

Attention deficits in bipolar disorder: a comparison based on the Continuous Performance Test

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Abstract

Although attentional deficits measured by Continuous Performance Tests (CPTs) have been observed in patients with bipolar disorder, their relationship with clinical state is not well understood. The identical pairs Continuous Performance Test (CPT-IP) shows particular promise as a measure sensitive to trait abnormalities in attentional function. In this study, the CPT-IP was administered to 27 patients with bipolar disorder (22 type I, 5 type II) and 25 demographically matched healthy comparison subjects, in order to assess the presence and nature of attentional deficits as a function of mood symptoms. Results showed significantly impaired CPT performance in bipolar patients compared with healthy subjects. Patients made fewer hits ($p < 0.01$), were slower to respond ($p < 0.007$), and had poorer discrimination ($p < 0.05$) and bias ($p < 0.006$) than comparison subjects. Severity of mania and depression was not correlated with any of the CPT measures. Our findings suggest that attentional dysfunction may be a trait deficit associated with bipolar illness. However, within-subjects longitudinal studies examining fluctuations in performance over time are needed.

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Impaired concentration and distractibility are commonly observed symptoms in bipolar disorder [11], and these symptoms may be accompanied by disturbances in psychomotor speed, learning, memory and executive function [2,14]. Continuous Performance Tests (CPTs) provide a means of quantifying aspects of sustained attention and vigilance in clinical populations [1,4,9,13,15–17]. Studies measuring attentional deficits in bipolar subjects show associations between task performance and the severity of manic symptoms [1,9,11,13,15,18,19]. Bipolar outpatients show less severe at-

tentional impairment compared with inpatients [13]. Bipolar inpatients improve from admission to discharge; but they remain significantly impaired compared with the general population [13]. This pattern suggests certain aspects of attention may be state related in bipolar illness, whereas others represent trait markers, and may be associated with distinct pathophysiological mechanisms [5]. While attentional impairment as a function of acute manic or depressive symptomatology is not surprising, recent investigations demonstrate neuropsychological deficits in bipolar patients in the euthymic state [14]. Euthymic patients demonstrate impairments in attentional performance [6,8], learning executive function, and working memory [8]. Furthermore, differential impairment in target detection, as assessed by a CPT, occurs in euthymic

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bipolar patients compared with healthy controls after controlling for residual affective symptoms [3]. Similarly, stable bipolar patients exhibit impaired performance on the CPT [21], and performance is not associated with residual mood symptoms or medication usage. These findings suggest that attentional dysfunction may represent a trait feature in bipolar disorder.

The present study sought to further characterize the nature of the attentional dysfunction in patients with bipolar disorder with various levels of symptomatology, by utilizing an identical-pairs version of the CPT that is sensitive to genetic liability for schizophrenia [7]. As attentional processing deficits tapped by this test have previously been shown to be heritable, developmentally stable, and independent of clinical state in patients with schizophrenia [7], this measure may

also be particularly informative as a trait marker for bipolar disorder.

Twenty-seven patients diagnosed with bipolar disorder (22 type I and 5 type II) were recruited through the inpatient and outpatient research programs at The University of Texas Health Science Center at San Antonio and its affiliated hospitals. Diagnoses were determined by psychiatrists, using the Patient Edition of the Structured Clinical Interview (SCID) [10]. Patients were included if they met DSM-IV criteria for BP-I or BP-II. Exclusion criteria were: (i) any serious medical illness, including neurological disorders; (ii) borderline IQ/mental retardation (IQ less than 80). The patients had an average of illness duration of 15.9 years and the average age of onset was 24.0 years (see Table 1). Thirteen patients met DSM-IV criteria for comorbid generalized anxiety disorder

Table 1
Participants and clinical characteristics

	BP patients	Healthy subjects	Group difference
Demographics			
Age	39.0 (12.3)	35.8 (13.8)	$T=0.87, p=0.4$
Female	63%	52%	$\chi^2=0.64, p=0.4$
Left handed	11%	4%	$\chi^2=0.92, p=0.3$
Education Level (yrs)	13.9 (2.1)	15.1 (3.5)	$T=-1.5, p=0.1$
Parental Education (year)	12.7 (2.7)	12.9(3.2)	$T=-0.3, p=0.8$
Verbal IQ	104.6 (9.8)	108.7(10.0)	$T=-1.52, p=0.1$
Full Scale IQ	104.0 (9.7)	109.0(10.1)	$T=-1.68, p=0.1$
Clinical factors			
HAM-D ^a	18.2 (8.3)	N/A	
YMRS ^b	9.9 (6.8)	N/A	
Age at onset	24.0 (12.8)	N/A	
Illness duration	15.9 (11.4)	N/A	
Depressive episode ^c	7	N/A	
Euthymic ^d	2	N/A	
Manic episode ^e	2	N/A	
Mixed episode ^f	16	N/A	
Family history (N)			
Any Psychiatric diagnoses	16	N/A	
Bipolar disorder	6	N/A	
Depression	5	N/A	
Schizophrenia	2	N/A	
Substance abuse	3	N/A	
Comorbidity (N)			
Past alcohol	9	N/A	
Current alcohol	7	N/A	
GAD ^g	13	N/A	
PTSD ^h	9	N/A	
Medication use (N)			
Atypical antipsychotics	5	N/A	
Other Antidepressants	9	N/A	
SSRI	4	N/A	
Benzodiazepines	6	N/A	
Mood stabilizers	12	N/A	

^a Hamilton Depression Scale.

^b Young Mania Rating Scale.

^c Depressed mood state was defined as HAM-D >8 and YMRS <8.

^d Euthymic mood state was defined as HAM-D <8 and YMRS <8.

^e Manic state was defined as HAM-D <8 and YMRS >8.

^f Mixed state as HAM-D >8 and YMRS >8.

^g Generalized anxiety disorder diagnosed by SCID.

^h Post-traumatic stress disorder diagnosed by SCID.

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