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Emotion Perception and Quality of Life in Bipolar I Disorder

Daniel Fulford[1], **Andrew D. Peckham**[2], **Kaja Johnson**[2], and **Sheri L. Johnson**[2]

Daniel Fulford: daniel.fulford@ucsf.edu

[1]University of California, San Francisco, Department of Psychiatry, 401 Parnassus Avenue, Box 0984, San Francisco, CA 94143, P: 415-502-4557, F: 415-476-7320

[2]University of California, Berkeley

Abstract

Background—Across two studies we examined the role of emotion perception as a correlate of quality of life and occupational functioning in bipolar I disorder.

Method—In Study 1, we tested a multifactorial model of quality of life and occupational functioning, including the role of emotion perception and other established correlates of functional outcomes, among 42 participants diagnosed with bipolar I disorder. In Study 2, participants diagnosed with bipolar I disorder and age- and gender-matched controls completed an affect recognition task and a quality of life measure.

Results—Across both studies, emotion perception related to functional outcomes. In Study 1, self-rated emotion perception explained unique variance in subjective well-being after controlling for illness characteristics, education, and executive function. In Study 2, a behavioral measure of facial affect recognition accuracy was related to quality of life, even after controlling for illness severity.

Limitations—Limitations include the use of a cross-sectional design, relatively small sample sizes, and the focus on only one aspect of social cognition.

Conclusions—Findings indicate that emotion perception may protect quality of life in bipolar disorder. This dimension may help predict important outcomes and, with further research, could serve as a potential treatment target.

Keywords

bipolar disorder; quality of life; psychosocial functioning; emotion perception; affect recognition

Correspondence to: Daniel Fulford, daniel.fulford@ucsf.edu.

Contributors

D Fulford conceptualized, executed, and wrote the initial draft of Study 1. A Peckham and K Johnson contributed to data analysis of Study 2 and manuscript preparation. S Johnson contributed to study design and execution of both studies, and edited all drafts of the manuscript.

Conflict of Interest

The authors declare no conflicts of interest.

Introduction

Bipolar I disorder has been estimated to be the fifth leading cause of medical disability among persons aged 15 to 44 (World Health Organization, 2001). Most troubling, the lifetime rate of at least one suicide attempt is as high as 50% within this population (Simpson and Jamison, 1999). Low subjective well-being and quality of life, as well as high rates of interpersonal conflict and unemployment rates, are apparent for those with bipolar disorder even during remission (Coryell et al., 1993; Fagiolini et al., 2005; Harrow et al., 1990). Consumers and researchers have both proposed that quality of life should be a treatment target for bipolar disorder (Sachs and Rush, 2003; Murray and Michalak, 2012). Despite the significant deficits in quality of life observed in bipolar disorder, about one-quarter achieve good functioning, and up to 15% achieve excellent functioning (Hammen et al., 2000; Harrow et al., 1990). Indeed, it has been proposed that the affective features of bipolar disorder may confer certain adaptive advantages (Akiskal and Akiskal, 2005).

Illness characteristics, demographic variables, and neurocognitive deficits certainly influence quality of life in bipolar disorder. Established correlates of quality of life include the number of previous episodes of depression and mania (Di Marzo et al., 2006; Dickerson et al., 2004), severity of current symptoms (Atkinson et al., 1997), lower educational attainment (Kessler et al., 1995), and neurocognitive deficits (Altshuler et al., 2007). Although these variables have a moderate link with quality of life in bipolar disorder, much of the variance remains unexplained.

Here, we examine whether deficits in social cognition—defined as the ability to encode, store, retrieve, and apply social information within the social context (Damasio, 1994)—predict functional outcomes. Previous research suggests that social cognition is an important predictor of psychosocial functioning in schizophrenia (Fett et al., 2011; Horan et al., 2012). Multiple aspects of social cognition have been studied in bipolar disorder (Bora et al., 2005; Olley et al., 2005), but a dominant focus of this work has been on deficits in the ability to recognize and respond to emotion. Emotion perception is thought to be the first step in responding to others' emotions in an adaptive way (Salovey and Grewal, 2005). Impaired ability to accurately recognize facial expressions has been found to predict social functioning in the general population (Corden et al., 2006), as well as in psychiatric populations such as schizophrenia (Addington et al., 2006).

