Author's response to reviews

Title: A survey study of the association between mobile phone use and daytime sleepiness in California high school students

Authors:

Nila Nathan (nilandogz@gmail.com)
Jamie M Zeitzer (jzeitzer@stanford.edu)

Version: 5 Date: 10 July 2013

Author's response to reviews: see over
Dr. Matthias Morgenstern
BioMed Central

July 5, 2013

Dr. Morgenstern,

We thank the reviewers for their suggestions for the attached manuscript (1171542743845348). We appreciate the opportunity to improve and resubmit the manuscript for your consideration. We have made all corrections suggested, as detailed in a point-by-point fashion below. We believe that these edits have substantially improved the content and quality of the manuscript.

We look forward to working with you on this manuscript.

Sincerely,

Jamie Zeitzer, Ph.D.

Reviewer 1:
The revised manuscript is much improved. For example, the background is updated, the methods are better described, and limitations are stated. However, there are still some points that need to be addressed.

Major compulsory revisions 1. The conclusion in the abstract is still too confident – an easy solution is to change from “is” to “was” (i.e. a conclusion relating to the study and not a generalized truth). Also, make sure the main conclusion corresponds in the abstract and manuscript.

We have changed “is” to “was” in the last line of the Abstract and aligned the conclusions in the different parts.

Major compulsory revisions 2. The aim is still not stated in the main manuscript.

We have added this to the last line of the Introduction (p. 3).

Major compulsory revisions 3. The last sentence of the Results (“Thus, the association...”) belongs in the Discussion. I think too much emphasis is put on the variables that were not included in the final model. The post-hoc analyses are very interesting, but it is not obvious that these variables are moderators of the relationship between the variables that remained in the model and increased ESS scores. They can be covariates or mediators - so, I think it is necessary to tone done the “were both likely moderators...”. Perhaps, they can be discussed more in terms of what characterized the high access group and/or as possible mediators or mechanisms?

We have revised the last sentence of the Results to be more of a summary of the findings presented in the paragraph. In the Discussion, we have revised the sentence describing moderators to read more conservatively (associations).
Major compulsory revisions 4. There is something strange about Table 3. Accessibility was recoded from five to four categories (was it “all day” and “around the clock” that became “all day”? -should be explained). But what was used as reference? All 4 categories are presented as results. The analysis and the table need to be explained better. Also, the asterisks in the heading probably belong to Table 2?
Yes, the asterisks were misplaced in this table and have been moved. The data were recoded as following:

- Accessible - Never 0/1
- Accessible - Now and then 0/1
- Accessible - Daily 0/1
- Accessible - All day 0/1

such that someone who replied "accessible -daily" would be 0 - 0 - 1 - 0, someone who replied "accessible - Round the Clock" would be 0 - 0 - 0 - 0, etc.

Minor essential revisions 1. I miss a mentioning of how the respondents were contacted. Was the survey monkey sent via student email addresses?
Yes, they were contacted via e-mail; this has now been included in the Methods (p. 4).

Minor essential revisions 2. The item “having tried but failed to reduce mobile phone use” is mentioned in various ways throughout the manuscript. The last sentence in the 1st paragraph of Results may be better turned around (i.e. 17% had tried but failed to reduce their mobile phone use) - a simple way to get the “but failed” in. And in the last paragraph of Results it says “attempted to quit”. Please check the manuscript for these variations.
We have reversed this sentence and made the parlance uniform throughout the manuscript.

Minor essential revisions 3. An association between texting and ESS is discarded in Results, therefore the sentence about “If the sheer number of text messages ... likely with a small effect size” seems superfluous in the Discussion.
This was included in the Discussion as it has been mentioned as a possibility in other published manuscripts on this topic.

Minor essential revisions 4. Table 2: The asterisks need to be explained.
We have added this to the Table (was mistakenly in Table 3).

Discretionary revision 1. I find the comment about adolescent females scoring higher on the ESS without being objectively sleepier odd in the context.
Previous investigations have shown that adolescent females might rate themselves higher on the ESS. No investigation has determined whether adolescent females are objectively sleepier or if this is just a scaling issue on this subjective test. We felt this warranted a brief mention.

