Supplementary Materials

Performance of patients with bipolar I with a history of psychosis, schizophrenia patients and controls on each social cognitive task

For the Facial Affect Recognition Task and the Managing Emotion component of the MSCEIT, ANOVA analyses showed a significant main effect of group ($F_{2,85}$=17.44, p<.001 and $F_{2,82}$=10.91, p<.001, respectively) in which schizophrenia patients performed worse than bipolar patients with a history of psychosis and controls, who did not differ from each other. A significant main effect on the Empathic Accuracy Task ($F_{2,86}$=7.21, p<.01) showed that controls performed better than both schizophrenia patients and bipolar patients with a history of psychosis, who performed comparably. The TASIT, with subscale as a within-subject factor and group as a between-subject factor, showed a significant main effect of group ($F_{2,76}$=21.18, p<.001) and a significant group by subscale interaction ($F_{2,76}$=6.31, p<.01). For both the Lie and Sarcasm subscales, schizophrenia patients performed worse than bipolar patients with a history of psychosis and controls, who did not differ from each other. While controls showed better performance on Sarcasm versus Lies, both bipolar patients with a history of psychosis and schizophrenia patients performed better on Lies than Sarcasm subscales. The Self-referential Memory Task, with encoding condition as a within-subject factor and group as a between-subject factor, showed a significant main effect of condition ($F_{2,158}$=158.86, p<.001) and a significant condition by group interaction ($F_{4,158}$=7.95, p<.001). All groups performed best in the self-condition and poorest in the physical condition. The Self-referential Memory Task, with encoding condition as a within-subject factor and group as a between-subject factor, showed a significant main effect of condition ($F_{2,158}$=158.86, p<.001) and a significant condition by group interaction ($F_{4,158}$=7.95, p<.001). All groups performed best in the self-condition and poorest in the physical condition. For the self- and general social conditions, controls performed best and schizophrenia patients performed worse; bipolar patients with a history of psychosis showed intermediate performance, which significantly differed from both controls and schizophrenia patients. A different pattern of performance across the three groups was observed for the physical condition; bipolar patients with a history of psychosis performed worst and schizophrenia patients showed best performance while controls showed intermediate performance.

Patterns of social cognitive and non-social cognitive performance across groups

The profile for schizophrenia significantly differed from those in bipolar and control groups mainly due to the relatively large impairment of schizophrenia patients on the Facial Affect Recognition and TASIT Sarcasm tasks (Facial Affect Recognition, schizophrenia patients versus bipolar patients, p <.0001, and schizophrenia patients versus controls, p<.0001; Managing Emotion of the MSCEIT, schizophrenia patients versus bipolar patients, p <.01, and schizophrenia patients versus controls, p<.01; Empathic Accuracy, schizophrenia patients versus bipolar patients, p <.001, and schizophrenia patients versus controls, p<.001; TASIT Lie subscale, schizophrenia patients versus bipolar patients, p <.001, and schizophrenia patients versus controls, p<.01; TASIT Sarcasm subscale, schizophrenia patients versus bipolar patients, p <.0001, and schizophrenia patients versus controls, p<.0001; Self-referential Memory Task, schizophrenia patients versus bipolar patients, p <.001, and schizophrenia patients versus controls, p<.001). For non-social cognition, bipolar patients and controls also showed a similar performance profile. Schizophrenia patients had a different profile from both bipolar and control groups that appeared to be due to relatively smaller group differences on verbal learning and reasoning/problem solving (speed of processing, schizophrenia patients versus bipolar patients, p <.001, and schizophrenia patients versus controls, p<.001 ; attention / vigilance, schizophrenia patients versus bipolar patients, p <.001, and schizophrenia patients versus controls, p<.001; Working memory, schizophrenia patients versus bipolar patients, p <.001, and schizophrenia patients versus controls, p<.001; Verbal learning, schizophrenia patients versus bipolar patients, p <.05, and schizophrenia patients versus controls, p<.01; Visual learning, schizophrenia patients versus bipolar patients, p <.01, and schizophrenia patients versus controls, p<.001; Reasoning / Problem solving, schizophrenia patients versus bipolar patients, NS, and schizophrenia patients versus controls, p<.01).