Some researchers have documented diminished accuracy and slowed responses in the recognition of fear and disgust among persons with remitted bipolar disorder (e.g., Yurgelun-Todd et al., 2000). Other researchers, however, have failed to confirm such deficits (e.g., Lee et al., 2013), with even some evidence of enhanced recognition for certain emotions (e.g. Harmer et al., 2002). These findings suggest that there may be substantial variability across individuals with bipolar disorder in facial affect recognition.

Here, then, we consider whether emotion perception ability could help explain quality of life in bipolar disorder. Preliminary evidence supports this idea. Among adolescents with bipolar disorder, difficulties with facial affect recognition correlated with social reciprocity deficits as assessed using parental report (Rich et al., 2008). Among adults with remitted bipolar I disorder, accurate recognition of happy faces was related to higher quality of life (Hoertnagl et al., 2011). The current study, though, improves on this work by considering the effects of emotion perception after accounting for other well-established predictors of quality of life.

In two studies we tested emotion perception as a predictor of quality of life in bipolar I disorder. In Study 1, we considered self-rated emotion perception as a predictor of functioning and well-being, after accounting for general intelligence, educational attainment, and executive function. We also tested the role of emotion perception in predicting

occupational functioning. In Study 2, we administered a behavioral index of emotion perception. Across studies, we hypothesized that difficulties with emotion perception would be associated with poorer quality of life, above and beyond the role of other key variables.

Study 1

Quality of life has been defined using self-ratings of well-being as well as objective indices, such as occupational functioning (e.g., Andrews and Withey, 1976). Here, we include both types of measures, as subjective and objective indicators of quality of life appear to be only modestly correlated (e.g., Gutiérrez-Rojas et al., 2008; Headey and Wearing, 1992).

Method

Local Institutional Review Boards approved procedures for both studies. Participants completed written informed consent procedures after achieving adequate symptom remission and before taking part in the study assessments. Participants in both studies were paid for their participation.

Participants and Procedures—Participants included a socio-economically and ethnically diverse sample of 42 persons with bipolar I disorder (see Table 1), recruited through public advertising, outpatient clinics, and consumer organizations. Criteria for inclusion included: age between 18 and 65, fluency in English, and diagnosis of bipolar I disorder using the Structured Clinical Interview for DSM-IV (SCID; First et al., 1996). Exclusion criteria included: organic brain disorder; inability to complete self-report measures independently; clinically significant symptoms of mania and/or depression as indicated by scores greater than seven on the Bech-Rafaelson Mania Scale (MAS) and six on the Modified Hamilton Rating Scale for Depression (MHRSD), respectively (Johnson et al., 2000a); severe head trauma; any developmental or learning disabilities; alcohol or substance abuse or dependence within the past year; a primary psychotic disorder. Participants completed social functioning-related measures in a second session. Participants also completed other measures described elsewhere (Victor et al., 2011; Johnson et al., 2012; Edge et al., 2013).

Measures—Participants completed diagnostic interviews and measures of emotion perception and functional outcomes. Current symptoms of mania and depression, intelligence, and executive function were assessed as potential confound variables.

SCID: Diagnoses were assessed using the SCID, a widely used interview designed to assess DSM-IV-TR diagnosis. In addition to diagnoses, course parameters were gathered during the SCID. Interrater reliability of the SCID is high for diagnosing bipolar I disorder (k = .84; Williams et al., 1992). Graduate students trained and supervised by a clinical psychologist conducted diagnostic interviews. For our team, interrater reliability, as assessed using fourteen randomly-selected interviews, was high (α = .93 for major depressive episodes and .86 for manic episodes).

Assessing Emotions Scale – Emotion Perception (AES-EP; Schutte et al., 1998): The 9-item Emotion Perception subscale was used as an index of the ability to recognize emotions in oneself and others. Example items include the following: “By looking at their facial expressions, I recognize the emotions people are experiencing”; “I easily recognize my emotions as I experience them”; “It is difficult for me to understand why people feel the way they do” (reverse scored). The AES-EP has shown good internal consistency and test-retest reliability (Shutte et al., 1988), and relates to subjective well-being (Carmeli et al., 2009). Internal consistency for the AES-EP was acceptable (α = .70).

