ORIGINAL ARTICLE

Social Cognition and Global Functioning in Bipolar Disorder

Guillermo Lahera, MD,* Salvador Ruiz-Murugarren, MD,* Paloma Iglesias, MD,* Claudia Ruiz-Bennasar, MD,*
Elvira Herrería, MD,* José Manuel Montes, MD,† and Alberto Fernández-Liria, MD*

Abstract: The purpose of this study was to assess the role of social cognition, together with other relevant clinical variables and measures of general cognition, in the global functioning of euthymic bipolar patients. Thirty-nine euthymic outpatients fulfilling *DSM-IV-TR* criteria for bipolar disorder type I or II were recruited and were divided in two groups: high ($n = 19$) and low ($n = 20$) global functioning. Both groups' performance was compared in verbal and nonverbal social cognition (Faux pas test and Facial Emotion Recognition test), sustained attention and executive function. The low-functioning group showed a significant impairment in both verbal and nonverbal measurements of social cognition compared with the high-functioning group. Globally, both bipolar groups showed a significant impairment in facial emotion recognition compared with a similar sample of healthy volunteers. Social cognition may play a significant role in the clinical-functional gap of bipolar patients.

Key Words: Social cognition, functioning, bipolar disorder, theory of mind, psychosocial adjustment.

(J Nerv Ment Dis 2012;200: 135–141)

Bipolar disorder is associated with a significant impairment of overall functioning at work, social and family levels, even during periods of sustained and substantial remission (Jaeger and Vieta, 2007; Murray and Lopez, 1996). Gone is the optimistic view of the disorder whereby patients return to their previous function level after mental recuperation (Pope et al., 2007). This psychosocial deterioration cannot be solely attributed to the phases of affective relapses, given that it is observed during the euthymic state as well (Sanchez-Moreno et al., 2009). There is, therefore, a gap between clinical remission and functionality (Goetz et al., 2007; Huxley and Baldessarini, 2007; Rosa et al., 2008, 2009; Sanchez-Moreno et al., 2009), and it is estimated that only 40% of patients recover their premorbid levels during euthymia (Delbello et al., 2007).

One of the priorities of bipolar disorder research is to clarify what is involved in this global dysfunction. Some studies have suggested the possible implications of comorbid substance abuse (Tohen et al., 1998), treatment adverse effects (Zarate et al., 2000), a history of psychotic symptoms (Tohen et al., 1990, 2000), low premorbid levels (Cannon et al., 1997), the number of episodes (McQueen et al., 2000), or early onset (Tohen et al., 2000). Nevertheless, more recent studies have marked the decisive importance of affective subsyndromal symptoms and persistent cognitive deterioration (Altshuler et al., 2006; Rosa et al., 2009; Sanchez-Moreno et al., 2009). Bipolar subjects with low general functioning are more cognitively impaired than highly functioning patients, particularly with regard to verbal memory tests (Dickerson et al., 2004; Martinez-Aran et al., 2004, 2007), vigilance or sustained attention skills (Clark et al., 2002), and executive tasks (Martino et al., 2009). Bonnín et al. (2010)

showed, in a prospective study, that certain cognitive factors (such as verbal memory) and depressive symptoms were significant predictors of long-term functionality, confirming the findings of these earlier transverse studies. Despite all of this, the question of what constitutes the determining factor in the psychosocial maladjustment of bipolar patients has not been completely resolved (Fagiolini et al., 2005; Martinez-Aran et al., 2007).

With regard to schizophrenia, many studies on the causes of psychosocial maladjustment have led to the creation of a multicausal model in which the social cognition deficit is decisive (Brüne and Juckel, 2010; Green et al., 2008; Yager and Ehmann, 2006). Social cognition implies those processes involved in "how individuals think about themselves, others, social situations, and their interactions" (Penn et al., 1997), in other words, "the cognitive ability to infer mental states to oneself and to others in terms of thought, emotion, and intention, which makes it possible to predict the behavior of others and to understand the social information of the surroundings" (Baron-Cohen et al., 1985; Premack and Woodruff, 1978). This capacity has been recognized as crucial in the adaptation of primates to complex social environments (Brothers, 1990). We can therefore hypothesize that the global functioning of patients may be partially mediated to an optimum output of their social cognition module.

