Author's response to reviews

Title: Developmental Trajectories of Physical Activity and Television Viewing during Adolescence among Girls: National Growth and Health Cohort Study

Authors:

Soyang Kwon (skwon@luriechildrens.org)
Jungwha Lee (jungwhalee@northwestern.edu)
Mercedes Carnethon (mcarnethon@northwestern.edu)

Version: 3
Date: 3 June 2015

Author's response to reviews: see over
Dear BMC Public Health Editors,

Thank you for providing a second round of review comments on our manuscript titled “Developmental Trajectories of Physical Activity and Television Viewing during Adolescence among Girls: National Growth and Health Cohort Study” (MS: 2055433574157078) for publication in BMC. Please find our point-by-point responses to the reviewer’s comments below.

**Referee 1**

The authors have adequately addressed the majority of the issues I previously raised with clear and extensive justification and amendments. The revised manuscript has been considerably improved. I have raised some additional points for consideration below.

**Major Compulsory Revisions**

1) Discussion: In their response to my previous comments the authors state that they have conducted an additional study with objectively measured physical activity. They indicate that this additional study, in part, supports the findings of the current study. As the additional study has been accepted for publication in JAMA Pediatrics it would seem to be appropriate to include this additional paper in the discussion of the current study. It would be beneficial to explain how current results fit with the additional paper and how it fits with/is different from the paper by Janz et al, currently discussed extensively, which also used a group based trajectory approach in the IBDS cohort.

**Response:** We have revised the paragraph in the Discussion as follows to explain how the current results fit with our JAMA Pediatrics paper that was e-published on May 18th, 2015 and how the current results differ from the Janz study: “The current study results are consistent with a group-based trajectory analysis by Kwon et al., which also identified a consistently active pattern in the Iowa Bone Development Study (IBDS) cohort. However, the study by Kwon included both boys and girls together in the analysis. An earlier study by Janz et al. [27] reported three PA trajectories for girls from age 5 to 17 years in the IBDS cohort, all of which showed a declining trend over time and reached a similar level of PA at age 17. The conflicting results from the Janz study can be partly attributed to its relatively small sample size (n=263), where a consistently active trajectory, which would have represented only a small number of the study participants, may not have been detectable. Future research should confirm the existence of a consistently active pattern among girls in large cohort studies.”
Minor Essential Revisions

2) Background, paragraph 1: Since the authors now refer to the international debate I suggest removing ‘federal’ from the sentence as this is specific to the US. Perhaps: “There is an ongoing international debate regarding the inclusion of sedentary behavior recommendations in physical activity (PA) guidelines.”

Response: Thank you for pointing out this detail. We have deleted “federal” from the indicated sentence.

3) Background, paragraph 4: It is still unclear what is meant by the risk factor of the PA trajectories in the sentence stating the aims of the study. The authors do not mention risk factor analysis until the end of the methods section so it would be helpful if this were more explicit. Perhaps the authors could break the sentence into three e.g. “In this study, we first aimed to demonstrate group-based trajectory analysis for identifying distinct developmental PA and TV viewing trajectories. Secondly, we aimed to present an example of risk factor analysis by examining the difference in the distribution of race by PA trajectories. Thirdly, we aimed to examine the interrelationship between PA and TV viewing patterns simultaneously among adolescent girls.”

Response: As suggested, we have revised our aim statements.

4) Methods, measurements: In their response to my previous comment that “the correlation between the accelerometer data and HAQ is very low (rs = 0.09)” the authors draw on an additional paper to suggest that: “Longitudinal trends of activity levels were parallel among the three methods—HAQ, activity diary, and accelerometry—which strengthen the assumption that the HAQ data is valid to examine longitudinal patterns over time. Therefore, while HAQ may be inadequate to examine absolute PA levels, is adequate to examine longitudinal trajectory patterns of PA levels.”

To me this seems better justification and more informative for the reader than that currently included in the manuscript. I therefore suggest it is included in the manuscript.

Response: As suggested, we have added the information: “HAQ data is valid… to examine longitudinal patterns of PA over time.”

5) Results, paragraph 1: P-value rather than P

Response: As suggested, we have corrected “P” to “P-value”
6) Results, paragraph 1: annual income of <$10,000 rather than <annual income of $10,000. This sentence is would also be clear to me if the text and the values were in the same order. Currently, in the text those excluded are mentioned first and compared to those included, but the values for those included are first, followed by those excluded.

Response: Thank you for pointing this out. We have corrected the revised manuscript to read “annual income of <$10,000.” We have also revised the text and the values to be in the same order.

