale, assessing symptoms during the previous week (Hamilton, 1960). The total score is 52 and is divided into four levels (Keck, 2004): 0–7 means remission, 8–13 means mild severe, 14–22 means moderate severe, and > 23 means very severe. The HDRS has been translated into Chinese and has adequate psychometric quality (Zheng et al., 1988). The inter-rater reliability of the HDRS in the present study was adequate ($\kappa = 0.85$).

a) **Depression, Anxiety, and Stress Scale (DASS):** The DASS-21 (Henry and Crawford, 2005) is a 21-item self-report measure of depression, anxiety, and stress. It has translated for use as a valid and reliable instrument in Chinese (Moussa et al., 2001). Items are measured on a 4-point Likert scale with higher scores indicating greater severity of symptoms. Only the depression subscale was used in this study. The depression subscale showed good internal consistency (Cronbach's $\alpha = 0.90$) and moderate correlation with the HDRS ($r = 0.48$) in this study.

a) **Young Mania Rating Scale (YMRS):** The 11-item YMRS is a clinician-rated assessment of manic symptoms experienced during the previous week (Young et al., 1978). The total score is 60; patients with a total score of 0 to 12 are usually in remission; 13 to 19 are moderate, and scores > 20 usually indicate a full manic episode by DSM-IV criteria (Lukasiewicz et al., 2013). The YMRS has been translated into Chinese and has adequate inter-rater reliability ($\kappa = 0.93$) and concurrent validity (significantly correlation with days hospitalized) (Hwu, 1999). The inter-rater reliability of the YMRS in the present study was high ($\kappa = 0.85$).

a) **Altman Self Rating Mania Scale (ASRM):** The ASRM (Altman et al., 1997; E.G. 2001) is self-report measure of 5 (hypo)mania symptoms rated on 5-point Likert scales over the past a week. Five items are summed to get a total score. A cutoff score of 6 or higher indicates a high probability of a manic or hypomanic condition (sensitivity: 85.5%, specificity: 87.3%). The ASRM was translated into Chinese and demonstrated acceptable internal consistency in this study (Cronbach's $\alpha = 0.65$), with a significant but low correlation with total scores on the YMRS ($r = 0.28$, $p < 0.001$), suggesting that clinically observed mania and self-reported mania had minimal overlap in this study.

2.4. Statistical analysis

Data were analyzed using SPSS 18.0 for Windows (SPSS Inc., Chicago, IL, USA). Descriptive statistics for the demographic variables, the SRM-5, BIPQ, HDRS, DASS-depression, YMRS, and ASRM scores were first examined. Pearson correlations between the scale scores were examined. Then, multiple regression analyses were used to test whether each IP subscale (i.e., Consequence, Timeline, Personal Control, Treatment Control, Identity, Concern, Comprehension, Emotional Response) and SRM-5 scores was related to the mood symptom variables. The mood symptom measures included clinician-rated (YMRS, HDRS) and self-reported (DASS-depression, ASRM) depressive and hypomanic/manioc symptoms, respectively.

As exploratory analyses, we analyzed the interaction between social rhythms and IPs on the same mood outcomes. To avoid multiple comparisons, we examined an unfavorable IP variable and a favorable IPs variable for each participant. The PROCESS macro within SPSS was used to conduct the moderation analyses of favorable and unfavorable IPs (separately) with SRM-5 scores on mood symptoms (Hayes, 2017). Based on existing evidence in healthy samples (Monk et al., 2002), we classified participants as high in social rhythm disturbances (1 SD *below* the sample mean) or low in social rhythm disturbances (1 SD *above* the sample mean).

3.   Results

3.1.   Demographic characteristics

Of the 154 eligible participants, 131 (85.1%) completed the study. The mean age was 38.71 ± 13.65 (SD); most patients were female, unmarried, unemployed, and college-educated. Most had been diagnosed with BD-II, had never been hospitalized, and had been referred to the study from outpatient services (see Table 1).

3.2.   Patients' illness perceptions, social rhythm, and mood symptoms

The mean BIPQ subscale item scores ranged from 5.88–7.53. The highest scores were recorded for emotional response (an unfavorable item), and the lowest for personal control (a favorable item). The mean score for unfavorable IPs were significantly higher than the score for favorable IPs ($M = 6.92$, SD=1.74 versus $M = 6.32$, SD=1.89, respectively; $t = -2.68$, p=.008). The mean score on the SRM-5 was 2.69 (SD= 2.10) (see Table 1).