Studies on social cognition in affective disorders are scarce but show a deficit of Theory of Mind (ToM) in both the symptomatic and the euthymic phases (Bora et al., 2005; Inoue et al., 2004; Kerr et al., 2003; Lahera et al., 2008; Olley et al., 2005). Inoue et al. (2006) demonstrated that patients with ToM deficit in second-order false belief during remission were a high-risk group for recurrence and lower social function 1 year after recovering from a major depressive episode. Recently, Montag et al. (2010) identified a ToM deficit in euthymic bipolar patients through a realistic video-based examination, concluding that social cognition may have an impact on the development of the illness. In patients with schizophrenia, it has been suggested that social cognition may be a mediator for basic neurocognitive processes and the acquisition of social abilities as well as functional impairment (Green and Nuechterlein, 1999; Kee et al., 1998), but little is known about this association in patients with bipolar disorder. The main objective of our study is to assess the role of social cognition, together with other relevant clinical variables and measures of general cognition, in the global functioning of euthymic bipolar patients.

METHODS

Thirty-nine euthymic outpatients fulfilling *DSM-IV-TR* criteria for bipolar disorder type I or II (American Psychiatric Association, 2000) were recruited from two different mental health centers in Madrid, Spain. Diagnoses were confirmed using the Structured Clinical Interview for Diagnosis of Symptoms (*DSM-IV-TR*), and euthymia was defined as a score lower than 8 on the Hamilton Depression Rating Scale (HDRS) and a score lower than 6 on the Young Mania Rating Scale (YMRS) sustained during the last 3 months. Exclusion criteria were current psychiatric comorbidity in axis I, substance abuse or dependence (in the last year), a history of head injury, neurological illness, mental retardation, serious medical illness, and electro-convulsive therapy in the last year. The ethics committee of the Principe de Asturias University Hospital approved the

protocol, and all of the participating subjects gave their written informed consent.

The sample of stable bipolar patients was divided into two groups with respect to their psychosocial functioning assessed according to the Functioning Assessment Short Test (FAST). A score of 11 was taken a priori as the cutoff to distinguish between patients with high and low global functioning. Both groups were compared on clinical variables, general cognition (sustained attention and executive functions), and social cognition (facial emotion recognition and ToM). With the aim of having a reference about the social cognition performance of both bipolar groups, a similar sample of 39 healthy volunteers was also recruited and assessed on facial emotion recognition.

Clinical and Psychosocial Functioning Evaluation

The clinical variables included in the study were the number and type of affective episodes (depression, mania, hypomania), the duration of the illness in years, the age at onset, the number of hospitalizations, the type of bipolar disorder (I or II), and whether there was a history of psychotic symptoms. The FAST scale was used to measure psychosocial functioning because it provides much more information than the Global Assessment of Functioning (GAF) and because it allows predictors to be identified for specific functioning domains such as autonomy, occupational functioning, cognitive functioning, financial issues, interpersonal relationships, and leisure time. The higher the score, the greater the disability will be. A score higher than 11 represented a significant degree of functional impairment, this cutoff having been used in previous studies (Rosa et al., 2008, 2009). To complement the use of the FAST, a reanalysis using the GAF (*DSM-IV*) was performed, verifying that the results were the same.

Evaluation of Social Cognition

Two types of social cognition measurements were used (verbal and nonverbal):

1. Comprehension Faux Pas test (Gregory et al., 2002; Stone et al., 1998). This test measures the ability to understand socially awkward situations. There are 20 strips, ten of which describe faux pas situations and 10 of which do not. If a faux pas is identified, two clarifying questions are asked: "Why shouldn't they have said what they did" and "Why do you think they did say it?" To comprehend that a faux pas has occurred, the subject has to understand two mental states, namely, that the person making the faux pas does not, at that moment, know that they should not say it and that the person hearing it would be upset or hurt to discover the informant. In the control stories, no faux pas is committed but all of the same questions are asked of the subject. In all stories, regardless of the subject's answer to the first question, non-ToM based memory questions are asked to assess the subject's story comprehension.