Reviewer 2:
The paper is much improved and reads well. I have only a couple of remaining comments. The first is about the questionnaire. Regarding Q 4 & 5, you advise that you intended to have the respondent indicate the total number of texts/call that were made + received. Clearly it is impossible to know whether this is how it was interpreted. A comment on the possibility for misinterpretation of survey questions in the limitations paragraph should perhaps be added. Such a comment is likely to also be more suitable for dealing with the possible misinterpretation of Qs 14 and 18 (regarding passenger or driver) - rather than the step you have taken of including the words 'as a passenger' after the case!
We have added a qualifying statement to this effect in the Discussion (p. 6). The 'as a passenger' was in the original survey given to the students and due to a cut-and-paste error was not in the original copy that we sent to reviewers.

The second point is about your response to the question of testing collinearity: "We examined the variables in the model for collinearity using the VIF statistic and found that there was low likelihood of collinearity (VIF’s<3.9). “ Great - I suggest you include this is information in the text.
This has been added in both the Methods (p. 4) and Results (p. 5).
Reviewer 3:
Thank you for the opportunity to re-review this manuscript. The authors do not appear to have addressed my major compulsory revisions 5-11. Moreover, major compulsory revision 4 and 12 have been mistakenly cut and pasted together into one. If the authors have addressed these revisions as a response to the previous reviewers, could they please still make it clear where this has occurred (e.g., something along the lines of see reviewer 2, revision 8)? This would assist me in the re-review. Thank you.

Our apologies - we have provided a full point-by-point response to your first critique below.

This was interesting study examining aspects of mobile phone use and sleepiness in adolescents. The method (cross-sectional survey) was appropriate for exploring the relationships between variables, but not for establishing causality. My main comment is that the authors did not define their research question well, which made it difficult for me to assess whether this was answered sufficiently and/or appropriately. In particular, I felt the discussion was - for the most part - a missed opportunity to place the findings in context, discuss the strengths and limitations of the study design, and explore the implications for practice.

We have made several revisions in response to this and the other reviewers to better define the research question in the Introduction. We have also expanded the discussion to reflect the limitations of the study design and point to future research directions. Given the limitations of our analysis, we didn't want to make too strong a recommendation about phone use.

Major compulsory revisions 1. Title. I think the title is misleading as it implies causality: “...mobile phone use and its effects on daytime sleepiness”. Causality can not be inferred from your cross-sectional design, so please consider changing this. For example “A retrospective survey study of the association between mobile phone use and daytime sleepiness in California high school students”.
We have changed the title to: “A survey study of the association between mobile phone use and daytime sleepiness in California high school students”.

Major compulsory revisions 2. Abstract. In your abstract, the stated aim of the study is to examine “mobile phone use at night and the lack of sleep in teenagers”. For two reasons, I think this misrepresents what you actually did. Firstly, of the eight questions asked about mobile phone use, only two referred specifically to mobile phone use at night. The rest asked about total daily volume of mobile use, and perceptions of mobile phone use. Secondly, your scale assessed subjective sleepiness – I don’t know if this is exactly the same thing as “lack of sleep”.
We have edited the Abstract to more explicitly state our a priori hypothesis about nocturnal phone use and its association with daytime sleepiness.

Major compulsory revisions 3. Background. Para 2. Here, it seems you are making the point that sleepiness is a normal part of going through puberty, due to changes in circadian rhythms not accommodated by the school schedule. This may then be compounded by mobile phone use. However, in the abstract you make the point that sleep time is declining in teenagers. This seems to represent two slightly different points – that sleep time is low in teenagers, and that sleep time is declining over time in teenagers. Can the authors provide some clarity?
We have edited the Abstract to clarify the point that it is the amount of sleep obtained, not needed, that is declining.

Major compulsory revisions 4. Background. I did not get a good sense of why sleepiness is an important issue. What are the long-term implications of sleepiness on health or academic achievement etc in adolescents? Given the limited amount of published data on this topic, we wanted to be broader rather than narrower in our assessment of mobile phone use and not to approach the question with too many a priori hypotheses. We limited ourselves to the questions designed by Thomée to allow a degree of comparability with an already published work in the area.

Major compulsory revisions 5. Background. Para 4. No specific aims or hypotheses are stated. The authors do mention an aim in the abstract, and a hypothesis in the discussion but it would be good to clearly state both in the background section.
We have added an explicit hypothesis as the last line of the Background (p. 3).

Major compulsory revisions 6. Methods. Para 1. “The modified ESS consists of eight questions.....” In the supplementary file provided, only seven questions are included. The item about watching TV is not included. Can the authors please clarify how many items were included?
There are eight questions. The supplementary file was in error.