World Health Organization Quality of Life – Brief Form (WHOQOL-BREF; Harper and Power, 1998): The WHOQOL-BREF is a self-report measure designed to assess satisfaction over the last four weeks with four factor-analytically supported domains: physical, psychological, social relationships, and environment. Higher scores indicate greater quality of life. Test-retest reliabilities were adequate (.66 to .87), as were internal consistency estimates (α = .72–.88) in the current study. WHOQOL-BREF scores are lower among those with bipolar disorder compared to the general population (e.g., Dias et al., 2008). Because all subscales correlated highly with the total score (*r*'s = .65–.82), analyses focus on the total score.

Nam-Powers-Boyd Occupational Prestige Rating (NPB; Nam and Boyd, 2004): The Nam-Powers-Boyd (NPB) occupational scores were used as an index of occupational accomplishment. NPB scores for each occupation were developed based on the median income and educational levels of persons with these occupations in the 2000 census. Scores are interpreted as the approximate percentage of individuals in the labor force who are in occupations having combined levels of education and income lower than the given occupation (e.g., a score of 93 indicates approximately 93% of the labor force are in occupations having combined levels of education and income lower than that score). For individuals who were unemployed or retired at the time of study entry, their last occupation was used to calculate the NPB score. The mean NPB score in the current sample was 55.64 (*SD* = 20.58, range = 20–93).

Modified Hamilton Rating Scale for Depression (MHRSD; Miller et al., 1985): The MHRSD is a 17-item interview to assess symptoms of current depression. This modified version correlates highly with the original HRSD (*r* = .84), and attains high interrater reliability. The intraclass correlation based on 14 recordings in the current study was .93. The scale is sensitive to bipolar depression as measured by the SCID (Johnson et al., 2000b). Scores in the current sample ranged from 0 to 15.

Bech-Rafaelson Mania Scale (MAS; Bech et al., 1979): The MAS is a widely used interview of manic symptom severity. Standardized probes and anchors have been developed by our research team to rate each of the 11 items on a scale of 0 (not present) to 4 (severe). Inter-rater reliability, as evaluated by intraclass correlation based on 14 recordings, was .84. The MAS has demonstrated high sensitivity to small changes in symptoms over time (Bech, 2002). MAS scores ranged from 0 to 15 in the current sample.

Shipley Institute of Living Scale (SILS; Shipley, 1940): The Vocabulary subtest of the SILS is a widely used 40-item multiple choice test that is robustly correlated with Wechsler Adult Intelligence Scale (WAIS) scores (Zachary et al., 1985). The SILS has shown high internal consistency (Shipley, 1940) and high test-retest reliability (α = .80; Martin et al., 1977). Internal consistency in the current sample was high (α = .87). The mean (31.88) and standard deviation (5.63) of scores in the current sample were comparable to previous norms (e.g., McCabe et al., 2010).

Trail Making Test (TMT; Reitan, 1958): The TMT-Part B is a widely used screening measure of executive function (Lezak, 1995). Participants are asked to draw a line connecting alternating numbers and letters in sequence (i.e., 1-A-2-B-3-C, etc.). The time to complete the task is recorded. The TMT-B is thought to measure inhibition and set-shifting (Burgess et al., 1998). Acceptable reliability and validity estimates have been obtained (e.g., Arbuthnott and Frank, 2000). In a meta-analysis, bipolar disorder and family history of bipolar disorder were both associated with deficits on the TMT-B (Arts et al., 2008; Bora et al., 2009). The TMT-B has also been shown to be correlated with self-reported quality of

life in euthymic bipolar disorder (Dias et al., 2008). The mean time to complete the TMT-B was 53.60 seconds (*SD* = 22.63) in the current study.

Results

As shown in Table 2, subjective well-being scores were significantly related to lower current depressive symptoms and higher emotion perception scores (AES-EP). Occupational functioning was significantly related to higher education, intelligence, and executive function. Because demographic and illness history variables were unrelated to the outcomes, these variables were not included in further analyses.