2. The Emotion Recognition test (Baron-Cohen et al., 1997). It consists of a series of photographs of facial expressions of the same actress who interprets 10 basic emotions (happiness, sadness, anger, fear, surprise, disgust, discomfort…) and 10 complex emotions (guilt, reflection, doubt, admiration, seduction, boredom…) for the patient to identify. In a third of the pictures, the whole face is shown, another third only shows the eyes, and in the last third, only the mouth can be seen, all randomly chosen. Scores are calculated from 0 to 60.

Evaluation of General Cognition

Asarnow's Span of Apprehension Test was used to assess sustained attention. The test presents a sequence of target and non-target stimuli at a fixed rate of 1 second for a short period of 0.1 second so that the presence of the target stimulus must be captured. The computerized version of the test included in the COGLAB Neuropsychological Test Battery (Spaulding et al., 1989; Spanish version by Gurpegui and Cerezo) was used. The final sustained attention score ranged from 0 to 30. A computerized version of the Wisconsin Card Sort Test (WCST; Heaton et al., 1993) was used to assess executive function. This test measures the ability to use information to solve problems or to design a course of action and whether the patient has the cognitive flexibility to change certain criteria because of the demands of reality (*i.e.*, when the patients receive feedback that their answers are incorrect). In this version, the test ends when the subject completes five categories or makes 128 attempts. The results are computed using the number of completed categories and are based on the number of correct answers, the number of random errors, the number of perseverative errors, and the percentage of perseverative errors of the total number of errors.

Statistical Analysis

Quantitative variables were described using either the mean and standard deviation along with 95% confidence intervals or the median and interquartile range, depending on the normality assumption as assessed using the Kolmogorov-Smirnov tests. Categorical variables were summarized in terms of absolute and relative frequencies. When variables had normal distribution, parametric tests were used regardless of sample size. Comparisons were performed between groups using the *t*-test, whereas categorical variables were compared using the chi-square test. Pearson correlation coefficients were also used to assess correlations between continuous variables and functioning. Analysis of variance (ANOVA) was used for the complementary analysis between the three groups (low- and high functioning and control groups). Finally, we fitted a multiple logistic regression model, with dichotomous FAST scoring as a dependent variable. Independent variables included in the maximal model were clinical and cognitive variables (social and general) associated with FAST scoring (Pearson, <0.05). We also used a manual backward modeling strategy, where the fit of the model was tested after the elimination of each variable to ensure that the model still adequately fitted the data. Logistic regression started to drop less significant variables from the list. When no more variables could be eliminated from the model, the analysis was complete. Odds ratio (OR) and their 95% confidence intervals were estimated. All statistical analyses were conducted using SPSS (Norusis 1995, version 14.0). The level of significance for all tests was 0.05.

RESULTS

As illustrated in Table 1, the two groups (low and high degrees of global functioning) did not differ with respect to sex, age, marital status, or work activity, yet they did in education level (years of schooling). With regard to clinical variables, no significant differences were found in onset age, duration of illness (years), total number of manic, hypomanic, and depressive episodes, number of hospitalizations, history of psychotic symptoms, type of bipolar disorder (I or II), and smoking habits. Despite the fact that all the patients were in stable phase, differences in subsyndromal depressive symptoms were detected, although they were not manic. The number of medications administered was the same in both groups although they differed in type. Given the large heterogeneity of the administered treatments, they were regrouped into a) lithium only/anticonvulsant, b) lithium/anticonvulsant + antipsychotic, and c) other combinations including antidepressants and benzodiazepine. Hypnotics were not taken into account. In the high-functioning group, the lithium only/anticonvulsant type was predominant (57.8%),

