Reviewer's report

**Title:** Delayed school progression and mental health problems in adolescence: a population-based study in 10,803 adolescents.

**Version:** 2  
**Date:** 14 January 2014  
**Reviewer:** Hugh Ramsay

**Reviewer's report:**

Thank you for the opportunity to review this interesting and well-written paper. I have a number of general and specific comments outlined below.

**Major compulsory revisions:**

**General comments:**

1. This cross-sectional study design is not appropriate overall to examine for causality in the association between DSP and mental health problems and this should be acknowledged. While we know that DSP has arisen in the past, there is no information on the role of mental health problems themselves as a cause of DSP. It is therefore impractical to try to examine causal risk with this method. Rather, the method can examine DSP as a marker of risk.

2. The study population is very heterogeneous in terms of age (and therefore types of mental health problems). This should be acknowledged in the limitations. Alternatively, it may be more appropriate to examine specific ages or specific mental health problems as the outcome of interest.

3. There are significant problems with the way confounding is included in the methodology. Firstly, as mentioned above, the method cannot assess causality. Secondly, the number of confounders included is confusing and many are associated directly with the outcome of interest (e.g. school problems and behavior problems are features of conduct disorder). It would be more appropriate to examine DSP as an independent predictor of mental health problems and control for a smaller number of well-recognised (and separate) risk factors.

**Specific comments:**

**Abstract:**

1. The methods section should clarify that SDQ was the outcome of interest, DSP the primary exposure of interest and that logistic regression was used to assess the association.

2. It appears excessive to conclude that DSP is a “risk factor” for mental health problems. It would be more appropriate to refer to it as a “risk marker”.

**Introduction:**

3. It would be useful to more clearly explain how DSP could act as a risk factor
for mental health problems. Is there evidence that DSP reflects cognitive function?

4. It is important to justify the inclusion of confounders in the analysis at the introductory stage. Why were these confounders chosen for inclusion?

Study population and methods:

5. Is the sample a random representative sample? Does it reflect the Dutch population in terms of ethnic background, gender and socioeconomic status? (This is addressed later in the manuscript but may benefit from being stated earlier.)

Measurements:

6. Has the definition of DSP used here been used elsewhere in the past?

Potential confounders:

7. Overall, the approach adopted of including numerous potential confounders confuses the reader and obscures the main message. Any confounder included should have a clear rationale for inclusion (be associated with both DSP and SDQ and not on the theoretical causal pathway) and should not be a mediating factor.

8. There is a good general rationale for including adverse life events and socio-demographic factors as potential confounders, though too many are included. I recommend reconsidering the inclusion of some factors (school level, family care, future perspectives on life and parental involvement). There are problems with including school-related variables and risk-taking behaviour. Some of these overlap with SDQ questions and concepts, particularly those related to conduct problems. Inclusion could therefore mask associations between DSP and SDQ general risk. I also fail to see the reasoning for inclusion of health and lifestyle factors as potential confounders. They further complicate an already long list of confounders.

Discussion:

9. As discussed above, the first paragraph of “Strengths and limitations” suggests that the method gives the possibility of a longitudinal perspective. However, this is not the case as there is no way to examine the outcome of interest longitudinally. Mental health problems commonly persist over time and this DSP may simply be associated with persistence rather than incident problems.

10. As discussed above, it should be acknowledged that SDQ is a highly heterogeneous outcome across such a large age range. The role of DSP in younger adolescents with ADHD may be quite different to older adolescents with emotional problems.

Minor Essential Revisions:

Introduction:

1. Please provide a reference for how you divided the SDQ total difficulties score
into normal and abnormal.

2. Table 1: please explain SDQ, SES

Discretionary Revisions:

Introduction:
1. I would rephrase the term “elaborate” in the final line.

Results:
2. Line 2 would be clearer written “14.2 (SD=1.6) years and 49.8% male.”
3. Line 5 should read “were equally distributed by age, gender and ethnicity.”

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**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.