To test our hypothesis that emotion perception would uniquely predict quality of life after controlling for other variables, we conducted two parallel hierarchical regression models with subjective well-being and occupational functioning as separate criterion variables. Current symptoms of mania and depression were entered as the predictor variables in Block 1, and intelligence, executive function, and years of education were entered in Block 2. The AES-EP was entered in Block 3. As shown in Table 3, only AES-EP significantly predicted subjective well-being. Emotion perception accounted for 11% of the variance in subjective well-being after accounting for other predictors ($p < .01$). Occupational functioning (NPB) was only predicted by years of education, and not by AES-EP.

Study 1 Discussion

In Study 1 we developed a multivariate model of subjective well-being and occupational functioning. To our knowledge, this is the first study to consider the role of emotion perception in quality of life while controlling for the effects of current symptoms, general intelligence, educational attainment, and executive function. Consistent with hypotheses, self-reported emotion perception was related to higher quality of life. This effect, though, was relevant to well-being and not to occupational prestige. Occupational functioning was related to better executive functioning, more education, and higher verbal intelligence, although only educational attainment was uniquely related to occupational prestige in multivariate analyses. Emotion perception plays a significant role in subjective well-being even after accounting for other well-established predictors.

Several limitations are important to note. First, power was limited for multivariate analyses. Second, although the NPB index of occupational functioning is well-validated (e.g., Sutin et al., 2009), the occupation one holds may not be as informative as the level of performance within that occupation (Bowie et al., 2008). Third, cognitive functioning declines during mood episodes (e.g., Lyon et al., 1999); thus, symptomatic periods may be particularly important to assess in future studies of quality of life.

Perhaps of greatest concern, self-ratings of emotion perception could be biased by demand characteristics. Common method variance may also have inflated effect sizes. In Study 2, we examined whether parallel findings could be demonstrated using facial affect recognition—a widely used behavioral measure of emotion perception (Mayer et al., 2003; Brackett and Salovey, 2006)—as a predictor of quality of life.

Study 2

As noted above, facial affect recognition paradigms have been found to predict social functioning in the general population and in schizophrenia (Addington et al., 2006; Corden et al., 2006). Hoertnagl and colleagues (2011) found preliminary evidence of this relationship in bipolar disorder; however, they presented emotionally valenced faces for very short durations (300 ms). In real life, facial affect displays tend to last much longer.

Hence, in this study, we consider ability to accurately detect facial affect during longer displays.

Based on findings of Study 1 and previous research, we hypothesized that difficulties with recognizing happy and fearful facial expressions would be related to diminished quality of life within bipolar disorder. We hypothesized that deficits in facial affect recognition would predict quality of life after accounting for depressive symptoms.

Beyond effects on quality of life, previous research has suggested that deficits in facial affect recognition might be related to mood state (Niedenthal et al., 2000). These effects might be magnified in bipolar disorder. For example, researchers found that ability to recognize negative facial expressions was particularly impaired during manic episodes but not during euthymia (Lembke and Ketter, 2002). Among persons at risk for mania, a manipulation designed to increase happiness was found to improve ability to detect happy faces (Trevisani et al., 2008). Taken together, findings indicate that the ability to accurately perceive facial affect might be mood-state dependent among those with bipolar disorder. Thus, a secondary goal of Study 2 was to consider whether a positive mood induction would lead to particular deficits in facial affect recognition among people with bipolar disorder as compared to a control group.

Method

Participants and Procedures—Participants with bipolar disorder were recruited within the Palo Alto, California, and Miami, Florida communities in a manner parallel to Study 1. Inclusion and exclusion criteria for the bipolar I disorder group were identical to Study 1; inclusion for the control group was no lifetime history of depression or bipolar spectrum disorder. Remission was verified in the two days before measures were completed.

Individuals who had taken part in Study 1 were invited to take part in Study 2[1]. Exclusion criteria included severe head trauma, developmental or learning disabilities, a degenerative disorder, alcohol or substance abuse or dependence within the past year, primary psychotic disorder, or electroconvulsive therapy within the past 18 months. Persons taking traditional antipsychotic medications were excluded from Study 2 given effects of these medications on emotion systems (Walter et al., 2009).