Major compulsory revisions 7. Methods. Para 1. Can the authors provide more detail (and a reference) on what “clinically-significant sleepiness” is? Is this sleepiness that would be expected to negatively impact daily function? Or does all sleepiness impact daily function, but it is a question of degree?

All sleepiness has the capacity to impact daily function, depending on the function in question. Clinically-significant sleepiness is defined as sleepiness that is outside of what would be considered "normal" by a clinician. This is a statistically established level based on population distribution patterns. We have added the reference for this.

Major compulsory revisions 8. Methods. Para 1. The item “tried and failed to reduce mobile phone use”. I think this item is poorly worded, as it does not capture those who tried and succeeded to reduce mobile phone use. Later on in the results section (para 1 “most (83%) had never tried to reduce their mobile phone use”, and para 3 “We did a similar analysis, parsing the population into those who had attempted to reduce their use of mobile phone (17%)...”), the authors refer simply to people who tried to reduce mobile phone use, which is not how the actual item is worded. My understanding of this item is that it captures those who have tried AND failed, not just those who have tried per se. The authors could consider re-wording these sections to reflect this.

We have now reworded this throughout the manuscript.

Major compulsory revisions 9. Methods. Para 1. 211 out of 2000 potential participants sent back a survey (response rate 11%). This is a poor response rate, but perhaps not unexpected in this type of survey study. The authors should discuss the response rate, and implications thereof, in the discussion section. What type of response rate has been found in other similar research?

We have added this limitation in the Discussion section (p. 6).

Major compulsory revisions 10. Methods. Para 2. Was the study given ethical approval? The authors mention that it was conducted according to the Declaration of Helsinki but an explicit statement should be made about ethical approval.

We have added this to the Methods (p. 4).

Major compulsory revisions 11. Discussion. I felt there were many issues that were not addressed in the discussion section. Specifically, discussion of the findings relative to other research would have placed the findings in context and given me a better appreciation of their importance. The strengths and limitations of the study should be discussed. Key limitations include the cross-sectional nature of the study (can’t infer causation), use of a self-report tool (social desirability bias, memory bias) and poor response rate (non-responders may differ in key ways to responders, meaning that results can’t even be generalised to the sample, let alone the wider population). I would have also liked to see further discussion of the practical implications of the findings (the authors did touch on this by mentioning temporal patterning of mobile phone use, but I think more detailed discussion is warranted).

We have added these limitation in the Discussion section (p. 6). Given the limitations, we didn’t want to provide too strong a conclusion.

Major compulsory revisions 12. Discussion. Para 1. This hypothesis should be stated at the end of the background section. See also point 2 and point 5 in this section. Given that you measured a range of variables on mobile phone use (total daily volume, perceptions etc), did you have a hypothesis about anything else other than mobile phone use at night?

We have now added a specific aim at the end of the background section.

Major compulsory revisions 13. Discussion. Para 1. “It may be that adolescent females score higher on the ESS without being objectively sleepier, though this remains to be tested”. I wasn’t sure about the value of this discussion point. It suggests that the ESS has inherent flaws in its construct validity, in which case I would question the validity of the entire study. I’m also not sure how you would measure sleepiness objectively.

The ESS measures subjective sleepiness. Objective sleepiness can be measured in a variety of ways that include both behavioral performance testing (e.g., Psychomotor Vigilance Test), electroencephalographic measures (e.g., slow wave power), and other physiologic measures (e.g., percent of time with eye lid closure). Dichotomies between subjective and objective measures of both sleep and sleepiness have been reported in a variety of circumstances. There is no specific data to indicate that this is one such circumstance, but we felt that it was important to raise the point.
Discretionary revisions 1. Background. Para 1. Given that you conducted the study in the US, do you have any mobile phone ownership statistics for adolescents, similar to what you presented for the UK?
We have changed this part of the Background to reflect statistics for the US.

Discretionary revisions 2. Methods. Para 1. The ESS question “in a car for an hour without a break” – I was not clear whether this referred to driving the car, or travelling as a passenger.
This was a mistaken omission on our part. The correct text has been added ("as a passenger in a car...")

Discretionary revisions 3. Results. Para 1. “The number of mobile phone calls sent or received per day”. Suggest changing to “the number of mobile phone calls made or received per day”.
This has been changed.