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Stability of facial emotion recognition performance in bipolar disorder

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ABSTRACT

The aim of this study was to assess the performance in emotional processing over time in a sample of euthymic patients with bipolar disorder (BD). Performance in the facial recognition of the six basic emotions (surprise, anger, sadness, happiness, disgust, and fear) did not change during a follow-up period of almost 7 years. These preliminary results suggest that performance in facial emotion recognition might be stable over time in BD.

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1. Introduction

There is currently a debate about the static or progressive nature of the cognitive deficits often observed in euthymic bipolar disorder (BD) patients across an array of domains such as verbal memory, attention, and executive functions. Based on the association between the number of previous episodes of illness and cognitive performance, some studies have suggested that successive episodes could worsen cognitive impairment (Robinson and Ferrier, 2006; López-Jaramillo et al., 2010) and this interpretation of the data has been taken as evidence for neuroprogression in BD in subsequent reports (Berk, 2009; Kapczinski et al., 2009; Post et al., 2012). However, both preliminary longitudinal studies of young adult patients (Samamé et al., 2014) and cross-sectional studies of elderly patients (Samamé et al., 2013) do not support the notion of progressive cognitive decline in BD. Therefore, further longitudinal research is needed to clarify this controversial issue (Martino et al., 2016).

Social cognition refers to the mental operations underlying social interactions (Pinkham et al., 2003). These operations could be relatively independent of traditional neurocognitive domains and have been found to be affected in BD (Samamé et al., 2015). To the best of our knowledge, there are no long-term studies exploring social cognitive features in bipolar subjects (Strejilevich and Martino, 2015). Then, the aim of this preliminary analysis was to assess the longitudinal trajectory of facial emotion recognition, one of the key aspects of social cognition, in euthymic BD patients.

2. Methods

The present sample comprised 40 patients diagnosed with BD type I or II using the Structured Clinical Interview for DSM-IV. Patients were included if they were aged between 18 and 60, euthymic (Hamilton Depression Rating Scale –HDRS- <8 and Young Mania Rating Scale –YMRS- <6) during at least 8 weeks, and had two assessments of facial emotion recognition separated by a period of at least 48 months. Exclusion criteria were: history of substance abuse, neurological disease, or any other unstable clinical condition that could affect cognitive performance. Facial emotion recognition was assessed with the Ekman-60 (Young et al., 2002). In this test, different faces appear in random order for 5 s each on a PC monitor, and subjects have to recognize the facial expression of six basic emotions (anger, disgust, fear, surprise, happiness, and sadness). The test yields a score out of a maximum of 60 correct answers for recognition of all six emotions, or scores out of 10 for recognition of each basic emotion. The study was approved by the Hospital Ethics Committee and all subjects gave written informed consent.

3. Results

At study entry, patients had a mean age of 43.25 (12.70) years, 57.5% were BD type I and they had a length of illness of 11.45 (6.81) years with 3.49 (1.79) previous depressive episodes and 2.65 (1.84) previous hypomanic/manic episodes. The period between baseline

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Table 1
Results of facial affect recognition at baseline and follow-up.

	Baseline	Follow-up	Wilcoxon signed ranks test
Total			
Mean (SD)	45.18 (7.45)	45.68 (8.27)	
Median (Range)	47.0 (32)	48.0 (35)	Z = −1.081, p = 0.28
Surprise			
Mean (SD)	9.08 (1.61)	9.03 (1.24)	
Median (Range)	10.0 (6)	10.0 (4)	Z = −0.082, p = 0.93
Anger			
Mean (SD)	7.38 (1.70)	7.47 (1.94)	
Median (Range)	8.0 (6)	7.0 (8)	Z = −0.27, p = 0.77
Sadness			
Mean (SD)	6.88 (2.21)	6.71 (2.59)	
Median (Range)	7.0 (8)	7.0 (10)	Z = −0.44, p = 0.66
Happiness			
Mean (SD)	9.90 (0.30)	9.92 (0.27)	Z = −0.45, p = 0.65
Median (Range)	10.0 (1)	10.0 (1)	
Disgust			
Mean (SD)	6.65 (2.21)	7.03 (2.78)	
Median (Range)	7.0 (8)	8.0 (9)	Z = −1.51, p = 0.13
Fear			
Mean (SD)	5.40 (2.60)	5.53 (2.91)	
Median (Range)	6 (10)	5.5 (10)	Z = −0.80, p = 0.42

