Author's response to reviews

Title: Associations between electronic media use and BMI: a cross-national investigation in 30 countries

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Author's response to reviews: see over
Editors’ Comment:
Please use the term ?sex? throughout rather than ?gender?. Sex is the biological construct measured in studies such as this whereas gender is the social construction of identity. THIS IS DONE.

I would encourage the authors to either spell out screen behaviors throughout the paper or use an alternate term (such as electronic media (EM)) as the abbreviation SB is most commonly used in this field to refer to sedentary behavior. THIS IS DONE. EM IS NOW USED AS AN ABBREVIATION FOR ELECTRONIC MEDIA USE.

The authors seem to refer to PA and MVPA interchangeably throughout the paper. Given increasing investigation of light PA (which would well be worth the authors considering in their analyses), ensuring clear, appropriate and consistent use of the terms PA and MVPA is necessary. Please revise accordingly. THIS IS DONE.

Given differences in behaviors (TV, computer, etc.), and potential differences in health outcomes from those behaviours, analysing the data for differences in outcomes based on each type of SB, rather than any 1, any 2, etc., would significantly strengthen the paper and greatly inform the literature (for instance, tables 2 and 3). These types of findings are largely missing from the literature for SBs other than TV. We have done the new analyses as suggested. These are included in table 4. We also added a table with mutually adjusted estimates for the appendix. We also tested for interactions with each type of EM behavior with physical activity while controlling for FAS and breakfast consumption. None of these were statistically significant.

Page 3, line 10: in the first para, the authors discuss both interactive and additive associations. However in the second para, the additive associations seem to have disappeared. Please either identify in the paper that additive assns. will no longer be discussed (and rationale for that) or include discussion of them as appropriate. THE SENTENCE HAS BEEN ALTERED TO “THE RELEVANCE FOR INVESTIGATING BOTH ADDITIVE AND INTERACTIVE ASSOCIATIONS BETWEEN EM AND MVPA IS HIGHLIGHTED...”. THE MAIN POINT OF THIS SENTENCE IS SIMPLY TO POINT OUT THAT MOST STUDIES GENERALLY DO NOT ACCOUNT FOR ANY INTERACTIONS BETWEEN BEHAVIORS IN PREDICTING HEALTH OUTCOMES.

Page 5, line 1: ?was done by the command? ? which command? THE ZANTHRO COMMAND IN STATA. THIS IS INCORPORATED IN THE TEXT.

Same para: It would seem that there may be some value in investigating differences in behaviours between children who are overweight and obese, yet the authors have combined these groups of children. The sample size is sufficient to allow this type of more nuanced, detailed and potentially insightful analysis. This is particularly important to understand as health outcomes vary by weight status. WE HAVE NOT COMPLIED WITH THIS REQUEST AS WE FEEL THAT THE RESULTS ARE SUFFICIENTLY COMPLICATED. REPEATING ALL ANALYSES FOR YET ANOTHER OUTCOME, OR REPPLICATING ANALYSES FOR A MULTINOMINAL REGRESSION MODEL WOULD PROBABLY GENERATE MORE INCONSISTENCY IN RESULTS AND LEAD TO A MUCH MORE COMPLICATED RESULTS SECTION AND DISCUSSION.

HOWEVER, WE ARE PREPARING A NEW PAPER WHERE WE FOCUS ON RISK BEHAVIORS FOR THE DIFFERENT WEIGHT CLASSIFICATIONS. WE WOULD CONSIDER SUBMITTING THIS PAPER TO BMC PUBLIC HEALTH IF THE EDITOR IS INTERESTED.

Page 5, line 10: The use of e-media for homework is typically not included in recommendations about how much e-media children and young people should be doing. It is concerning that it has been included in the question about PC use and this is a limitation of this study. Is there any way the authors can tease out how much PC use was for entertainment (typically where health recommendations are targeted) and how
much for homework and analyse their data accordingly? **WE ACKNOWLEDGE THIS AS A PROBLEM AS DOING HOMEWORK ON A COMPUTER IS INCREASINGLY NORMAL FOR STUDENTS OF ALL AGES. WE ARE UNFORTUNATELY NOT ABLE TO SPECIFY THE EXTENT TO WHICH PC WAS USED FOR ENTERTAINMENT OR FOR SCHOOLWORK. HOWEVER, WE ARE MAINLY INTERESTED IN THE SEDENTARY TIME SPENT IN SCREEN BEHAVIOR, AND FOR THIS PURPOSE IT DOES NOT REALLY MATTER WHETHER THEY ARE DOING HOMEWORK OR NOT.**

Lines 11-14: the categorical measure of screen time is a limitation and needs to be included in the limitations section. **THIS IS DONE.**