3.3.   The associations of illness perceptions, social rhythm, and mood symptoms

Social rhythm stability scores were not associated with either favorable or unfavorable IPs or patient- or clinician-rated mood symptoms. For clinician-rated mood assessments, two unfavorable IPs – consequence and identity – were positively associated with depression, and all 3 favorable IPs – personal and treatment control, and comprehension – were negatively associated with depression. Personal control was the only IP associated (negatively) with clinician-rated manic symptoms.

For patient-rated mood assessments, all IPs were moderately associated with depression, except Concern (see Table 2). All three favorable IPs were negatively associated with depression, and all of the unfavorable IPs - Consequence, Timeline, Identity, and Emotional response - were positively associated with patient-reported depression. None of the IPs were associated with patient-rated manic symptoms.

In multiple regression analyses controlling for each of IPs and SRM scores, only personal control was associated with clinician-assessed depressive and manic symptoms. Personal control, treatment control, and emotional response were each significantly associated with patient-rated depression symptoms. Comprehension was the only IP significantly associated with patient-rated manic symptoms (see Table 3).

We then examined the interaction between favorable and unfavorable IPs (separately) with social rhythm stability on mood symptoms. These analyses revealed a significant interaction

between unfavorable IPs and social rhythm scores on clinician-rated mania scores (b=−0.21, SE=0.08, p=.007; see Fig. 1). For patients with low social rhythm scores (i.e., greater social rhythm disturbances), unfavorable IPs were associated with more severe manic symptoms (b = 0.35, SE=0.19, p = .07). The association was reversed for patients with high social rhythm scores (i.e., low rhythm disturbances), such that unfavorable IPs were associated with lower clinician-rated manic symptoms (b=−0.53, SE=0.25, p=.04). There was no interaction of unfavorable IPs and social rhythm scores on clinician-rated depressive symptoms or self-reported manic symptoms or depressive symptoms. There was no interaction between favorable IPs and social rhythms on any of the mood variables.

4. Discussion

To our knowledge, this is the first study to document a relationship between illness beliefs and concurrent mood symptoms in patients with BD. We found that beliefs about personal control, controlling for all other IPs and social rhythm, was the strongest IP associated with clinician-rated mania and depression and patient-rated depression. A similar finding emerged in a study of anxiety patients (Yap et al., 2019), which found that personal control and biological illness attributions were significant predictors of anxiety symptoms. Thus, patients who perceive greater control over their illness may have stronger confidence to manage their symptoms or may believe they are able to use their experience and skills to improve their symptoms (Scerri et al., 2019; Wisting et al., 2019; Yang et al., 2018). Our findings are in line with previous research on different medical conditions (Sawyer et al., 2019) suggesting that favorable IPs play a critical role in many health outcomes, including treatment adherence, symptom control, perceived stress, and quality of life. Alternatively, unfavorable IPs can hinder recovery and illness management efforts.

Although the social rhythm scores in this sample were more dysregulated than scores observed in two healthy control samples (Monk et al., 2002), there was lack of association between social rhythm regularity and mood symptoms, which is inconsistent with the bulk of previous research (Abreu and Braganca, 2015; Alloy et al., 2017). Possibly, the short period of assessment (the previous week) compared to previous research with longitudinal follow-up (e.g., Shen et al., 2008) or objective assessments (e.g., actigraphic recording; Jones et al., 2005) may have limited our ability to observe this relationship. It is also possible that social rhythm regularity is more clearly associated with future than concurrent symptoms. Importantly, studies observing an association between social rhythm stability and future mood symptoms find that this relationship is moderated by specific personality factors or cognitive appraisal styles not measured in this study, such as reward hypersensitivity or hypomanic personality features (Alloy et al., 2015; Banks et al., 2016; Meyer and Maier, 2006).

Despite no direct relationship between social rhythms and mood symptoms, we found that social rhythm stability moderated the relationship between unfavorable IPs and clinician-rated manic symptoms. Patients with more negative IPs had higher levels of hypomania when their daily routines and sleep/wake cycles were irregular. Conversely, patients with more negative IPs had low hypomania scores when they kept consistent social rhythms. Together, these findings suggest that social rhythm regularity may not individually affect

manic symptoms, but may moderate the effects of negative cognitions on symptom states. Thus, a person who has been sleeping consistently may wake up in the morning with negative thoughts, but these thoughts may be less potent in affecting mood than they might have been with irregular sleep. Because this interaction between the risk factor of IPs and the protective factor of social rhythms only held for hypomanic symptoms, it appears that IPs are associated with depressive symptoms independently of social rhythm habits. This study did not test the causal direction between these variables. Future research should investigate whether changes in patients' social rhythm behaviors affect the influence of negative cognitions on the course of bipolar disorder.