TABLE 1. Demographic and Clinical Characteristics of Bipolar Patients With Low and High Global Functioning

	Low Functioning (n = 20)		High Functioning (n = 19)		Student's t-Test	
	Mean	SD	Mean	SD	t	p
Age, yrs	48.5	15.8	45.1	13.7	0.722	0.47
Education, yrs	8.6	3.8	14.6	5.8	−3.815	**0.01***
Age at onset	23.7	12.3	26	12.6	0.587	0.56
Years of illness (chronicity)	23.9	14.5	19.2	12.3	1.085	0.28
Total relapses	6.3	5	5.9	4.4	0.264	0.79
Manic relapses	1.8	1.7	1.9	1.4	−0.179	0.85
Hypomanic relapses	0.7	0.8	1.6	2.7	−1.461	0.15
Depressive relapses	4	3.6	2.4	2.7	1.555	0.12
Hospitalizations	2.1	1.6	1.5	1.6	1.276	0.21
Number of psychodrugs	2.6	1.1	2.3	1.1	0.834	0.30
Hamilton Scale	3.8	3.2	1.1	1.6	0.013	**0.002***
Young Scale	1.3	2.1	1.3	1.9	−0.025	0.98

					Chi-square Test	
	n	%	n	%	χ^2	p
Sex						0.26
Male	7	35	10	52.60		
Marital status						0.19
Married	16	80	10	52.6		
Single/divorced/widow	4	20	9	47.4		
Unemployed	12	60	8	42.1		0.26
Previous history of psychotic symptoms	13	65	12	63.1		0.9
Bipolar disorder type 1	14	70	15	78.9		0.52
Treatment (type)						**0.03***
Lithium/anticonvulsant	4	20	11	57.8		
Lithium/anticonvulsant + antipsychotic	6	30	5	26.3		
Others	10	50	3	15.8		
Smoker	10	50	12	63.1		0.38

*Statistically significant.

whereas in the low functioning group, the other combinations group was predominant (50%). None of the evaluated patients were medication free.

The results of the cognitive variables are shown in Table 2. Parametric tests were used because studied variables followed a normal distribution (Kolmogorov-Smirnov FAST, $p = 0.09$; GAF, $p = 0.44$; Faux pas, $p = 0.99$; Facial Recognition, $p = 0.98$; Asarnow, $p = 0.24$; WCST persistent errors, $p = 0.95$). Significant differences were observed in both verbal and nonverbal measurements of social cognition between the low- and high-functioning bipolar groups. The

low-functioning group performed worse in the Faux pas stories (t-test; $p = 0.012$), whereas the performance of the control stories (with normal social situations) was the same as that of the high-functioning group (t-test, $p = 0.383$). The low-functioning group showed a significant deficit in recognizing facial emotion (t-test, $p = 0.027$). In line with previous studies, low functioning was associated with a general cognitive deficit, especially with respect to sustained attention and vigilance (t-test, $p = 0.004$). Nevertheless, no differences were found in the executive functions evaluated using WCST or in the perseverative or random errors (Fig. 1).

TABLE 2. Performance on Social and General Cognition in Bipolar Patients With High and Low Global Functioning

	Low Functioning (n = 20)		High Functioning (n = 19)		Student's t-Test	
	Mean	SD	Mean	SD		p
Faux pas	35.3	11.9	45.6	11.8	2.640	**0.012***
Faux pas (control)	16.1	2.7	16.9	3.1	0.883	0.383
Face test	39.7	5.9	43.9	7.3	1.916	**0.027***
Asarnov	16	8.1	22.5	3.8	3.078	**0.004***
WCST perseverative errors	25.3	11.8	24.3	8.9	−0.284	0.778
WCST aleatory errors	36.6	23.1	29.5	20.3	−0.992	0.328

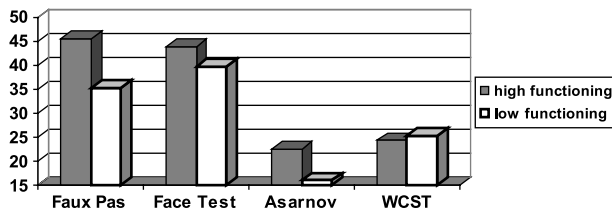WCST, Wisconsin Card Sort.
*Statistically significant.