Participants were 60 persons who met criteria for bipolar I disorder and 43 persons with no history of mood disorder (95 from the Miami area). Recruitment was stratified in both groups to enable examination of the most common comorbid conditions in bipolar disorder of lifetime substance use or anxiety disorders (see Table 1)[2]. That is, specific recruitment was conducted through community and outpatient advertising to identify control participants with a history of anxiety or substance-related disorders.

Bipolar disorder and control groups were matched on age, gender, and current depression level. As shown in Table 1, Study 2, participants with bipolar disorder had slightly higher mania (MAS) scores, lower GAF scores, and higher rates of unemployment compared to controls; they were also more likely to meet criteria for a lifetime anxiety disorder and substance use disorder diagnoses than were controls.

The affect recognition task was presented to participants using Eprime, Version 1.1 (Psychology Software Tools, Pittsburgh, PA) to display images on a 31 × 24 cm^2 monitor. To foster strong task engagement, the computerized instructions noted that performance on

[1]23 persons from Study 1 completed measures in Study 2. Findings were parallel with and without inclusion of those persons.
[2]Analyses of facial affect recognition and quality of life yielded parallel results when study site was added as a factor.

the task was related to social adeptness. Participants were instructed to work as quickly and accurately as possible because their score would be based on speed and accuracy, but were allowed as much time as necessary to respond.

After the first block of affect recognition trials, participants received a positive mood induction using a cognitive task followed by false success feedback (Lawrence et al., 2002; Trevisani et al., 2008). Participants were presented with nonsense words but were told that these were actually words from obscure languages in their English phonetic translations. They were instructed to indicate if they thought the word meant the same thing as another English word. At the start of the task, participants were told that most participants who completed this task scored in the 60–65% range, and that a score of 70% was considered excellent. After each of four blocks of ten words each, every participant was given standardized false feedback ("Your score was 60, 73, 82, and 88%", consecutively) regardless of their actual scores.

After the mood induction and a reminder of the task instructions, participants completed another block of 46 randomly ordered trials (4 actors displaying 10 angry, 10 sad, 12 happy, 10 fear, and 4 neutral faces). Participants answered questions about their mood state and expectancy of success before the task and after a mood induction to assess the effectiveness of the mood manipulation.

Measures—As with Study 1, participants completed the SCID, MHRSD, and MAS. Because number of depressive and manic episodes was highly skewed, an ordinal scale comprised of 0 (for depression only), < 4, 4–6, or > 6 episodes was used. For Study 2, inter-rater reliability across 10 randomly selected audio interviews was high for the SCID (kappas for mania and depression were both 1.0), the MHRSD (intraclass correlation = .93 based on 14 recordings), and the MAS (intraclass correlation = .84 based on review of 14 recordings). Although all bipolar disorder participants completed the MHRSD and MAS to verify remission, scores were not available for 13 persons with bipolar disorder due to a data entry error; these scores were imputed.

Brief Quality of Life in Bipolar Disorder (Brief QoL.BD; Michalak et al., 2010): Participants diagnosed with bipolar disorder completed the QoL.BD, a measure of self-reported quality of life. The QoL.BD has achieved factor analytic support, strong internal consistency, and large correlations with established quality of life measures. The QoL.BD was developed after 3 participants had completed the study; data was imputed for these participants. In the validation study, one-week test-retest reliability of the QoL.BD was adequate (.69). In this sample, internal reliability was good (α = .81).

Affect Recognition Task: The affect recognition task is a computerized measure designed to assess participants' ability to accurately identify facial displays of emotions (Trevisani et al., 2008). Participants were shown black and white images of eight male and female actors' faces chosen from the Facial Expressions of Emotion: Stimuli and Tests (FEEST; Young et al., 2002). Actors displayed a face that either showed no emotion (neutral), or expressions of happiness, sadness, fear, or anger at three levels of intensity (25, 50, or 75%). For each photograph, participants were asked to indicate which emotion was being expressed from a list of the five possible expressions (including neutral).