7) Discussion, paragraph 2: It is adequate to use the abbreviation MVPA as moderate-to vigorous-intensity PA as it has been written out in previously.

Response: While addressing the Major Compulsory Revision comment above, we have deleted the “moderate- to vigorous-intensity PA”.

8) Figures use red and green which may be difficult to differentiate for colour blind readers - please consider a different choice of colours.

Response: Thank you for the suggestion. We will discuss the figures (colors and other configurations) with the BMC Public Health Journal Editorial Office to establish the best presentation.

Discretionary Revisions

9) Methods, statistical analysis: In the aims (in the background) and in the results the order of analyses is presented as 1) trajectory analysis, 2) risk factor analysis, 3) interrelationship between PA and TV. To help the flow of the paper I suggest also following this order in the statistical analysis section of the methods.

Response: Thank you for pointing this out. We have reorganized the statistical analysis paragraphs in the order of “Model search,” “Model diagnostics,” “Risk factor analysis,” and “Dual trajectory analysis”.

10) The authors state that when they re-ran the analysis using weekly activity frequency (rather than MET-hrs/wk) the trajectory patterns were homogenous. Does this imply that the predominant driver behind the decreasing trajectories was participation in activities of lower intensity later in adolescence or did frequency declining for all? This would be a rather interesting finding to report. I appreciate that space restrictions prohibit the inclusion of interesting results but it would be great if it could be included as supplementary information along with the separate analyses of the distinct physical activity contexts!
Response: We really appreciate the insightful comments. To answer the reviewer’s question as well as to add to the reviewer’s thoughts on this topic, two identified trajectories of weekly activity frequency showed homogeneously decreasing patterns. We also identified two trajectories of intensity, both of which showed a slightly increasing trend of intensity over time. Using the separate (parallel) analyses of MET-time trajectories (overall PA trajectories), activity frequency trajectories, and intensity trajectories, we believe that it is premature to conclude that the predominant driver behind the decreasing trajectories was the decline of the activity frequency, and that behind the maintenance trajectories was higher intensity later in adolescence. These hypotheses should be rigorously tested in complex association analyses in the future studies to draw further conclusions.
Referee 2.

This manuscript addresses an important public health issue, i.e. the physical activity patterns over time on youth population. The stronger value of the study was the use of group-based trajectory analyses to identify different PA patterns among a heterogenous population. However, the manuscript would need a deep and meticulous work to be clearly understood. Therefore, I believe that several major and minor revisions are warranted as described below.

The current manuscript has been consistently improved. Most of the issues have been appropriately addressed; however, there are still several issues that must be clarified. See the comments below.

Minor Essential Revisions:
1. Authors have reduced the methods section in this 2nd review; however, I would suggest trying to reduce even more, mainly in the Measurements and/or Model search process.

   Response: In the 2nd version of our manuscript that the referee reviewed, we added a lot of additional information to the Methods section to address the Major Compulsory Revision comments by the first reviewer. In the current (3rd) version, we have deleted redundant statements as much as possible to reduce the Methods section.

2. Regarding your response: The additionally recruited White girls had no significant differences in terms of distribution of income and parental education levels, when compared to prior-recruited White girls. It is suggest to adress in the text.

   Response: We have added “The additionally recruited White girls had no significant differences in terms of distribution of income and parental education levels, when compared to prior-recruited White girls”.

3. Regarding the last suggestion in the last review: It strongly recommended include more detail about why the mean of PA levels at each assessment was higher among White than Blacks girls. This is shown in results, but you should hypothesize about it… It is recommended adress in the discussion section. It is advise to include more detail to explain briefly which are the most important factors to determine lower PA levels among Black girls compared to White girls.

   Response: To briefly explain which are the most important factors used to determine lower PA levels among Black girls compared to White girls, we have
added the following sentence: “The finding may imply that Black girls are less likely to experience individual and environmental factors that promote PA, such as self-efficacy, perceived behavioral control, land-use mix, and residential density [38].”

If you have any additional questions or concerns, please do not hesitate to contact me.

Sincerely,

Soyang Kwon, PhD
Research Assistant Professor, Stanley Manne Children’s Research Institute
Ann & Robert H. Lurie Children’s Hospital of Chicago
Northwestern University Feinberg School of Medicine
T 312.227.7033 | F 312.227.9523 | skwon@luriechildrens.org | luriechildrens.org
225 East Chicago Avenue, Box 157, Chicago, Illinois 60611-2991