FIGURE 1. Differences between groups on social and general cognitive performance.

Pearson correlation was used to assess which clinical and neuropsychological variables were associated with global or psychosocial functioning, evaluated using the FAST scale as a continuous variable. The variables that showed significant correlation were subsyndromal depressive symptoms measured using HDRS ($R = 0.395$; $p = 0.01$), performance in the Faux pas test ($R = -0.326$; $p = 0.04$), Asarnow test ($R = 0.417$; $p = 0.01$), and, as expected, global functioning measured according to the GAF scale ($R = -0.519$; $p = 0.00$). No significant correlation was found between global functioning and onset age; duration of illness; total number of manic, hypomanic, and depressive episodes; number of hospitalizations; subsyndromal manic symptoms (YMRS); control comic strips for the Faux pas test; facial emotion recognition; and executive functions.

The variables that were significantly correlated with global functioning ($p < 0.05$) were introduced into the logistic regression model. The covariables considered were depressive subsyndromal symptoms, sustained attention (Asarnow), years of education, and social (verbal) cognition (Faux pas test), with low/high global functioning (FAST, >11) as dependent variable. Drug exposition was not considered because it was an exclusion criterion. After fitting of the maximal model, OR/Ex(B) for social cognition was 1.003. In the backward stepwise model selection procedure, variables are sequentially removed. Variables that were more significantly associated with psychosocial maladjustment were entered in each model first. This ordering of the variables allows for an examination of the independent contribution of social cognition in the prediction of interpersonal skill and also for consideration of the influence of demographic and clinical variables. A manual backward strategy allowed us to extract years of education and sustained attention from the model because they were not confounding factors (defined as a change in the estimated OR for social cognition greater than 10% after adjustment for the confounder). Verbal social cognition and subsyndromal depressive symptoms remained in the final model, with an OR/Ex(B) of 0.960 (0.903 to 1.021) and OR/Ex(B) of 1.534 (1.066 to 2.207). According to the results, verbal social cognition deficit is associated with low general functioning, and this result is not confounded by the presence of education level or attention deficit. However, subsyndromal depressive symptoms can significantly influence this association.

As a complementary analysis, the results for those patients whose GAF score was lower than 60 (indicating a moderate to severe social, occupational, or academic deterioration) were compared with those who scored above this cutoff point. The main result of our study (the deficit in social cognition associated with low global functioning) was confirmed. Patients with GAF score lower than 60 (low function) showed a significantly worse performance in the Faux pas test (Mann-Whitney *U*-test, $p = 0.01$). Their performance in recognizing emotions and in the Asarnow test was also lower, although it did not reach statistical significance (Mann-Whitney *U*-test; $p = 0.06$ and $p = 0.06$, respectively).

In addition to this analysis, we finally compared the social cognition performance of both bipolar groups with a control group of similar sociodemographic characteristics (age, sex, and education

level; ANOVA, not significant). The bipolar patients showed globally a significant impairment in Facial Emotion Recognition compared with healthy controls (*t*-test; $p = 0.03$). As shown in Figure 2, the three groups (high- and low-functioning and healthy controls) differed in the performance of this test (ANOVA; $p = 0.00$).

