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Affective prosody perception in symptomatically remitted patients with schizophrenia and bipolar disorder

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ABSTRACT

Affect perception has frequently been shown to be impaired in patients suffering from schizophrenia or bipolar disorder (BD), but it remains unclear whether these impairments exist during symptomatic remission and whether the two disorders differ from each other in this regard. Most previous studies have investigated facial affect recognition, but not the ability to decode mental states from emotional tone of voice, i.e. affective prosody perception (APP). Accordingly, the present study directly compared APP in symptomatically remitted patients with schizophrenia or BD and healthy control subjects and investigated its relationship with residual symptomatology in patients.

Patients with schizophrenia and BD showed comparable APP impairments despite being symptomatically remitted. In comparison to healthy control subjects, overall APP deficits were found in BD but not in schizophrenia patients. Both patient groups were particularly impaired in the identification of anger and confounded it with neutral prosody. In addition, schizophrenia patients frequently confused sadness with happiness, anger, or fright. There was an inverse association between the degree of residual positive symptoms and the ability to correctly recognize happiness in schizophrenia patients.

Overall, these data indicate that impairments in APP represent an enduring deficit and a trait marker of both schizophrenia and BD and that the level of impairment is comparable between disorders.

1. Introduction

The ability to accurately recognize, discriminate, and experience emotional stimuli represents a fundamental skill for successful social interaction. A number of studies dealing with affect perception in patients with schizophrenia or bipolar disorder (BD) have demonstrated deficits in this area during both acute phases of the disorders as well as during periods of symptomatic remission (Hofer et al., 2010; Hoertnagl and Hofer, 2014). A shortcoming of most studies is that they have included relatively small patient samples with varied clinical symptoms and that they did not directly compare affect recognition abilities across schizophrenia and BD. To overcome these limitations, we have recently studied facial affect recognition (FAR) abilities in patients meeting strict remission criteria. Compared to healthy control subjects, schizophrenia patients were particularly impaired in the recognition of facial expressions depicting anger, disgust and sadness, while BD patients showed deficits in the recognition of disgusted and happy facial expressions. A comparison of the two patient groups revealed that individuals suffering from BD outperformed those with schizophrenia in the recognition of expressions depicting anger. In addition, we found an inverse association between the degree of residual symptoms of depression and the ability to correctly recognize happy facial expressions in BD patients, whereas no relationship between FAR and residual symptomatology was seen in schizophrenia patients (Yalcin-Siedentopf et al., 2014). Lee et al. (2013), on the other hand, investigated both social (including FAR) and nonsocial cognition in patients suffering from schizophrenia or bipolar disorder and a non-psychiatric control group and found comparable performance patterns in bipolar patients and healthy control subjects, whereas schizophrenia patients showed impairments across both domains compared to both bipolar patients and healthy controls.

So far, the bulk of research in serious mental illness (SMI) investigated FAR but not the ability to decode mental states from emotional tone

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of voice, i.e. affective prosody perception (APP). In a study comparing the two disorders, Vaskinn et al. (2007) reported on auditory emotion identification impairments in male schizophrenia but not BD patients, whereas Rossell et al. (2013) found such deficits among both diagnostic groups with BD patients showing a trend for performance intermediary to schizophrenia patients and healthy individuals. In addition, schizophrenia but not BD patients were impaired in recognizing the vocal emotion while ignoring the affective meaning of test trials.

The sample investigated in our abovementioned study (Yalcin-Siedentopf et al., 2014) also underwent APP assessment, the results of which are the focus of the present report. Contrary to Vaskinn et al. (2007) and Rossell et al. (2013) we included a large sample of individuals who were symptomatically remitted. The primary aim of our study was to investigate impairments in APP as a potential trait marker for SMI. Secondly, we wanted to confirm whether schizophrenia patients have greater APP deficits compared with individuals suffering from BD. Lastly, we aimed to investigate whether APP performance was related to residual symptomatology.

2. Materials and methods

Patients meeting diagnostic criteria for schizophrenia or BD-I and healthy control subjects between the ages of 18 and 60 were included into a cross-sectional study. Patients were recruited from the psychiatric outpatient services of the Medical Universities of Innsbruck and Salzburg, while control subjects were recruited from the community and were chosen to match patients in age, sex, and education. All participants signed informed consent forms in accordance with the local ethics committees.

In patients, diagnoses were confirmed by using the Mini International Neuropsychiatric Interview (M.I.N.I.; Sheehan et al., 1998). In order to ensure symptomatic remission, schizophrenia patients had to meet the severity component criteria proposed by Andreasen et al. (2005), whereas BD patients had to have a score of 8 or less on both the Montgomery–Asberg Depression Rating Scale (MADRS) (Montgomery and Asberg, 1979) and the Young Mania Rating Scale (YMRS) (Young et al., 1978). Ratings were completed by psychiatrists belonging to a trained research team. Healthy participants had to have a score of 63 or less on the Brief Symptom Inventory (BSI; Franke, 2000) and no history of any psychiatric illness. Exclusion criteria in patients included any other axis I disorder as well as developmental disorders and any physical illness that may have affected the participants' cognitive performance in all three groups (e.g., history of head trauma or epilepsy; history of electroconvulsive therapy in patients).