Page 5, lines 23-25: While I acknowledge the authors’ limitations comments about combined e-media use, I believe there is value in combining the three measures of e-media. The international guidelines to which the paper refers all recommend 2 hours or less of combined e-media per day and therefore analysing the data in line with that recommendation, in addition to the results already presented, will greatly strengthen the paper and provide additional health-related evidence to inform future policy. **THIS IS DONE. RESULTS ARE WRITTEN OUT IN TEXT UNDER TABLE 4.**

Page 9, line 7: the use of the negative term “reported not exceeding two hours daily” here and elsewhere is confusing. Could the authors please rephrase. **THIS IS DONE.**

Page 10, line 15: the first sentence of this para is much too long and would be better shortened into 2 or 3 sentences. **THIS IS DONE.**

Page 15, line 8: the authors note that future studies should assess whether their findings are attributable to actual time in the behaviors or characteristics of the behaviors. Do the authors have any data they could include in this paper which may shed some light on this issue? **WE WOULD HAVE LOVED TO HAVE SUCH DATA. UNFORTUNATELY, THE HBSC CONTAINS VERY FEW QUESTIONS ON EACH TOPIC, AND WE DO NOT HAVE ASSESSMENTS OF SEDENTARY TIME.**
Reviewer 1
Specific comments

Title: “Physical activity as a moderator for the association between screen behaviors and BMI: a cross-national study of adolescents in 31 countries”. It is inconsistent with the declared objective: “…we wish to explore whether exceeding two hours in one or multiple SBs is associated with BMI or risk for overweight in adolescents participating …”. In fact, the title seems to assume a proved existence of the relation between SBs behaviours and BMI, and focus only on the ‘moderator’ activity of PA, while the objective points to demonstrating the association between SBs and BMI, and only in a secondary phase, to assess whether PA is a moderator of this association. This contradiction must be clarified.

THE TITLE IS CHANGED. HOPEFULLY THE NEW ONE IS LESS CONFUSING TO THE READER.

Results section: Following the same line of thinking, one would expect in the result (and discussion) section data showing the association between SBs behaviours and BMI, and not just a description of this association (page 9, lines 10-15). Again, one does not understand whether this association is assumed as already proved (then there should be a reference for it) or is it the main objective of this paper, as declared before, and therefore evidenced with its statistical significance.

WE HAVE DONE THESE STATISTICAL TESTS AND HAVE NOTED IN THE TEXT UNDER TABLE 2 THAT THE DESCRIBED TENDENCY IS TESTED IN A REGRESSION MODEL AND THAT OUTPUT CAN BE REQUESTED FROM THE FIRST AUTHOR.

Discussion section: the first two parts of this section and the first sentence of the third part are somewhat confusing and repetitive. It should just be said that a relationship between BMI and not meeting MVPA recommendations does exist in boys and girls, while this is different in the group meeting MVPA guidelines, then start discussing this one as the main finding.

THE FIRST PARAGRAPH OF THE DISCUSSION IS NOW REWRITTEN. WE HAVE ALSO MOVED THE DISCUSSION ON PREVALENCE IN ORDER TO DEDICATE THE FIRST SECTION OF THE DISCUSSION TO THE MAIN FINDINGS.

In particular, the sentence “… Consequently associations between exceeding 2 hours daily in one or more types of SBs and BMI differs between adolescents who report to be sufficiently active according to international recommendations and those who report being less physically active… “ doesn’t make much sense as one doesn’t understand what is consequent of what.

WE ARE NOT SURE WE UNDERSTAND WHAT YOU MEAN. WE DO NOT PROPOSE CAUSALITY IN THIS PAPER AS WE DISCUSS CROSS-SECTIONAL ASSOCIATIONS. IN THIS SECTION WE ARE TRYING TO DESCRIBE THAT ASSOCIATIONS BETWEEN EM AND BMI DIFFER ACROSS LEVELS OF PHYSICAL ACTIVITY. WE BELIEVE THAT THE LANGUAGE WE USE HERE IS IN LINE WITH THE LIMITATIONS OF OUR DATA. PLEASE TRY TO REPHRASE YOUR COMMENT AND WE WILL TRY OUR BEST TO MEET YOUR RECOMMENDATIONS.
Before the last sentence in pag 12 line 23-24, it could also be said that overweight children with high SBs may have been pushed to do PA just for that reason (our survey being cross-sectional, we cannot really know what’s the cause and what’s the consequence) or that there is no relationship between SBs and PA because these two behaviours are not conflicting in boys (which is more and more noted in the recent literature).