Consistent with evidence from research in a variety of diseases (Berner et al., 2018; Miceli et al., 2019; Sawyer et al., 2019; Scerri et al., 2019; Subramaniam et al., 2018; Wisting et al., 2019; Yang et al., 2018), our findings suggest that IPs have a strong relationship with mood symptoms in patients with BD. A cognitive-behavioral approach to improving mood symptoms would emphasize cultivating favorable IPs in patients' concerning their understanding of BD and its controllability, challenging unfavorable IPs about negative consequences of the illness, and increasing awareness of the strategy of maintaining regular social rhythms. Future research should investigate whether integrating techniques from cognitive behavioral therapy and interpersonal and social rhythm therapy (Haynes et al., 2016; Salcedo et al., 2016) could enhance patients' positive cognitions as well as adaptive behaviors relevant to maintaining daily and nightly routines.

Limitations of this study are acknowledged. First, the findings may not generalize to more severely ill patients, such as those who have been hospitalized; the majority of the patients had bipolar II disorder. The low severity of symptoms may have limited the study's power to detect associations between social rhythms and mood symptoms. Second, a cross-sectional research design limits our ability to interpret the causal direction of these associations. Third, as discussed above, the short period of social rhythm assessment may not reflect the patient's ordinary habits over longer intervals. Fourth, the accuracy of self-reported measures, in particular the ASRM and SRM-5, are subject to social desirability effects. Individuals' recognition and awareness of their manic symptoms may be limited (Aspiazu et al., 2010; Regeer et al., 2015). Additionally, we used the abbreviated SRM-5 as opposed to the original 17-item SRM, which may have limited our ability to detect more subtle variations in daily routines (e.g., exercise routines) that might be correlates of mood states.

5. Conclusion

This study firstly indicates that BD patients' beliefs about their illness – notably, beliefs about personal control - are associated with their concurrent mood states. The relationships between unfavorable beliefs and manic symptoms may be buffered by the regularity of their daily and nightly routines. Thus, enhancing social rhythms in individuals with unfavorable IPs may lead to greater stabilization of manic or hypomanic symptoms. Examining how patients develop unfavorable IPs would inform the development of interventions to ameliorate the impact of these illness perceptions on the course of the illness.

Acknowledgments

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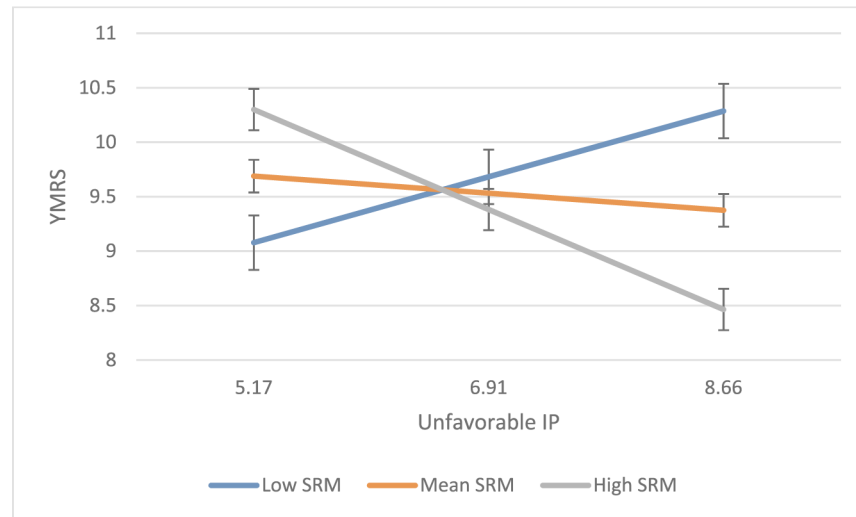
Fig. 1.
Interaction of unfavorable illness perceptions and social rhythm stability on manic symptoms

Note. Low and High SRM refer to +/− 1 SD from the mean, respectively. Standard error bars = +/− 1 standard error of the mean. IP = illness perception; SRM = Social Rhythm Metric; YMRS = Young Mania Rating Scale.

Table 1

Sociodemographic and clinical characteristics, illness perceptions, social rhythm stability, and mood symptoms ($N = 131$).

Variables	*Mean ± SD;%*
Age (years)	38.71 ± 13.65
Age at bipolar disorder onset (years)	29.96 ± 12.30
Female,%	54.2
Married,%	45.0
Employed,%	42.7
Education> 12 years,%	60.3
Outpatient,%	78.6
Diagnosis subtypes	
Bipolar I,%	31.3
Bipolar II,%	68.7
Illness duration (years)	7.69 ± 7.90
Hospitalizations, NO.	1.06 ± 2.40
Illness Perceptions (0–10)	
Unfavorable illness perceptions	6.92 ± 1.74
Consequence	6.57 ± 2.40
Timeline	6.59 ± 2.66
Identity	6.52 ± 2.41
Concern	7.38 ± 2.50
Emotional response	7.53 ± 2.24
Favorable illness perceptions	6.32 ± 1.89
Personal control	5.88 ± 2.39
Treatment control	6.55 ± 2.29
Comprehension	6.53 ± 2.39
Social rhythm (SRM)(0–5)	2.69 ± 2.10
Mood Symptoms	
HDRS (0–52)	8.80 ± 3.61
YMRS (0–60)	9.50 ± 3.01
DASS-depression (0–21)	8.50 ± 6.21
ASRM (0–20)	4.28 ± 3.49

Abbreviations: SRM, Social Rhythm Metric; HDRS, Hamilton Depression Rating Scale; YMRS, Young Mania Rating Scale; DASS, Depression Anxiety Stress Scales; ASRM, Altman Self Rating Mania Scale.

Table 2

Correlations among illness perceptions, social rhythm, and mood symptoms ($N = 131$).

Variables	SRM	HDRS	YMRS	DASS-Depression	ASRM
Illness Perceptions					
Consequence	−0.15	.24**	.09	0.39**	.02
Timeline	−0.09	.13	.10	0.27**	.07
Personal control	−0.03	−0.37**	−0.33**	−0.46**	.06
Treatment control	.02	−0.21*	−0.146	−0.35**	−0.09
Identity	−0.15	.21*	.05	0.38**	.11
Concern	−0.02	−0.03	−0.03	−0.01	.01
Comprehension	.04	−0.24**	−0.13	−0.32**	.14
Emotional response	−0.03	.14	0.06	0.31**	.08
SRM	1	.01	−0.05	.16	−0.04

Note.

Abbreviations: SRM, Social Rhythm Metric; HDRS, Hamilton Depression Rating Scale; YMRS, Young Mania Rating Scale; DASS, Depression Anxiety Stress Scales; ASRM, Altman Self Rating Mania Scale.

*
$p < .05$.

**
$p < .01$.

Table 3

The associations between illness perceptions and social rhythm stability on mood symptoms ($N = 131$).

Variables	HDRS			YMRS			DASS-Depression			ASRM		
	B	t	p	B	t	p	B	t	p	B	t	p
Constant	10.28	5.97	.00	11.92	7.84	.00	8.6	3.30	.00	2.16	1.20	.23
SRM	.08	.53	.60	−0.08	−0.61	.54	−0.01	−0.03	.97	−0.02	−0.15	.88
Consequence	.05	.29	.77	−0.03	−0.17	.87	.25	.92	.36	−0.11	−0.57	.57
Timeline	.01	.10	.92	.01	.08	.94	.17	.82	.41	.17	.84	.41
Personal control	−0.46	−2.99	**.00**	−0.45	−3.30	**.00**	−0.72	−3.06	**.00**	.12	.75	.45
Treatment control	−0.08	−0.50	.62	−0.07	−0.53	.60	−0.63	−2.61	**.01**	−0.33	−1.97	.05
Identity	.18	.98	.33	.05	.34	.74	.39	1.45	.15	.21	1.10	.27
Concern	.10	.63	.53	.05	.37	.72	−0.06	−0.23	.82	−0.24	−1.41	.16
Comprehension	−0.15	−0.89	.38	.08	.53	.60	−0.10	−0.38	.71	.40	2.32	**.02**
Emotional response	.02	.11	.91	−0.03	−0.23	.82	.53	2.16	**.03**	.18	1.07	.27

Abbreviations: HDRS, Hamilton Depression Rating Scale; YMRS, Young Mania Rating Scale; DASS, Depression Anxiety Stress Scales; ASRM, Altman Self Rating Mania Scale; SRM, Social Rhythm Metric.

Note.

*
$p < .05$

**
$p < .01$.