2.1. Premorbid intelligence

In patients, premorbid intelligence was measured by using the German adaptation of the National Adult Reading Test (Nelson, 1982), the Mehrfachwahl-Wortschatz-Test-B (MWT-B; Lehrl, 1977), a reliable and valid multiple-choice vocabulary test. The items of the MWT-B consist of 37 lines, each comprising five words. One is an authentic word from the dictionary, while four are fictitious. The participant is asked to find the correct word and to underline it. Each correctly recognized word scores one point.

2.2. Affective prosody perception test

APP was assessed by using subtest 8 ("name emotional prosody") of the Comprehensive Affective Testing System (CATS, Froming et al., 2003). In this test, one sentence at a time is read by a male actor and the subject selects which emotion (happiness, sadness, anger, fright or neutrality) the voice expresses. With 22 sentences read, the total score ranges from 0 to 22. In addition, we calculated misidentification scores.

Table 1
Sample characteristics.

Variable	Group		
	Schizophrenia patients N = 41	Bipolar patients N = 58	Controls N = 85
Age, mean ± SD	40.5 ± 8.5	42.2 ± 11.8	39.2 ± 8.6
Gender, N (%)			
Male	22 (53.7%)	20 (34.5%)	42 (49.4%)
Female	19 (46.3%)	38 (65.5%)	43 (50.6%)
Education, years, mean ± SD	12.9 ± 2.9	13.0 ± 2.9	13.3 ± 2.2
MWT-B, percentile, mean ± SD	60.9 ± 24.5	67.9 ± 25.6	
Duration of illness, years, mean ± SD	12.4 ± 6.9	13.7 ± 9.9	–
PANSS positive symptoms, mean ± SD	8.1 ± 1.6	–	–
PANSS negative symptoms, mean ± SD	10.0 ± 3.1	–	–
PANSS general symptoms, mean ± SD	20.2 ± 3.2	–	–
PANSS total score, mean ± SD	38.3 ± 6.5	–	–
MADRS, mean ± SD	–	2.8 ± 2.3	–
YMRS, mean ± SD	–	1.1 ± 1.4	–
GAF score, mean ± SD*	76.0 ± 15.3	81.9 ± 11.5	–
Treatment, N (%)			
MS monotherapy	0 (0.0%)	9 (15.5%)	–
AP monotherapy	26 (63.4%)	0 (0.0%)	–
AP + AP	5 (12.2%)	0 (0.0%)	–
AD monotherapy	0 (0.0%)	0 (0.0%)	–
MS + AP	2 (4.9%)	20 (34.5%)	–
MS + AD	0 (0.0%)	8 (13.8%)	–
AP + AD	6 (14.6%)	3 (5.2%)	–
MS + AP + AD	0 (0.0%)	17 (29.3%)	–
Marital status, N (%)**			
Single	20 (48.8)	26 (44.8)	22 (25.9)
Married/stable partnership	9 (22.0)	17 (29.3)	52 (61.2)
Divorced/separated	11 (26.8)	14 (24.1)	11 (12.9)
Widowed	1 (2.4)	1 (1.7)	0 (0.0)
Housing, N (%)**, ***			
With original family	4 (9.8)	6 (10.3)	1 (1.2)
With own family	7 (17.1)	27 (46.6)	73 (85.9)
Alone	25 (61.0)	23 (39.7)	10 (11.8)
In a small group home	2 (4.9)	0 (0.0)	0 (0.0)
Other	3 (7.3)	2 (3.4)	1 (1.2)
Employment status, N (%)**			
Full-time employment	6 (14.6)	13 (22.4)	58 (68.2)
Part-time employment	6 (14.6)	11 (19.0)	18 (21.2)
Supported employment	6 (14.6)	1 (1.7)	0 (0.0)
Training	2 (4.9)	3 (5.2)	5 (5.9)
Housewife	1 (2.4)	1 (1.7)	4 (4.7)
Retired	17 (41.5)	23 (39.7)	0 (0.0)
Unemployed	3 (7.3)	6 (10.3)	0 (0.0)

Abbreviations; MWT-B = Mehrfachwahl-Wortschatz–Test-B, PANSS = Positive and Negative Syndrome Scale, MADRS = Montgomery–Åsberg Depression Rating Scale, YMRS = Young Mania Rating Scale, GAF = Global Assessment of Functioning Scale, MS = mood stabilizer, AP = antipsychotic, AD = antidepressant.
* p = 0.058 trend-level significance, Mann–Whitney *U* test.
** p < 0.001 Chi-square test (schizophrenia patients vs. controls, bipolar patients vs. controls).
*** p = 0.026 Chi-square test (schizophrenia patients vs. bipolar patients).

2.3. Psychosocial Functioning

Psychosocial functioning was evaluated through the assessment of the participants' partnership and employment status, and by assessing their living situation. In addition, the Global Assessment of Functioning Scale (GAF; American Psychiatric Association, 1994) was used in patients.

2.4. Statistical analyses

Depending on the variable type (categorical, normally and non-normally distributed metric variables, respectively), the Chi-square