Reviewer's report

Title: Differences in working memory load produce an abnormal pattern of P300 amplitude in schizophrenia

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Reviewer: Heidi Thermens

Reviewer's report:

This study compares the P300 ERP at different working memory (WM) loads in persons with paranoid SZ vs. controls. Authors sought to determine whether P300 amplitude is suppressed at high WM loads in SZ, as seen in controls. Groups were well matched on demographic variables, but the sample size is very small (n=13 SZ v 13 controls) and this is a significant limitation. Results: 1. SZ showed reduced accuracy and longer reaction times on the N-back (replicating the literature); 2. Controls demonstrated P300 suppression from 0-back to higher WM conditions, but this was not seen in SZ; 3. Significant between group differences in P300 amplitude were observed only in the 1-back condition (differences in other conditions were not significant possible due to a lack of power, but the lack of findings in the 2back condition requires further discussion than is currently given), 4. The amplitude change between 0-back and higher load conditions was greater for controls than SZ; 5. SZ showed a trend toward longer P300 latencies (this was not significant possibly due to a lack of power, but findings have been inconsistent in the literature).

Major Compulsory Revisions

The English writing of the abstract and manuscript needs significant improvement; in the current state it is not a professional scientific document. Several major points in the writing are unclear or very weakly laid-out: 1. the conceptual descriptions of the WM domain and resource allocation theory, 2. the relationship of WM to ERP markers, 3. complex nature of cognitive and neurobiological contributions to the P300, and 4. biological significance of impaired load-induced P300 suppression in SZ. It is not clear what this paper uniquely adds to the literature and our understanding of the neurobiology of SZ. We already know that SZ show 1. WM deficits, especially at high WM loads, and 2. P300 deficits. Authors need to state clearly what this paper uniquely add to the literature.

Discussion. The alternative theories offered to explain the data (i.e., task-closure) are unclear. The last point suggesting that SZ exhibit deficits of ‘…WM updating even at low loads, and an incapacity to reallocate resources at high WM demands’ should be further fleshed out, very simply and with plenty of evidence from the literature (references).

Minor Essential Revisions
The sample size is small (n=13 SZ v 13 controls), limiting generalizability of the findings. This may contribute to the lack of significant expected differences in some of the comparisons. This should be mentioned in a limitations sub-section of the discussion.

Is ref #s12 and 16 the correct citations for the N-back task used? The task description should be written more clearly and the English needs improvement.

Tables.
Commas are used where periods should appear (periods are standard in English journals).
Why is EQZ used as an abbreviation for schizophrenia?

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Not suitable for publication unless extensively edited

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests.