PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Paid and unpaid working hours among Swedish men and women in relation to depressive symptom trajectories: Results from 4 waves of the Swedish Longitudinal Occupational Survey of Health (SLOSH)
AUTHORS	Peristera, Paraskevi; Westerlund, Hugo; Hanson, Linda

VERSION 1 – REVIEW

REVIEWER	Marko Elovainio University of Helsinki Finland
REVIEW RETURNED	12-May-2017

GENERAL COMMENTS	Review BMJ Open Manuscript Number: bmjopen-2017-017525 Paid and unpaid working hours among Swedish men and women in relation to depressive symptom trajectories The authors examined the associations of paid , unpaid working hours and total working hours with depressive symptoms trajectories among middle-aged men and women from waves of the Swedish Longitudinal Occupational Survey of Health (SLOSH 2008-2014). The trajectories were constructed using a SAS macro proc Traj (group-based trajectory modeling) and six depressive symptoms trajectory groups were identified: ‘very low stable’, ‘low stable’, ‘doubtful increasing’, ‘high decreasing’, ‘mild decreasing’, and ‘high stable’. More time spent on paid- or unpaid work were associated with a higher probability of having ‘low stable’ , ‘mild decreasing’ or ‘high stable’ symptoms compared to having ‘very low stable’ symptoms and the associations were similar between men and women. The authors concluded that longer total working hours which indicate a double burden from paid and unpaid work may be associated with higher depressive symptom trajectories. The paper is interesting and has some obvious strengths (prospective longitudinal design, large sample size, representative sample, valid outcome measures). My suggestions for improving the manuscript are as follows: 1. Although long working hours as such have shown to be a health risk, the results would be more interesting if also the potential effects of job strain (that is probably measured in SLOSH) would have been taken into account. It is different to work long hours in high strain than in low strain jobs.

	2. The authors could have tested the sex interaction and then decide whether performing the tests both genders combined or separately in men and women. 3. One of the problems of the study that needs to be discussed further is the huge drop out. Only about 30% of the smallest data sets were included. The trajectory analyses do not require complete cases and complete case analyses are in any case problematic. The authors could try to do something with the large drop out (impute ?) or justify why they did not anything about it. 4. It is difficult to understand the complete trajectory solution, because I can't find the figure 1 in my version of the manuscript and no information is provided about fitness of the solution compared to other possible solutions. One of the groups also is suspiciously small (1.3%)? 5. Table 3 is confusing. Unpaid and unpaid working hours are probably added simultaneously in the model, otherwise the results are very odd. It seems that neither of them are associated with depressive symptoms trajectories (the direction of the associations are even different) but their combination is? I suggest that the authors make this clear or add the variables in the models separately. In sum, interesting paper that could be further clarified.

REVIEWER	Dr Naomi Finch University of York, England
REVIEW RETURNED	07-Jul-2017

GENERAL COMMENTS	This is an important paper given we know very little about how the 'double burden' impacts upon health. Thus the results are interesting and publication would add knowledge to the literature. There are a few suggestions: First, the literature review is very short - although more literature is introduced int the discussion. Whilst the review does point out a gap in the literature, it would benefit from placing the research in context - why is it important. Thus, for example, the 'double burden' mentioned in the discussion could be explained. Measures: The cut offs for the paid / unpaid work measures included need to be justified (especially for paid work). I am not sure why the lowest category is paid work up to 40/41 hours. This does not allow for analysis of the impact of part time work and could be why longer paid hours did not significantly impact upon the odds compared to the reference group. If the reference group had a lower upper limit then there may have been significant odds. Also, it is not clear to me how the variables were included in the models - it appears that they were included as continuous rather than categorical variables. Whilst they are ordinal variables, I think it would be clearer to include as categorical so that we can understand the impact of each group on the odds compared to the reference group. Alternatively, if possible, do not categorised paid/ unpaid/ total hours and leave these as continuous variables. Either would be better than treating the ordinal as continuous. You report that there is no difference between men and women for paid / unpaid hours. But what about for total hours? Could you report this, even if not significant. It would be useful to include descriptive statistics for hours worked (paid, unpaid and total) for men and women. So, whilst working long hours may not impact men and women differently in term of depression, you could point out that

	women are more likely to be undertaking long working hours, for example and experiencing a double burden - if the case. Also, it may not be that long hours per se is the problem but having to balance the two creates additional strain - so women are more likely to be juggling? The discussion could include more about the implications of the findings, and a discussion about why a gender difference was not found, despite gender being such an important factor in unpaid and paid work patterns.

VERSION 1 – AUTHOR RESPONSE

Thank you very much for valuable comments to our manuscript and for the chance to clarify and revise the manuscript!
Reviewer: 1
1.Due to restrictions in power we have initially been selective with regard to covariates in the models. However, we agree that work stress may indeed explain why long working hours lead to poorer health and may interact with long working hours. In this revised version we therefore also tested for interaction with job strain. There were no clear differences between those with or without job strain. We now comment on this in the manuscript.
2.Thank you for pointing that out. We agree that we should have tested the sex interaction first as a basis for deciding to do stratified analyses. We now tested for interaction also with regard to total workload and found significant, although relatively small, differences between men and women in some trajectory groups. In our revised version of the paper we have therefore made changes accordingly in the method section and suggest to include the stratified results in supplementary tables.
3.We are aware of that description of the study population may confuse the reader and give an impression of large drop out. Between 65 and 52 % of the invited people usually respond to the SLOSH data collections. However, the dropout of course increase with repeated follow-ups. We have now attempted to clarify the description of the sample and illustrated with a figure how we arrived to the selected number of individuals in our analyses. In addition, we have included a description of diffences between responders , non responders and between the included and excluded participants.

The trajectory analyses do not require complete case analyses. In proc traj missing data on dependent variables are assumed to be missing at random. The trajectory models are therefore estimated by using all available observations on the dependent measure (thus subjects are included in the analysis if they have at least one observation with valid data on the dependent variable). However, subjects with missing data on the covariates are excluded from the analysis since there is no missing data theory for covariates given that the model is estimated conditioned on the covariates. In our case we included all 6300 individuals and the analyses were based on 6291 with data on depressive symptoms all time points. Only a small proportion of the sample was lost because of missing values. Multiple imputation would therefore not add much. Also according to our knowledge, multiple imputation has not been implemented in the SAS software for use in combination proc traj. We have, however, excluded a relatively large number of people because of non-response in any of the 4 waves. Since we also use repeated data on working times in the analyses, excluding those with non-response in any of the surveys was determined most appropriate, which we now explain in the method. Similar results were, however, obtained when the analyses were performed in a larger sample including people responding wave 2 (2008) irrespective of later response or not.
4.We apologize for not having the figure in the previous version of manuscript. The figure is now included in the main text. We also describe in more details in the result session how we ended up choosing this model. There are different recommendations regarding smallest size of the trajectory

groups. In this study we chose 1 % rather than 5 % as our limit since our sample is quite large. We have tried to clarify that in the revised manuscript.
5.We understand that that the table may be confusing. We have therefore tried to clarify by labelling the models 1 and 2.
Reviewer 2
1.Thank you very much for the suggestion. We have now extended the literature review and have tried to explain why it is important to study such relationships
2.Thank you very much for the comment. We totally agree that the optimal comparison groups would have been those working more standard hours of paid work. Unfortunately we do not have the possibility to separate shorther paid working hours (<35) from more standard hours since we are limited by response options in the questionnaires, which have changed over time. To rule out the possible bias by inclusion of people with part time work we therefore performed the analyses only among those reporting to work full time and the results were similar. We have now elaborated on this in the manuscript and return to that issue in the discussion.
3.
Yes, working hours were included in the models as continuous variables although ordinal in nature. One of the reasons for this was that only categorical data was available from the questionnaires, which restricted us from using fully continuous data. Another reason was power. Since our dependent variable consists of 6 groups, it is likely that power will be very limited when using also predictor variables consisting of several different categories. Still, we followed your suggestion and fitted models with working hours as categorical variables. No clear associations were observed in these analyses, which may be due to lack of power. We now report the results of these analyses as well in the manuscript.
4.Thank you for this suggestion. We have now provided a table indicating mean hours worked per sex. We have also investigated possible interactions by sex more in detail and included the results of group-based trajectory models for total working hours among both men and women.
5.
Thank you very much for the suggestion. We have followed the advice and have elaborated on potential gender differences in the discussion.

VERSION 2 – REVIEW

REVIEWER	Marko Elovainio University of Helsinki Finland
REVIEW RETURNED	26-Sep-2017

GENERAL COMMENTS	The authors have been responsive. I have no further comments.

REVIEWER	Dr Naomi Finch University of York United Kingdom
REVIEW RETURNED	18-Oct-2017

GENERAL COMMENTS	There have been some noticeable improvements and justifications to the paper. I am still not clear whether there was a way to weight for those over-represented groups in the study? As flagged in my previous comments, categories of paid working hours do not allow for part time work. Indeed, 38.6% of women and 20% of men were working less than 40 hours. A more nuanced

	categorising of paid work hours is therefore needed. The author does mention this in the statistical analysis section and discussion, but it is not clear - is it that the categories were fixed in the questionnaire or a decision on the part of the author? This needs to be more clear. (Likewise 46 percent of women undertake more than 21 hours a week of unpaid work, thus indicating this category needs to be re-grouped). The author states that part time work may be associated with poorer health (and thus may muddy the results), but is it not also likely to be associated with caring responsibilities. I not sure this totally justifies not exploring low paid hours in the analysis, but instead including a discussion about cause and effect.

VERSION 2 – AUTHOR RESPONSE

Editor Comments to Author:
- Please include the study design in the title.
Thank you for that comment, we have now added that in the title

Reviewer(s)' Comments to Author:

Reviewer: 1
Reviewer Name: Marko Elovainio
Institution and Country: University of Helsinki, Finland Please state any competing interests or state 'None declared': None declared.

Please leave your comments for the authors below The authors have been responsive. I have no further comments.

Reviewer: 2
Reviewer Name: Dr Naomi Finch
Institution and Country: University of York, United Kingdom Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below There have been some noticeable improvements and justifications to the paper.

I am still not clear whether there was a way to weight for those over-represented groups in the study? Although weights can be useful for descriptive statistics in cross-sectional data, we are not aware of a suitable way of using the weights, specific to single waves, in longitudinal analyses using multiple waves. In the discussion we therefore acknowledge that longitudinal sampling weights were not available.

As flagged in my previous comments, categories of paid working hours do not allow for part time work. Indeed, 38.6% of women and 20% of men were working less than 40 hours. A more nuanced categorising of paid work hours is therefore needed. The author does mention this in the statistical analysis section and discussion, but it is not clear - is it that the categories were fixed in the questionnaire or a decision on the part of the author? This needs to be more clear. (Likewise 46 percent of women undertake more than 21 hours a week of unpaid work, thus indicating this category needs to be re-grouped).
Thank you for pointing out! We agree that further categorization may be more informative and have now changed the categories of paid working hours, unpaid working hours and total working hours as

follows: paid working hours (<37, 37-40, 40/41-49/50, 50/51-59/60, 6+/61+), unpaid working hours (<8, 8-14, 15-21, 22-28, 29+), total working hours(<41, 42-57, 58-67, 68-80, 80+) and we have repeated all the analyses using the above mentioned categories. We therefore changed accordingly the abstract, results, and discussion session.

The author states that part time work may be associated with poorer health (and thus may muddy the results), but is it not also likely to be associated with caring responsibilities. I not sure this totally justifies not exploring low paid hours in the analysis, but instead including a discussion about cause and effect.
Since we have now changed the categorizing of paid and unpaid working hour. In the main analyses part time is included and explored, and may indeed be associated with caring responsibilities. However, when studying paid working hours part time work may not be the best reference group since some may be self-selected into part time work because of health problems. We have changed our description of the sensitivity analysis to clarify this further.

VERSION 3 – REVIEW

REVIEWER	Dr Naomi Finch University of York United Kingdom
REVIEW RETURNED	13-Dec-2017

GENERAL COMMENTS	I will accept, although the author still hasn't fully discussed the importance of part time work. It is likely a cross-national difference but women in the UK are more likely to work part time to look after children than because of ill health. Thus not further breaking down the 1/3 of women in the analysis who work part time misses an important discussion about the impact of part time work versus full time work upon mental health. The assumption that people working part time due to poor health is one more appropriate for men. I am still not clear whether the authors were tied to these categories due to the questionnaire or that they re-grouped them based on the questionnaire codings. Future research needs to examine part time work, and the reasons for part time work, more carefully when assessing the impact of work upon mental health.

VERSION 3 – AUTHOR RESPONSE

Reviewer(s)' Comments to Author:

Reviewer: 2
Reviewer Name: Dr Naomi Finch
Institution and Country: University of York, United Kingdom Please state any competing interests or state ‘None declared’: None.

Please leave your comments for the authors below I will accept, although the author still hasn't fully discussed the importance of part time work. It is likely a cross-national difference but women in the UK are more likely to work part time to look after children than because of ill health. Thus not further breaking down the 1/3 of women in the analysis who work part time misses an important discussion about the impact of part time work versus full time work upon mental health. The assumption that people working part time due to poor health is one more appropriate for men. I am still not clear whether the authors were tied to these categories due to the questionnaire or that they re-grouped them based on the questionnaire codings. Future research needs to examine part time work, and the reasons for part time work, more carefully when assessing the impact of work upon mental health.

Dear Reviewer

Thank you for your comments. We agree that it would be of interest to investigate part-time work further in relation to mental health. We have now tried to repeat the analyses for those working part-time but it was not possible due to power limitations. This has now been brought up in the discussion as a limitation of our study where we write: “Finally it would have been of interest to examine the impact of part time work on depressive symptoms but this was not possible due to power limitations.”

In the method section we have also acknowledged that part-time workers may differ from full-time workers in other respects as follows: “We further conducted the same analyses for men and women separately since a significant interaction effect was found for sex, and among participants working full time only. The latter was done to exclude those with part time from the reference group in the analyses of paid working hours, since those with part time work may differ from full time workers with respect to e.g. health, caring responsibilities.”

Regarding the categories for working hours we were partly tied to the response options in the questionnaires which also partly changed over time. We therefore also re-grouped them so that they would be similar over time and comparable to some of the previous literature. We hope that this is clarified in the method section were we now write:

“The respondents were asked to indicate number of hours according to pre-specified categories in 2010-2014, which were used to divide working hours into 5 categories which were similar for all waves and comparable to some of the previous literature on long working hours [10,25]: <37, 37-39, 40-49, 50-59, 60+ working hours/week. Unpaid working hours was also divided into 5 categories: <8, 8-14, 15-21, 22-28, 29+ hours on average/week. The total number of hours spent on paid and unpaid work constituted the total working hours measure (reflecting “total workload”), and was divided into the following 5 categories: <42, 42-57, 58–67, 68–80, and >80 h/week. These categories were also partly in line with previous literature on [18].