Reviewer’s report

Title: The Autism-Tics, ADHD and other Comorbidities inventory (A-TAC): Previous and Predictive Validity

Version: 0 Date: 07 May 2017

Reviewer: Somer Bishop

Reviewer's report:

Thank you for the opportunity to review this article about the A-TAC, a screening measure that has previously shown promise for detecting neurodevelopmental disorders, such as ASD and ADHD. The authors undertook further validation in a population-based sample of Swedish twins (the CATSS). The A-TAC was completed by parents of primarily 9-year-old twins (as well as a subsample with 12 year old twins), and results of the A-TAC were compared to diagnoses recorded in a national patient register. ROC analyses indicated good to excellent validity based on area under the curve (AUC). While results appear to indicate that the A-TAC is indeed a promising measure for detecting neurodevelopmental disorders, there are a number of areas that would benefit from further clarification and elaboration. This information is needed in order to provide the reader with more complete information about the potential utility of the measure for different purposes.

The authors report sensitivity and specificity of the A-TAC when used "concurrently" or "predictively." However, there is too little information about the time between when the diagnoses were assigned and when the A-TAC was completed. "Concurrent" validity usually refers to how well the measure agrees with diagnoses made at the time a measure was completed, but in this case, it appears that it may have been several years between the initial diagnosis and the completion of the A-TAC. Therefore, use of the term "concurrent" seems a bit misleading in this context. Other variables (e.g., sex of child, sex of informant) besides age at diagnosis/time since diagnosis are also not explored; additional examination of these variables would be useful for evaluating the appropriateness of the A-TAC for use in different populations.

I found Table 2 difficult to understand. Who are the screen-positives? What is the relationship between the data in Table 2 and what is reported in Table 3? If there were so many screen-positives for ASD (924) but only 298 ASD cases, wouldn't the specificity be much lower than what is reported in Table 3?

Despite excellent AUC values overall, the sensitivities reported for "predictive" in Table 3 are very low. Sensitivities for the "Concurrent" high cut-offs are also very low. Specificity values are impressive, but such low sensitivities would drastically affect the utility of the A-TAC as a screening tool. It would be helpful to present the positive and negative predictive values,
especially since the AUC values may be misleading in this context given the sample characteristics and apparently high specificities.

Related to the point above about AUC values not accurately reflecting the actual screening characteristics of the measure, the authors need to be careful about overstating the utility of A-TAC. AUC data would suggest excellent validity, but the actual sensitivity values (at least for the high cut-offs) are too low for this to be recommended for general screening. Thus, the authors need to be explicit about which cut-offs are recommended for detecting which disorders. Again, PPV and NVP would be useful for informing such recommendations.

Another major issue is that the A-TAC was administered when children were 9 or 12 years old. Thus, even if sensitivity and/or specificity for identifying certain disorders like ASD is good, its value as a screener may not extend to other ages. This needs to be explicitly stated, as well—ASD screeners are often used in very young children, but the A-TAC may or may not be useful for younger populations. I also wondered who the children were who were receiving diagnoses of ASD after age 9 or 12 years, as this is likely a special population (e.g., higher IQ, more psychiatric comorbidities, more mild ASD symptoms). Given this, it is not clear what the real utility of examining the "predictive" characteristics of the measure are for ASD or ADHD given that they are typically diagnosed much earlier than 9 or 12 years old.

In summary, the A-TAC appears to have the potential to contribute to screening practices for neurodevelopmental disorders. This paper helps extend previous work examining the validity of the A-TAC. However, additional information is required in order to judge the contribution of this manuscript, and ultimately, the utility of the A-TAC.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

No

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No
Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?

If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

**Quality of written English**

Please indicate the quality of language in the manuscript:

Acceptable

**Declaration of competing interests**

Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.
I agree to the open peer review policy of the journal