Discriminant analysis of the three groups using non-social cognitive and social cognitive performance

Using Fisher's Canonical Discriminant Analysis, we examined which cognitive domains discriminated among the three groups. For this we used Fisher's Canonical Discriminant Analysis. Using only non-social cognitive tasks, classification accuracy was 59.7%. Among the 6 non-social domains, speed of processing and attention / vigilance contributed the most to classification. Social cognitive measures provided 53.3% classification accuracy and facial affect recognition and sarcasm detection were critical for

classification. Using both non-social and social cognitive tasks, the classification accuracy was 62.5%. Facial affect recognition, detection of sarcasm and speed of processing was crucial for classifying the three groups.

Discriminant analysis of the two patients groups using non-social cognitive and social cognitive performance

We also examined which cognitive domains discriminate bipolar group from schizophrenia group using Fisher's Canonical Discrimination Analysis. Using only non-social cognitive tasks, classification accuracy for bipolar group versus schizophrenia group was 73.1%. Among the 6 non-social domains, speed of processing contributed the most to classification. Social cognitive measures provided 75 % classification accuracy; facial affect recognition and mental state attribution (sarcasm detection and lie detection) were critical for classification. Using both non-social and social cognitive tasks, the classification accuracy was 80.6%. Facial affect recognition, detection of sarcasm and speed of processing was crucial for classifying the two patients groups. Finally we used the relatively level of impairment of social cognition versus non-social cognition for classification; 72.8 % of original members of each patient group were correctly classified.

Social cognitive impairments of schizophrenia patients when controlling for non-social cognitive impairments

For the schizophrenia group, we examined whether social cognitive impairments in schizophrenia could be explained by non-social cognitive deficits (especially by impaired speed of processing). The same analyses could not be done for the bipolar group because their social cognitive performance was comparable to that of healthy controls. We conducted two separate ANCOVAs to compare social cognitive performance between schizophrenia patients and controls while controlling for non-social cognitive performance: one with speed of processing as a covariate and the other with non-social cognitive composite as a covariate. Both ANCOVA analyses showed significant group difference in social cognitive performance ($F_{1,69}$=23.54, p<.001 with speed of processing as a covariate; and $F_{1,69}$=14.73, p<.001 with non-social cognitive composite as a covariate). These findings suggest that social cognitive impairment in schizophrenia is unlikely to be explained by non-social cognitive impairments.

Supplementary Table 1. Demographic information and clinical characteristics of subgroups of bipolar patients

	Bipolar Disorder I (N=46)	Bipolar Disorder II (N=22)	Bipolar Disorder I with a history of psychosis (N=15)	Bipolar Disorder 1 w/o a history of psychosis (N=31)	Bipolar Disorder with antipsychotics (N=41)	Bipolar Disorder w/o antipsychotics (N=27)
Age	43.7 (10.5)	44.5 (11.1)	42.7 (10.1)	44.1 (10.8)	42.6 (10.8)	45.9 (10.1)
Personal education	14.2 (2.0)	14.2 (2.4)	14.2 (1.7)	14.1 (2.1)	13.9 (2.0)	14.5 (2.3)
Parental Education	15.3 (3.1)	13.7 (3.1)	14.8 (4.0)	15.5 (2.5)	14.8 (3.0)	14.7 (3.4)
Gender (% female)	45.7	45.5	33.3	51.6	39	55.6
Age of onset	19.7 (6.3)*	15.1 (6.5)	21.5 (4.9)	18.8 (6.8)	18.1 (5.9)	18.6 (7.8)
BPRS	32.8 (7.4)	34.4 (5.9)	30.4 (4.2)	34.0 (8.3)	32.8 (6.4)	34.2 (7.8)
HAM-D	7.4 (6.3)	9.3 (6.4)	6.1 (6.1)	8.1 (6.3)	8.1 (6.6)	8.0 (6.0)
YMRS	2.8 (4.0)	4.4 (3.8)	1.9 (2.4)	3.3 (4.5)	3.0 (3.4)	3.9 (4.6)

†Values are given as mean (standard deviation).
* Significant group difference ($p<.01$)