Reviewer's report

Title: Driving behaviour in adults with Attention Deficit/Hyperactivity Disorder

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Reviewer: Annie Garner

Reviewer's report:

Thank you for the opportunity to review this interesting manuscript entitled “Driving behaviour in adults with Attention Deficit/Hyperactivity Disorder”. This paper examines group differences in simulated driving performance as well as self-reported history in adults with and without ADHD in an interesting urban driver compared to a low stimulation motorway drive. Indicators of driving performance included speed, proportion of distance over the speed limit and standard deviation of lateral lane position. In addition, behavioral responses to predetermined events were compared across groups including driving responses/maneuvers as well as verbal expressions of frustration/anger. Finally, this manuscript also compared visual attention across the horizontal and vertical spread of search during driving across individuals with and without ADHD. The inclusion of multiple dependent variables, which are all important indicators of driving performance and crash risk, is a strength of the present investigation. The examination of the relationship between ADHD symptom dimensions (hyperactivity/impulsivity and inattention) in addition to the group comparisons is also informative. Still there are several concerns. They are listed below.

Major Compulsory Revisions

1) The contribution of this manuscript to the existing literature is not self-evident. Several studies have documented that significant differences exist between individuals with and without ADHD with regard to driving histories as well as performance in driving simulators. In addition, the authors note that a previous study has examined the role of drive type (urban versus motorway) in ADHD and non-ADHD samples and that a separate study examined differences in eye movements among individuals with and without ADHD. One area that seems relatively understudied, and could potentially be a novel aspect of the current study, is the examination of verbal expressions of frustration/anger across groups during driving. However, the introduction does not adequately address why group differences in frustration/anger were assessed in the context of driving. In summary, the contribution of this manuscript to the literature would be strengthened if the authors described the existent literature in greater detail by identifying weaknesses in the methodologies of the studies reviewed and stating how their manuscript addresses these weaknesses.

2) More information is needed regarding procedures for establishing a clinical diagnosis of ADHD. What were the credentials of the individual diagnosing ADHD participants (e.g., clinical psychologist)? Was a structured or
semi-structured clinical interview conducted? Who was the reporter for the interview (self-report, parent, significant other)? Where rating scales collected and used to determine diagnosis? Also, the authors note that individuals in the ADHD group met lifetime diagnosis of ADHD did they also meet diagnostic criteria based on current symptom presentation? This information is needed in order to determine whether the interpretation of results is appropriate. For example, it may be that differences between individuals with and without ADHD in anger/frustration during driving are only apparent in samples with a current diagnosis of ADHD versus those who have a history of ADHD but are not currently symptomatic.

3) More information about the sample is needed. In particular, what was the average age, years driving experience and frequency of driving the overall sample? Did the two groups differ on any of these variables or other relevant demographic variables such as gender? If the groups differed on any of these variables then they should be covaried in subsequent analyses.

Also, I am a bit concerned that the control group was not adequately screened for absence of ADHD. The authors report that controls were eligible if they had never received a diagnosis of ADHD but is there the chance that individuals in this group could meet diagnostic criteria at time of participation? Did the two groups differ on the Conners’ Adult ADHD Rating Scale (and Autism Quotient for that matter) as one might expect? If they did then this information would help alleviate some of my concern.

4) More information regarding the psychometric properties of the measures used in the study is needed. This information is critical for determining the scientific rigor of the study. The authors should include psychometric properties of both commonly used scales (e.g., Conners’ and Autism Quotient) as well as the Linguistic Inquiry and Word Count text software.

Minor Essential Revisions

1) The authors are encouraged to change the first line of the abstract as it is misleading. The authors seem to suggest that they will assess how ADHD-related cognitive impairments impact driving but there are no measures of cognitive functioning in the study.

2) The Data Analysis section is difficult to follow because there are so many planned analyses. The headings used in the Results section are very helpful for orienting the reader. It is recommended that the same headings be used in the Data Analysis section.

3) Analyses assessing the correlation between ADHD symptom dimensions and driving variables. The authors need to clarify whether the entire sample was used for this analysis or whether only the ADHD sample was used. I would argue for using the entire sample because this will increase the variability in responses to symptoms of inattention and hyperactivity/impulsivity. If the authors used the ADHD group for these analyses, the inattention variable would likely have very
little variability because the sample would likely have high levels of inattention. Thus, lack of variability in inattention symptoms may be reason that inattention was not correlated with driving outcomes. Symptoms of hyperactivity/impulsivity likely have greater variability because of the developmental progression of ADHD (a general decrease in symptoms of hyperactivity/impulsivity). I would recommend that the authors re-run analyses with the entire sample if they have not done so already. Alternatively, they should examine the distribution of the inattention variable and comment on this as a potential limitation in the Discussion.

4) Please provide F-statistics and p-values for non-significant findings as this information is helpful for meta-analyses.

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests.