Reviewer’s report

Title: Physical activity and sleep profiles in Finnish men and women

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Reviewer: Eliane Lucassen

Reviewer’s report:

This is a well conducted paper on the association between various self-reported types of physical activity and sleep characteristics. The authors have conducted novel statistical analyses appropriately. Furthermore, analyses have been performed in a large dataset, which adds to the quality of the paper.

Major Compulsory Revisions (in order of importance):

- Higher levels of activity in leisure time (LTPA) and lower levels of activity (OPA) during work cluster in the same profile as “better” sleep behaviors. As is, I am not convinced that people with moderate to high OPA actually sleep shorter or worse sleep or about the correlations between LTPA and sleep. It would support these conclusions to do additional analyses on the sleep characteristics stratified by activity level category (for OPA and LTPA). For OPA, and possibly also for LTPA, analyses may have to be done separately for the employed and the unemployed.

- You found that individuals with a more psychically active occupation sleep worse. I think a major confounder could be social economic status, which could be related to other parameters like obesity and smoking and could also influence sleep. Have you collected information about SES? If not, at least the possibility of confounding should be discussed.

- As indicated by the authors in the discussion, age influences sleep duration, chronotype and physical activity; yet it is not included in the analyses. Associations could potentially be quite different in the younger vs. older individuals. Especially since the age range is big (25-74 years), I would suggest including age in the LCA, or at least supply the average age of each Profile.

- Individuals in profiles 2 and 4 are unemployed; could you specify whether they are retired or unemployed for other reasons?

- Could you provide p-values for table 1 and 2? You mention in the discussion that men and women fundamentally differ in sleep and PA behaviors, so it would be good to see this confirmed in the tables.

- Could you specify which percentage of individuals you excluded because they had a history of CVD and which percentage because they did not participate in the health examination? Do you think there could be a selection bias in selecting only the individuals that participated in a health examination?

- Since you based the classification of chronotype on a LCA of a questionnaire, it...
would be good if you could show the midpoints of sleep of the four categories of chronotypes, so that the reader can compare how extreme the “morning” and the “evening” types in your particular study are.

Minor Essential Revisions:
- It would make it easier for the reader to label the figures with “men” and “women”. Also the legends (“inactive”, “light”, and “moderate to high”) are not well aligned with the appropriate category (e.g. “commuting PA”) so they should be somewhat adjusted.

- In the last sentence in Methods in the Chronotype paragraph “The shortened … original items”, please include “so” after the comma, or “Since” at the start of the sentence, and change “doesn’t” into “does not”.

- Please insert name of the authors before “[47]”.

- Could you specify how you classified education into low, middle and high?

- In table 2, please also supply the three significant digits for the height of women.

- In the 6th paragraph of the introduction, in the sentence “Long time … in elderly.”, please change “predict” to “predicts”.

Discretionary Revisions:
- I am not sure whether the term “sleep debt” is appropriate to describe the discrepancy between sleep duration on weekdays or on weekends. This implies that the underlying reason for sleeping longer is a shortage of sleep, while it could be caused by many factors. Maybe “sleep duration discrepancy” would be a better term to use?

- In category 2) of using sleep medication you included all individuals that are currently using sleep medication or have used in the past, including usage over a month and even over a year ago. Would it be better to dichotomize it a bit less strict – e.g. include answers 1) to 2) (or 1) to 3) if you prefer) in “Yes”, and 3) to 5) in “No, or over a month ago” (or (“No, or over a year ago”)?

- It might make it easier for the reader to label the profiles on the figures (e.g. for Profile 1 of the men “physically active, normal range sleepers”) and to indicate more clearly that individuals in Profile 2 and 4 are almost always unemployed, which explains the “inactive” OPA and CPA.

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