Transdiagnostic Comparison of Visual Working Memory Capacity in Bipolar Disorder and Schizophrenia

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Bipolar disorder, schizophrenia, cognitive dysfunction, working memory capacity, attention

Abstract

Background

Impaired working memory is a core cognitive deficit in both bipolar disorder and schizophrenia. Its study might yield crucial insights into the underpinnings of both disorders on the cognitive and neurophysiological level. Visual working memory capacity is a particularly promising construct for such translational studies. However, it has not yet been investigated across the full spectrum of both disorders. The aim of our study was to compare the degree of reductions of visual working memory capacity in patients with bipolar disorder (PBD) and patients with schizophrenia (PSZ) using a paradigm well established in cognitive neuroscience.

Methods

62 PBD, 64 PSZ, and 70 healthy controls (HC) completed a canonical visual change detection task. Participants had to encode the color of four circles and indicate after a short delay whether the color of one of the circles had changed or not. We estimated working memory capacity using Pashler’s K.

Results

Working memory capacity was significantly reduced in both PBD and PSZ compared to HC. Working memory capacity in PSZ was also significantly reduced compared to PBD. Thus, PBD showed an intermediate level of impairment.

Conclusions

These findings provide evidence for a gradient of reduced working memory capacity in bipolar disorder and schizophrenia, with PSZ showing the strongest degree of impairment. This underscores the relevance of disturbed information processing for both bipolar disorder and schizophrenia. Our results are also compatible with the cognitive manifestation of a neurodevelopmental gradient affecting bipolar disorder to a lesser degree than schizophrenia.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the manuscript can be downloaded and accessed as a PDF.

Figures

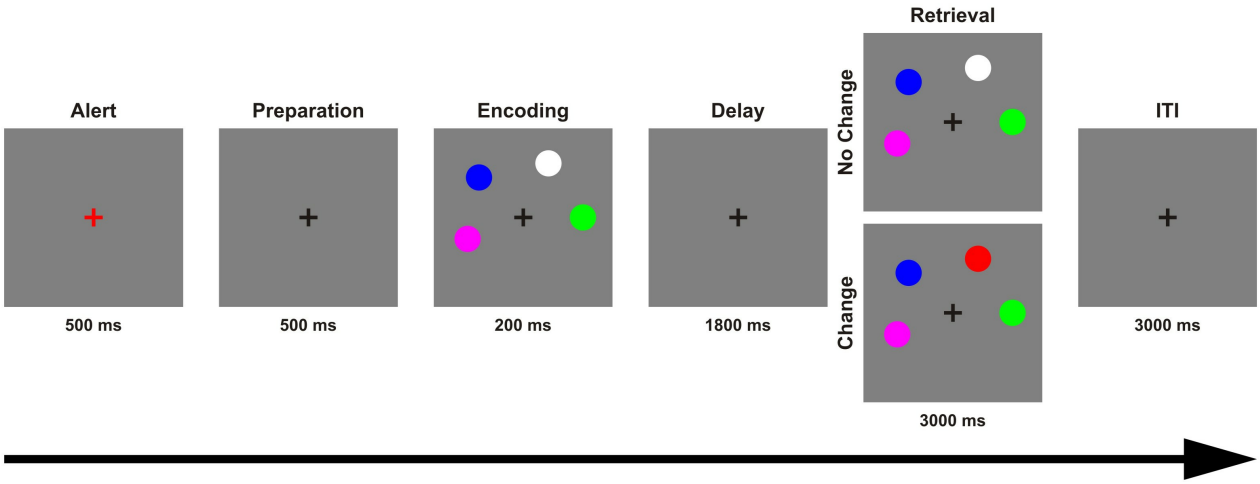

Figure 1

The change detection task used to assess working memory capacity. Each trial began with the alert phase, during which the fixation cross turned to red for 500 ms. This was followed by a preparation phase of 500 ms. During the encoding phase a sample array of four colored circles was presented for 200 ms. During the delay phase, the black fixation cross remained on the screen for 1800 ms. The whole-display recognition test array followed, in which participants had a maximum duration of 3000 ms to decide if the test array was identical to the sample array presented in the encoding phase, or if one of the circles had changed color.