The task began with five practice trials (neutral and 75% intensity of four emotion categories (happy, fear, angry, and sad). Then, participants completed a block of 44 randomly presented trials (four actors displaying 10 of each emotion and 4 neutral faces). Each emotion category was presented in varying degrees of intensity (25, 50, or 75%). For each emotion category, six facial affect accuracy scores indexed the percent of trials

answered accurately at 25, 50, and 75% intensity, before and after the positive mood induction.

Results

Preliminary analyses revealed that all distributions approximated normalcy

Was the mood induction successful?—A multivariate ANOVA with time (before and after mood induction) and diagnostic group as factors was conducted to examine if the positive mood induction had the desired effect, and if there were any group differences in the effects of the induction. These tests showed that the induction was successful (significant main effect for time: $F(1, 97) = 5.22$, $p < .05$), with self-ratings for happiness, alertness, and expectations for success increasing significantly (Happy: $F(1, 97) = 32.81$, $p < .001$; Alert: $F(1, 97) = 9.48$, $p < .01$; Expectations: ($F(1, 97) = 10.36$, $p < .01$), and ratings of sadness and nervousness declining significantly (Sadness: $F(1, 97) = 7.76$, $p < .01$; Nervousness: $F(1, 97) = 10.12$, $p < .01$). The effects for group ($F(1, 97) = .07$, $p = .79$) and group by time ($F(1, 97) = .82$, $p = .37$) were not significant.

Do people with bipolar disorder differ from those with no mood disorder on the facial affect recognition task?—To compare the bipolar disorder and control groups on facial affect recognition, we conducted a 2 (group: bipolar or control) × 2 (time: pre/post mood induction) × 3 (intensity: 25, 50, or 75%) within-subjects ANOVA for each emotion in the task (happiness, sadness, fear, and anger). For each ANOVA, results were parallel and indicated significant main effects of time ($p < .05$) and intensity ($p < .01$) for each emotion, as well as significant interaction effects for Time x Intensity ($p < .01$) for each emotion. The main effect for group was not significant, nor were the interaction terms of Group x Intensity or Group x Time significant for any of the emotions.

Does facial affect recognition predict quality of life in bipolar disorder?—Bivariate correlations were conducted to examine whether facial affect recognition scores were related to quality of life within the bipolar disorder group. For these analyses, average accuracy scores were computed per emotion across intensity and time. Overall fear accuracy was significantly correlated with QoL.BD scores ($r = .31$, $p < .05$). Accuracy for happy ($r = .21$, $p = .12$), sad ($r = .03$, $p = .83$), and angry ($r = .05$, $p = .70$) faces was not.

We tested whether demographic (age, gender, race, ethnicity, marital status, employment status, and years of education) and illness course variables operated as potential confounds of QoL.BD within the bipolar disorder group. QoL.BD scores were unrelated to age, race, years of education, employment, and marital status ($p > .05$ for all variables). Lower QOL.BD scores were observed among men ($t(58) = 2.46$, $p < .05$), and participants who identified as Hispanic or Latino compared to those who did not ($t(58) = -2.29$, $p < .05$). QoL.BD scores were unrelated to mania severity (MAS; $r = .12$, $p = .38$), number of lifetime manic episodes ($r = -.06$, $p = .66$), anxiety disorder diagnosis (SCID lifetime or current diagnosis; $t = 1.57$; $p = .12$), or lifetime alcohol or substance use diagnosis (SCID; $t(57) = -0.75$, $p = .46$). Current depressive symptoms (MHRSD) were negatively related ($r = -.30$, $p < .05$), while number of lifetime depressive episodes was positively related ($r = .36$, $p < .01$) to QoL.BD scores.

We then conducted a forward regression analysis with all potential confounds in the first block, and fear accuracy in the last block. This regression model accounted for 32% of the variance in QoL.BD scores ($F = 7.95$, $p < .001$). Depression history ($\beta = .24$, r^2 change = .13, $p < .05$), gender ($\beta = -.32$, r^2 change = .09, $p < .01$), and ethnicity ($\beta = .32$, r^2 change = .06, $p < .01$) each significantly contributed to the explained variance in this model, while

current depression ($p = .52$) did not. Fear accuracy remained a significant predictor ($\beta = .32$, r^2 change = .09, $p < .01$).

