Reviewer’s report

Title: Change in physical activity is not associated with change in mental distress among adolescents: The Tromsø Study: Fit Futures

Version: 0 Date: 14 May 2019

Reviewer: Peter Kremer

Reviewer’s report:

This study examines the longitudinal relationship between PA and symptoms of psychological distress among adolescents. Objectively measured PA and anxiety/depression symptom data was captured from a sample of secondary school students at baseline and follow-up. Data for a range of covariates was also captured at one or both time-points. Change score variables were constructed for two activity measures (steps, MVPA) and psychological distress symptoms and associations modelled using separate linear regression analyses. Results indicated that changes in steps/day and MVPA were both not associated with changes in psychological distress symptoms.

I have two principal concerns with the manuscript. First, a considerable proportion of the PA and parental education data was missing and hence values imputed for analysis - for some variables almost half of the scores were imputed. Second, given the purpose of the study, I am not convinced about the use of change scores and the analytic approach - other longitudinal analytic methods could be (better) utilised to test for associations between the study variables. In my view, further attention to each of these issues (eg. also analyse on available data; use of linear mixed modelling) would strengthen / verify reported conclusions.

Other matters include:

Page 6, Line 6 Spelling 'resent'

Page 7, Line 25 Is it possible to specify the nature of the hypothesised relationship (eg. positive/negative)?

Page 8, Paras 1 -2 Clarify why change scores are important for understanding the relationship between PA and psychological symptoms - ie. what does this approach add when compared with other longitudinal approaches? What unique information does it provide?

Page 8, Para 2 Why was a new cohort of students who had not participated at T1 invited into the study? How many of these participated as T2? Non-participation at T1 inevitably means data is missing on key variables at T1 (see issue of imputation indicated previously).

Page 9, Line 19 Spelling 'Analyiss'
Why are average scores (rather than change scores) computed and modelled for several covariates? It seems more 'elegant' to use the same variable construction approach within the same analysis.

Given the age range of participants and the fact that they are still growing, the BMI measure should be standardised (i.e., BMI-z).

As previously noted, I think other longitudinal modelling approaches should be utilised to test for relationships between the variables of interest. Alternatively, the rationale and justification for using a change score approach need to be made clear early in the manuscript.

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

Yes

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.

Yes

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

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