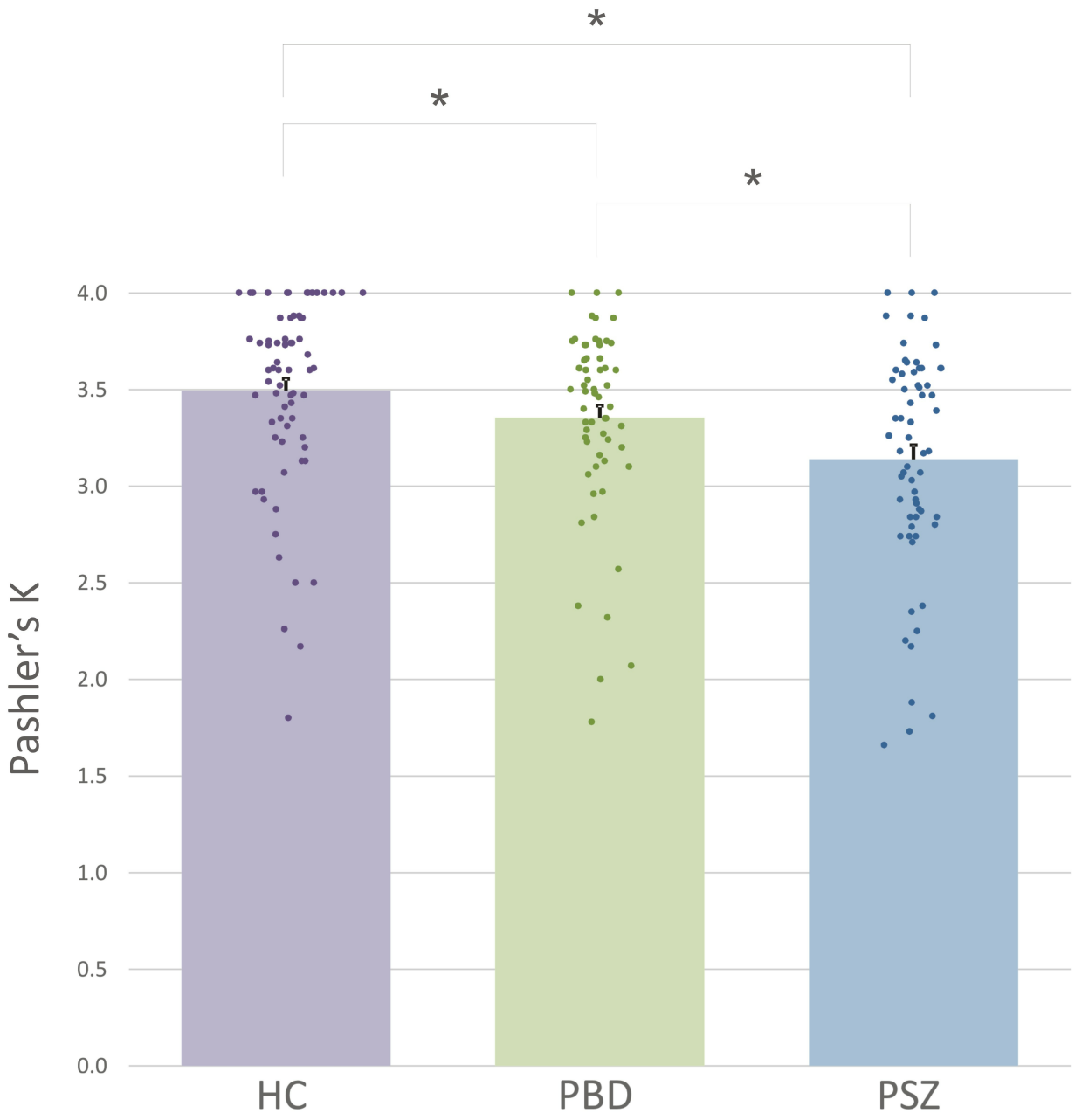

Figure 2

Working memory capacity for all groups. We estimated working memory capacity using Pashler's K. Bars indicate mean group average and scatter plot data indicates individual capacity estimates for healthy controls (HC) in purple, patients with bipolar disorder (PBD) in green, and patients with schizophrenia (PSZ) in blue. Error bars indicate standard error.