Study 2 Discussion

The goals of Study 2 were to compare bipolar and control groups on their accuracy in detecting affect and to consider whether this accuracy could help explain heterogeneity in quality of life in bipolar disorder. People with bipolar disorder displayed no deficits in detecting facial affect, whether tested at baseline or after a positive mood induction. This fits with other studies that have failed to find emotion recognition deficits in bipolar disorder (e.g., Lee et al., 2013).

Although people with bipolar disorder did not display poor affect recognition, variability in accuracy related to quality of life. That is, ability to identify fear was correlated with higher quality of life ratings, after accounting for demographic factors and current mood symptoms. Hence, accurate emotion perception, particularly related to detection of others' negative facial expressions, might play a protective role in bipolar disorder. Fear perception has long been theorized to have an important evolutionary role—ability to quickly note expressions of fear in conspecifics could foster effective responding to danger cues (Izard, 1992). Beyond these general effects, sensitivity to fear may have special protective functions in bipolar disorder. That is, detecting negative emotion in a caregiver (e.g., fear or worry of relapse) may facilitate taking measures to prevent a mood episode.

Although this study provided a behavioral assessment of a critical aspect of emotion perception, it is worth noting that the measure of facial affect recognition sacrificed some elements of ecological validity for greater standardization of and control over stimulus presentation. In future research, it will be important to test whether findings generalize to dynamic presentations of affective expressions with more natural timing and an absence of multiple choice prompts. It would also be important to consider ability to detect facial affect cues from close others.

Overall Discussion

Across two studies, we examined the role of emotion perception in quality of life within bipolar disorder. Bipolar disorder is marked by incredible heterogeneity in psychosocial functioning. Although previous studies had suggested that emotion perception might be important, these studies had failed to consider whether emotion perception exerted unique effects in the context of other important predictors of quality of life. In Study 1, we tested whether emotion perception could protect quality of life above and beyond the role of key variables from the literature (i.e., general intelligence, executive functioning, social support, and illness characteristics). Emotion perception ability was a substantive predictor of quality of life, even after accounting for other variables. Study 2, then, included a behavioral measure of emotion-perception skill, operationalized as the ability to accurately recognize facial affect. Findings of Study 2 mirrored those of Study 1 in suggesting that facial affect recognition, more specifically the identification of fear, predicted overall quality of life, even after considering other demographic and illness characteristics. Taken together, findings suggest that emotion perception, whether measured by self-ratings or behavioral indices, is an important correlate of quality of life in bipolar disorder.

Several limitations are important to note. First, we examined only emotion perception, and several other facets of social cognition likely contribute to outcomes in bipolar disorder. Second, although self- and other-rated quality of life show strong concordance in bipolar disorder (Gutiérrez-Rojas et al., 2008), self-report may be biased by demand characteristics. Third, participants were asymptomatic, but social cognitive abilities during symptomatic

periods undoubtedly contribute to quality of life and functional outcomes. Fourth, we are unable to comment on causality given the cross-sectional design of the studies.

Nonetheless, current studies provide insights into understanding why some with bipolar disorder experience such profound decrements in quality of life. For one, even very modest symptoms of depression may interfere with one's subjective well-being. Given subsyndromal symptoms are present nearly half the time (Judd et al., 2002), treating these symptoms can potentially improve quality of life among persons with bipolar disorder. Second, occupational functioning was predicted by educational attainment. This finding speaks to the importance of targeting early episodes and early onset in prevention efforts. Third, ability to accurately perceive emotion in others appears to protect quality of life in bipolar disorder. The applicability of this finding for real world settings is enhanced by the ability to document parallel findings with self-rated emotion perception. If findings are replicated, it is hoped that interventions to improve ability to identify and understand others' emotions could foster better quality of life for persons diagnosed with bipolar disorder.

