Reviewer’s report

Title: Trends in childhood and adolescent internalizing symptoms: results from Swedish population based twin cohorts

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Reviewer: Bryan Rodgers

Reviewer's report:

This manuscript reports analyses of data from successive birth cohorts of twins in Sweden, with the aim of identifying historical trends in internalizing symptoms for cohorts born 1994 to 2008. These data cover information on 9-year-old twins (cohorts 1998 to 2008) and 15-year-old twins (1994 to 2001) using parent reports for the younger age and both parent reports and self-reports at age 15. Analyses for 9-year-olds indicate an increasing trend in internalizing symptoms based on the SCARED measure but no or trivial trends based on the sMFQ measure. For 15-year-olds, increases were found for self-reports on the SDQ but there was little change using the parent-report SDQ. Where increasing trends were found, these appeared similar in boys and girls. The authors conclude that: "Trends of increasing internalizing symptoms are not exclusive to girls. A clinical implication of the results is that internalizing symptoms should be assessed across genders, from childhood and throughout adolescence."

The strengths of this study include the systematic collection of data from successive annual birth cohorts and the overall sample sizes (over 17,000 at age 9 and almost 11,000 at age 15). However, the manuscript has a number of weakness including: little consideration of why the study is important/significant, a very poor literature review, insufficient information on the validity of the outcome measures, inadequate statistical tests to investigate possible gender differences, and insufficient discussion (or explanation) of apparently conflicting findings. The final conclusions, quoted above, reflect this confusion. Is the primary implication of this research really clinical, and are the authors really suggesting some form of continuous assessment (research or general surveillance) of childhood and adolescent symptoms? How did the particular findings reported lead to such a conclusion?

At this stage, I think it would not be helpful to provide detailed feedback on all aspects of the manuscript when several fundamental features need to be addressed. The following are some key aspects for consideration in revising the report.

1) The literature in this field has suggested a number of reasons as to why it is important to investigate trends in the mental health of children and adolescents. Some acknowledgment of this literature would be helpful in pre-empting a "so what?" response. Even one or two sentences would set the scene for the manuscript.
2) There have been tricky conceptual issues with the measures used in this field in the past. The term "internalizing symptoms" is not well defined and the current paper is not clear in whether it is synonymous with "anxiety and depression" or covers other things. Historically, parent (and teacher) reports of internalizing behaviours have shown very low correlations with self-reports (as well as with each other) and self-reported introversion has been more consistently aligned with these measures than with measures of anxiety or depression. It would be good to know whether the measures reported on here have circumvented such difficulties but the information provided does not provide reassurance. The cited paper for the validity of the SCARED (ref 17) leaves doubts in terms of its generalizability to the present study and also because previous literature referred to in that publication is inconsistent with the findings reported by Hariz et al. The present study has the capacity to examine and report the correlations between self-reports and parent reports at age 15, and this would be reassuring if they indicate that the two sources are indeed assessing similar constructs.

3) Key references from the broader literature are not mentioned in the present report and the summary of previous research is weak. A good starting point is Collishaw's 2015 review and the relevant studies cited in this review (Annual Research Review: Secular trends in child and adolescent mental health, Journal of Child Psychology and Psychiatry 56:3 (2015), pp 370-393).

4) The statistical analyses used are not appropriate for investigating possible gender differences in trends (assuming these really are part of the study's aims). Methods are required for testing possible interaction terms (cohort x sex) rather than simply splitting the sample and applying separate tests to boys and girls.

5) There are a number of reported findings that are difficult to reconcile and can even seem contradictory. Why is the gender difference for the SCARED (Table 1) reversed for the sMFQ? Why is the trend for parent reports at age 9 not reflected in their reports for age 15? Might this be because of the different birth cohorts covered by the studies across the two age groups?

6) The manuscript does not give sufficient consideration as to whether the use of twin samples may not be generalizable to the total population. Given that the paper is about trends, the key issue is whether trends for twins can be generalized. The main potential threat to validity in this respect is the increased incidence in DZ twins resulting from fertility treatments. Can this distort trends over the particular cohorts used for this research? What do the authors know about changes in this population over time that are pertinent to the measured outcomes?
In addition to these listed points, the manuscript can be made more accessible with some tidying up. The captions of the tables are sometimes incorrect (Table 2) or do not convey what the table is about (Table 3). I was perplexed as to why the reported Ns were so different for different measures (17,576 for the sMFQ and 14,979 for the SCARED) and what effect this might have on the findings reported. The paper reports response rates but not missing data rates or any analyses intended to shed light on possible biases arising from missing data.

**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

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No

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