DISCUSSION

This cross-sectional study was carried out to investigate the influence of social cognition on psychosocial maladjustment. The primary purpose of this study was to examine the performance of individuals with bipolar disorder on several social cognitive domains and to determine how these domains relate to their psychosocial functioning. The results showed that there was a significant social cognition deficit in the low-functioning group of euthymic bipolar patients in both the verbal (Faux pas test) and nonverbal tests (recognizing facial emotion) compared with the high-functioning group. Factors of social cognition seem to play a significant role in global functioning (along with demographic, clinical, and general cognitive factors). These results, however, are not intended to establish a direct causal relationship. To our knowledge, this is the first study that assesses the potential role of social cognition in the psychosocial outcome of bipolar patients. The groups (low- and high-functioning) do not differ in most clinical variables, except for subsyndromal depressive symptoms and the type (not the number) of medications administered. In relation to the social demographical variables, significant differences in terms of educational level were found. This fact is commonly observed in social cognition articles, owing to the difficulty of obtaining a group of serious patients with low global functioning and a high social educational level. Low-functioning patients, however, performed worse in sustained attention tests and in two assessments of social cognition (verbal and nonverbal): the detection of faux pas or uncomfortable or embarrassing social situations and recognition of facial emotion. Therefore, both indicators (verbal and nonverbal cognition) should be included in a complex, biosocial model explaining the clinical-functional gap of bipolar patients.

Our results suggest that the mood swings that accompany bipolar disorder (subsyndromal symptoms, mainly depressive) alter the mechanisms of social understanding, worsening the patients' ability to detect faux pas or embarrassing social situations and to recognize basic and complex emotions transmitted through a person's eyes, mouth, or whole face. One plausible conceptual consequence of these findings could be that to understand another's emotional system, one's own emotional system needs to be intact (so that, for example, even minor sadness or irritability experienced by individuals may make it harder for them to establish the minimum emotional tuning which allows them to infer the mental state of others). This agrees with the studies which emphasize the importance of subsyndromal symptoms in a patient's functionality (Altshuler et al., 2006; Martino et al., 2009), although it continues to be a controversial topic, given that that correlation has not been found by other
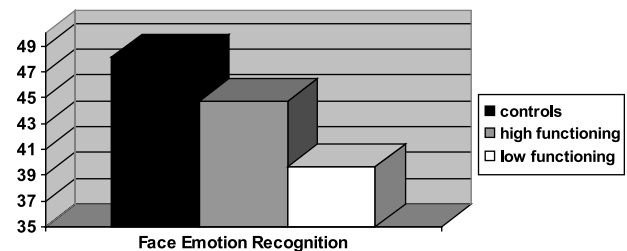

FIGURE 2. Differences in face emotion recognition among the three groups (low- and high-functioning bipolar groups and healthy controls). Analysis of variance, 17.455; $p = 0.000$.

authors (see Mur et al., 2009; Tabarés-Seisdedos et al., 2008). In previous studies (Lahera et al., 2008), an excessive influence of linguistic ability was noted in the performance of social cognition tasks, hence the importance of noting similar results not only in the verbal Faux pas test but also in the facial emotion recognition and in fundamental visual/nonverbal tests.

In recent years, there has been increased interest in the study of factors implicated in the psychosocial maladjustment of bipolar disorder. The variables studied, however, are mainly clinical or neuropsychological (verbal memory, executive functions, sustained attention), despite the growing evidence that cognitive deficit is not only an individual but also an interpersonal and social variable. For schizophrenia, different studies have concluded that the impaired ability to infer mental states in others (theory of mind), difficulty in understanding social keys, or not being able to recognize double meanings may have a larger relevance in the day-to-day life of the patient than the results of neuropsychological batteries of less ecological interest (Couture et al., 2006). Pijnenborg et al. (2009) concluded that ToM is the best predictor of community function even above general cognition. Bipolar disorder is the illness of extreme emotions, and an emotion could be defined as an automated biological social-cognition mechanism. This means that it is reasonable to assume that bipolar patients—even in a euthymic state—may have those emotional mechanisms altered and therefore have greater difficulty in performing social cognition tasks. The ecological validity of these tests (*e.g.*, recognizing facial emotion through photographs) is possibly greater than the usual neuropsychological batteries. Therefore, we believe it opportune to introduce social cognition variables when analyzing the causes of the clinical functioning gap in bipolar disorder patients. Our results support the idea that difficulties in finding or maintaining employment, in communicating effectively with others, in actively participating in the community, or in maintaining long-term relationships with partners or friends may at least partly affect deficits in different dimensions of social cognition.