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Table 1

Sample Characteristics

	Study 1	Study 2	
	Bipolar Disorder (*n* = 42)	Bipolar Disorder (*n* = 60)	Control (*n* = 43)
		M (*SD*) or %	*M* (*SD*) or %
Age (years)	41.0 (13.0)	37.1 (11.8)	33.5 (12.2)
Gender (% male)	33.0	35.0	41.8
Years of education	14.8 (2.3)	14.4 (1.9)	14.4 (2.2)
Employed, homemaker, or student (%)**	69.0	53.3	86.0
Number of lifetime depressive episodes	11.8	12.8	n/a
Number of lifetime manic episodes	6.3	9.3	n/a
Married (%)	23.8	18.3	25.6
Ethnicity			
Minority (%)	40.4	21.7	37.2
Hispanic (%)	21.4	21.7	23.3
Lifetime diagnosis			
Any substance use disorder**	n/a	61.0	20.9
Any anxiety disorder (current)**	n/a	63.3	25.6
Anxiety without substance use disorder	n/a	22.0	16.3
Any anxiety or substance use disorder	n/a	83.3	37.2
GAF**	n/a	66.5 (11.6)	80.5 (14.9)
MAS**	5.36 (4.67)	2.9 (2.7)	1.2 (1.6)
MHRSD	5.52 (4.42)	3.9 (4.4)	3.2 (4.1)

Note. GAF = Global Assessment of Functioning; MAS = Bech-Rafaelson Mania Scale; MHRSD = Modified Hamilton Rating Scale for Depression

n = 27 for MAS and MHRSD in control group for Study 2. SCID comorbid diagnoses were missing for one person in the bipolar disorder group in Study 2.

* $p < .05$

** $p < .01$ for differences between bipolar disorder and control groups in Study 2.

Table 2

Bivariate Correlations between Subjective Well-Being, Occupational Functioning, and Other Measures of Interest (Study 1)

	Subjective Well-Being (WHOQOL-BREF)	Occupational Functioning (NPB)
Age	−.09	.10
Gender	.02	−.17
Number Depressive Episodes	.17	−.09
Number Manic Episodes	.07	.08
Years Education	.16	.60**
SILS	−.02	.52**
TMT-B	.16	−.31*
MAS	−.17	−.15
MHRSD	−.38*	−.27
AES-EP	.38*	−.04
WHOQOL-BREF Total	-	.10

* $p < .05$,

** $p < .001$

Note. AES-EP = Assessing Emotions Scale – Emotion Perception; MAS = Bech-Raefelson Mania Rating Scale; MHRSD = Modified Hamilton Rating Scale for Depression; NPB = Nam-Powers-Boyd occupational scores; SILS = Shipley Institute of Living Scale – Vocabulary; TMT-B = Trail Making Test – Part B; WHOQOL-BREF = World Health Organization Quality of Life – Brief Form

Table 3

Hierarchical Multiple Regression of Subjective Well-Being and Occupational Functioning (Study 1)

		Subjective Well-Being (WHOQOL-BREF)			Occupational Functioning (NPB)		
Model	**Predictor**	***B***	***SE***	**Δ R^2**	***B***	***SE***	**Δ R^2**
1	MAS	−0.28	0.45	.154*	−0.43	0.69	.081
	MHRSD	−1.15*	0.48		−1.15	0.73	
2	MAS	0.03	0.48	.090	−0.24	0.63	.303**
	MHRSD	−1.39*	0.52		−0.93	0.69	
	Years Education	1.07	1.29		3.86*	1.70	
	SILS	−0.24	0.54		0.73	0.72	
	TMT-B	0.19	0.11		−0.03	0.15	
3	MAS	−0.01	0.45	.112*	−0.24	0.64	.002
	MHRSD	−1.09*	0.50		−0.03	0.72	
	Years Education	1.63	1.23		3.97*	1.76	
	SILS	−0.26	0.51		0.73	0.72	
	TMT-B	0.19	0.11		−0.03	0.15	
	AES-EP	0.98*	0.40		0.19	0.57	

Note.

* $p < .05$

** $p < .01$; AES-EP = Assessing Emotions Scale – Emotion Perception; MAS = Bech-Raefelson Mania Rating Scale; MHRSD = Modified Hamilton Rating Scale for Depression; NPB = Nam-Powers-Boyd occupational prestige score; SILS = Shipley Institute of Living Scale; TMT-B = Trail Making Test – Part B; WHOQOL-BREF = World Health Organization Quality of Life scale – Brief version

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