(T1) and the re-assessment (T2) of facial emotion recognition was 80.18 (19.29) months during which patients experienced a mean of 2.08 (2.23) depressive episodes and 1.18 (1.45) hypomanic/manic episodes. There were no differences between subclinical symptoms at baseline and after follow-up (T1-HDRS: 1.23 (1.46), T2-HDRS: 1.65 (1.92), Wilcoxon Signed Rank Test $Z = -0.93$, $p = 0.35$; T1-YMRS: 0.73 (1.18), T2-YMRS: 0.38 (0.67), $Z = -1.89$, $p = 0.06$). Similarly, there were no differences between T1 and T2 in terms of exposure to benzodiazepines (20% vs 27%, McNemar test $p = 0.25$), antidepressants (50% vs 31.7%, $p = 0.065$), mood stabilizers (97.5% vs 95%, $p = 1.0$), and antipsychotics (47.5% vs 50%, $p = 1.0$).

Based on the norms provided in the Ekman-60 test manual, 15 patients had impaired performance on the number of total responses. Similarly, patients' test performance at baseline was compared with an age-matched sample of 40 healthy subjects of our database; patients underperformed controls on the number of total responses (Mann-Whitney test, $p = 0.028$), and on the recognition of disgust ($p < 0.001$) and fear ($p < 0.001$). The results on facial emotion recognition assessment at T1 and T2 are shown in Table 1. No associations were found between test-retest changes in emotion recognition performance and the duration of the follow-up period (p-values of Spearman correlations between 0.14 and 0.77), number of depressive (p between 0.43–0.99) and hypomanic/manic (p-values between 0.14–0.86) episodes suffered during that period. Furthermore, there were not any differences between the longitudinal cognitive outcomes of bipolar I and bipolar II patients (p-values of Mann-Whitney test between 0.13 and 0.92).

4. Discussion

Previous studies have reported that patients with BD show deficits in the facial recognition of fear, disgust, and surprise with small effect size (Samamé et al., 2015), although it is unclear if these shortcomings are primary or secondary to neurocognitive deficits and medication (Martino et al., 2011). The main finding of this study was that performance on facial emotion recognition did not change during a period of almost seven years and was not related to the duration of the follow-up period or the number of episodes of illness suffered along that period. Our findings agree with previous longitudinal studies that reported the stability of traditional neurocognitive deficits in BD (Samamé et al., 2014). Then, regardless of the primary or secondary nature of social cognitive outcomes, our preliminary results suggest that facial emotion recognition performance might be stable over time, thus not supporting the hypothesis of neuroprogression in BD.

Some limitations of our work should be taken into account. First, this study was conducted in patients from a research database updated over time, and we included only patients with a follow-up period of more than 48 uninterrupted months, which could imply a potential selection bias. However, we compared the sample of patients included in this study with a random sample of patients of our database not included (either because they performed neurocognitive assessment without being monitored in our program, or because they were followed up in our program but for a period shorter than 48 months). There were no differences between these patient groups in any clinical or social cognitive variables at baseline (all $p > 0.05$, results available upon request). Second, similar to most follow-up studies of cognition in BD, we lacked longitudinal assessment of a control group. The stability in emotional processing seen in our sample could indicate a relative deficit if an improvement were observed in the performance of healthy controls during the same period. However, the risk of practice effects tends to decrease with the length of the test-retest interval both in healthy and clinical subjects (Goldberg et al., 2010; Calamia et al., 2013). Therefore, considering the duration of the follow up period, it is unlikely that our results are due to practice effects. Additionally, all patients were taking psychotropic medications. Hence, drug-related effects cannot be excluded from the interpretation of the findings. Likewise, we included patients with a mean length of illness of 11.45 years and around 6 previous affective episodes. Therefore, we cannot rule out the possibility that changes in the performance of facial emotion recognition may occur earlier in the course of the disorder (i.e., first episode patients). Although a recent study reported that neurocognitive impairment showed select improvements in the first year after the initial manic episode (Torres, et al., 2014), long-term studies in this population are needed to improve our knowledge about the trajectory of neurocognitive and social cognitive deficits in BD.

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