The relationship between social and general cognition is unquestionable. Recently, Bora et al. (2009) emphasized the relationship between the ToM deficit and a general underlying cognitive deficit as well as residual symptoms. Social competence requires the integration of various levels of social keys beyond the verbal (facial expression, body movements, prosody, etc.), and this is difficult to do after the deterioration of basic cognitive functions has occurred. For example, the deduction of mental states in another requires, at its most elementary level, continuous attention to be paid to that person. Consequently, in our study, sustained attention appears as a factor that is well associated with psychosocial maladjustment and is correlated with social cognition. Nevertheless, this association does not appear with executive functions, measured using WCST. We could hypothesize that this indicates that social deductions (such as recognition of emotions) are not so much intellectual or executive processes of reasoning and frontal dominance as processes with a strong emotional limbic charge. Shamay-Tsoory and Aharon-Peretz (2007) suggested a model that differentiated between cognitive ToM and affective ToM, with different neural bases (the cognitive ToM requires the integrity of the network formed by the superior temporal sulcus, the temporal poles, and the prefrontal cortex, although selective damage in the ventromedial cortex may specifically impact on the affective ToM). Complete evaluation of the different dimensions of social cognition may better delimit the potential influence of general cognition.

This study has various limitations that should be taken into account when the results are interpreted. The small sample size and the precision of the estimates cause difficulties in terms of stratified and multivariate analyses, and future work should use a larger sample size to remove the possibility of any type II error. On the other hand, a complete neuropsychological battery of tests was not performed on patients; only sustained attention and executive functions were measured. After performing a meta-analysis, Torres et al. (2007) determined that the variables in which euthymic bipolar patients showed the largest deficit were attention, executive function (both included in our study), and memory. Future studies on the relationship between general and social cognition and functionality should include an assessment of working memory.

Another limitation of the study is the artificial use of a cutoff on the FAST scale for classifying the patients into two groups (high and low global functioning). As stated earlier, however, our cutoff was used and recommended by other studies (*e.g.*, Rosa et al., 2009) because it delimits patients with minimal or no deterioration in functionality and patients with severe or moderate functionality. To offset this limitation, several correlations were carried out, which included the result of the FAST scale as a continuous variable (not dichotomized), which confirmed the results obtained. Another limitation was whether medication could interfere with the results because our patients were polymedicated and on different dosages. In our study, the number and type of drugs administered were taken into account in the analysis. The role of medication in the cognitive performance of bipolar disorder is, however, a controversial issue. Various studies rely on the premise that neither the use of lithium (Engelsmann, 1988; Martinez-Aran et al., 2004) nor atypical antipsychotics (McQueen and Young, 2003) substantially modify cognitive performance. Although a drug-free or drug-withdrawn sample would be desirable, it would be totally unrepresentative of bipolar disorder.

A challenge for the future is to develop more ecological methods of social cognition. Various studies have been published on the evaluation of social cognition through virtual reality or videos on schizophrenia (Bazin et al., 2009; Bedell et al., 1998; Dziobek et al., 2006; McDonald et al., 2006), but they are rarely applied to bipolar patients (one exception being Montag et al., 2010). Recently, Kim et al. (2009) presented an evaluation of nonverbal social conducts of manic patients during virtual interactions. Another challenge is to design specific training modules in improving social cognition for patients with bipolar disorders. Promising approaches have been reported for schizophrenia (Coombs et al., 2009; Green et al., 2008; Roder et al., 2006; Wykes and van der Gaag, 2001), but the efficiency of its transfer to the field of bipolar disorder is still unknown. It is possible that the deficits of bipolar patients may be more subtle, with mood swings that may redirect the rehabilitation strategies. In any case, the global strategy to reduce the psychosocial maladjustment of bipolar patients includes optimizing their pharmacological treatment (in the search for a symptomatic, not just syndromal, remission) and current cognitive rehabilitation approaches, and ultimately providing specific training in social interaction and understanding of the mental states of others.

DISCLOSURE

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