**THIS IS AN IMPORTANT POINT. WE ARE NOT TRYING TO ARGUE FOR CAUSALITY. WE ARE SIMPLY MAKING SUGGESTIONS OF DIFFERENT PLAUISIBLE EXPLANATIONS FOR OUR RESULTS. NOTE THAT THE SENTENCE IS REWRITTEN**

"Finally, it is also possible that boys and girls choose different behavioral patterns, or are encouraged to do different behaviors based upon their weight status”

**Conclusions:** again I would underline that PA is a moderator of the relationship between SBs and BMI only when recommendations for MVPA are respected, but not when they are not respected.

**WE AGREE THAT THE ASSOCIATIONS ARE NO LONGER SIGNIFICANT WHEN BOYS COMPLY WITH RECOMMENDATIONS, BUT WE USE THE MODERATOR TERMINOLOGY TO DESCRIBE THAT THE ASSOCIATIONS BETWEEN TWO VARIABLES (BMI AND ELECTRONICAL MEDIA) CHANGES ACROSS LEVELS OF A THIRD VARIABLE (THE MODERATOR (THE MVPA VARIABLE IN OUR ANALYSES)). WE THEREFORE WISH TO POINT OUT THAT MVPA FUNCTIONS AS A STATISTICAL MODERATOR FOR THE ASSOCIATION BETWEEN BMI AND MEDIA BEHAVIORS.**

**Table 2:**
include in the table label the explanation on how CI were calculated (see pag 7 line 3-4).

**THIS IS DONE**

The label should start with “Prevalence of screen behaviours …” Table headings should include, under ‘boys’ and ‘girls’: ‘Overweight prevalence within the different categories’.

**THIS IS DONE, BUT THIS CLUTTERS THE TABLE SOMEWHAT**

**Table3:** just for a sake of easiness of reading, I would put in bold all significant ORs.

**THIS IS DONE. FOR THE SAKE OF CONSISTENCY, WE HAVE ALSO MADE SIGNIFICANT ESTIMATES FOR THE LINEAR MODELS IN BOLD. WE HAVE ALSO WRITTEN UNDER THE TABLE “SIGNIFICANT ESTIMATES ARE IN BOLD”**
Reviewer 2: 
Minor revisions:

Background
Line 4 Please add ‘s’ to suggest - **DONE**
Line 5 Use ‘approximately’ rather than ‘about’ - **DONE**
Line 6 Suggest saying ‘that these high levels are stabilizing’ rather than ‘epidemic is levelling off’ – **DONE. THE NEW SENTENCE READS** ‘While some studies indicate that the high levels are stabilizing in some parts of the world [2-4], the prevalence is still high and require preventive efforts [5].’
Line 9 Instead of ‘threats’, use ‘poor health outcomes’ - **DONE**
Line 18 Insert comma between TV viewing and video gaming - **DONE**
Spell out PC - **DONE**

Page 3
Line 6 Instead of ‘it may also be’ rather than ‘not would be’
**WE DO NOT UNDERSTAND WHY WE SHOULD CHANGE THIS. THE SENTENCE WOULD CHANGE ITS MEANING TO THE OPPOSITE. THIS WOULD BE INCORRECT.**

Line 10 Briefly explain why MVPA used and not other intensities...
**WE HAVE ADDED A FEW SENTENCES WHERE MVPA IS INTRODUCED IN ORDER TO CLARIFY THE PURPOSE OF USING THIS VARIABLE. THERE IS ALSO A PRAGMATIC REASON FOR THE USE OF THIS VARIABLE AS IT IS BOTH INCLUDED IN THE HBSC STUDY ACROSS ALL COUNTRIES, AND AS IT IS A WELL KNOWN AND RELATIVELY WELL VALIDATED MEASURE.**

Page 11
Line 1 Remove comma after ‘status’- **DONE**
Instead of ‘but’, state ‘and the patterns are different.’ - **DONE**
Line 6 Add ‘as seen in’ after patterns - **DONE**
Line 7 Insert full stop after children - **DONE**
Line 11 No comma needed after UK - **DONE**

Page 12
Line 2 Full stop needed -- **DONE**
Line 20 Reference needed -- **DONE**

Page 13
Line 21 Need ‘which’ have been found… **SENTENCE HAS BEEN ALTERED AND THE SUGGESTION IS NO LONGER RELEVANT.**

Page 14
Line 16 No comma needed after ‘and’ - **DONE**

**Quality of written English:** Needs some language corrections before being Published - **DONE**
IMPORTANT NOTE TO EDITOR AND REVIEWERS

We have discovered a mistake in our original work, this is thankfully of no substantial consequence for the main analyses, but we want to point out why tables 1 and 2 contain some new estimates.

In the previous draft we had presented descriptive data for Austria despite that they did not include the relevant covariates (breakfast consumption). Consequently, we have excluded the Austrian observations from the analyses. The changes include only minor corrections to the estimates in tables 1 and 2 as the Austrian observations were not included in the regression models due to the lack of the covariate.