Author's response to reviews

Title: Influence of Socio-Economic Status on Habitual Physical Activity and Screen Time in Children

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Author's response to reviews: see over
Please find enclosed the revised manuscript and response to reviewer comments. In the manuscript, we have noted the changes in red. The response to reviewer comments are found below. We hope that you find the changes satisfactory.

Response to Referees:

Referee 1 (Karsten Froberg):
Only some minor revisions were suggested by this reviewer.

Are schools elected representative of the areas? Yes, the schools who participated in Study 1 were representative of the communities.

SES is divided by income, Why not education or combination? A variety of studies have used household income as indicator of SES – these studies are cited in the discussion section of the paper. In the methods section Ferreira et al. (2007) is cited, who reported that family income is one of the most consistent correlates with PA in children and adolescents.

Limitations and discussion could be better. The paragraph on limitations has been revised to address the issue of using household income as indicator for SES. It is, however, now pointed out that for both cohorts a significant correlation between educational level and household income existed.

Number of participants and differences in PA methods. Further it is addressed that differences in results in the two studies could be due to different measures of physical activity. The differences in sample size and different classification of SES groups is now pointed out in the limitation section as well.

Age in title and abstract. The mean age of both cohorts has been indicated in the abstract but because it differed in both cohorts we have not included in the title.

Figure 1 interpretation. The complex interactions between physical activity, BMI, and SES have been re-emphasized in the discussion section. More specifically, we discuss that a high BMI can result in low PA and high BMI can also be associated with low SES for various reasons.

References. The papers by Møller et al. (2009) and by Kristensen et al. (2006) have been included in the manuscript; specifically in the introduction and discussion.
Referee 2 (Verity Cleland):
Major Compulsory Revisions:

Abstract
1.1. The purpose statement has been rephrased according to the referee’s suggestion.
1.2. Including sex as a covariate is now mentioned in the abstract, even though it did not alter the results of either study. The comparison group (i.e. high SES) is specified in the conclusion. Due to the limited space in the abstract the authors decided to summarize the main findings in the conclusion without further discussing why results for physical activity levels were inconsistent. This issue will be addressed in more detail in the full manuscript.

Background
1.3. The necessity to include sedentary behavior as a separate concept when examining physical activity levels is emphasized by referencing Gorely et al. (2004) as well as Owen et al. (2000). Due to the longitudinal design of the study by Ball (2009) the paper will be referred to in the discussion part.
1.4. As pointed out previously a variety of studies have used household income as indicator for SES. In the methods section the statement by Ferreira et al. (2007) has been added to emphasize the existing relationship between household income and physical activity. Other studies using household income as indicator of SES are cited in the discussion section. In addition the problem of only using one variable to determine SES is addressed in the limitations of the manuscript.

Methods
1.5 & 1.6. The response rate of participants in both studies has been added in the methods section, when describing the sample. In addition compliance rates are reported.

Discussion
1.7. The statement in the second paragraph has been revised according to the referee’s suggestion, using “the relationship between SES and physical activity” instead of “the role of SES on physical activity.
1.8. The role relationship between BMI and physical activity is now pointed out more clearly. This is a major difference of this study in relation to previous studies. The paragraph has been revised in order to show this distinction more clearly.
1.9. The statement on directionality concerning physical activity and weight gain is given along with a proper reference. While there is not sufficient evidence at this time to support either opinion, the authors wanted to raise the awareness of the potential role of BMI and potential biological pathways related to physical activity.
1.10. Using household income as sole indicator for SES in this study is addressed in more detail during the discussion of findings and is also pointed out in the limitations of the study. It is, however, also shown that household income and educational level were significantly correlated in both cohorts.
1.11. The cross-sectional design is now specifically pointed out as a limitation of the study.
1.12. Response rates are now included in the manuscript and in the results section it is pointed out that response rate did not alter the results of either data analysis.
Conclusions
1.13. This paragraph has been revised according to the referee’s suggestion. Starting out on summarizing results concerning physical activity levels and sedentary behavior prior to addressing the relationship between BMI and physical activity and inactivity.
1.14. The statements according to the relationship between SES and physical activity have been changed to provide a better connection to results shown in this manuscript.
1.15. The sentence has been changed according to the referee’s suggestion.
1.16. Implications for public health, especially concerning intervention programs are now pointed out more clearly at the end of this manuscript.

Minor Revisions
2.1. Sedentary behavior is now used consistently throughout the paper after showing that self-reported time spent watching TV and at the computer have been used to determine sedentary behavior.

Abstract
2.2. This statement has been changed and clarified to better lead into the purpose of this study.
2.3. The mean age of both cohorts is now included in the abstract and the methods section.
2.4. It is now pointed out that screen-time reported by the child was used for analysis.
2.5. The importance of various covariates is addressed in the main manuscript. Addressing the inconsistency of previous findings concerning the relationship between SES and physical activity should suffice at this point.
2.6. The order of results reported has been changed – starting with physical activity levels.

Background
2.7 The sentence has been changed accordingly – “high” has been deleted.

Methods
2.8. The number of people per household was not available for analysis. This problem is now addressed in the paper.
2.9. It is addressed in the paper that physical activity as well as sedentary behavior is a complex behavior and, therefore, additional components that potentially influence these behaviors need to be considered. Since previous studies did not emphasize this aspect, it specifically pointed out in this paper, but it did not change the overall purpose of the study.
2.10. It has been clarified that child-report of sedentary behavior was used.
2.11. All subjects who were compliant on the physical activity portion also provided information about household income. This did not limit the number of subjects included in data analysis.
2.12. Bassett is now cited properly and included in the reference list. A reference for the step-test has been added as well, and in the methods section (participants) information on compliance of participants is given.
2.13. Units of measurements are now added in parenthesis for height and body mass.
2.14. Due to the homogeneity of either sample and no differences in age between SES groups, age was not considered as a covariate in the analysis.
Results
2.15. Significant differences between SES groups are now shown by a star in the tables.
   Concerning sex, the number of males and females are explicitly shown for each group
   in the tables.
   Stature has been changed to height in the table.
2.16. See above. The MVPA terms are now explained in a footnote underneath the table.
2.17. Body size has been changed to BMI, since this includes height and weight.
2.18. The star in figure 3 indicates a difference from this group to all other groups as
   indicated in the legend.
2.19. A reference to figure 5 has now been added into the results text.
2.20. Figures 4 and 5 have been changed according to the referee’s suggestions. The text of
   the results section has been adjusted accordingly.
2.21. Table 3 has been changed to table 2.

Discussion
2.22. The Ball reference has been added as suggested by the referee.
2.23. One component of this paper was to show that physical activity levels can be
   influenced by environmental as well as biological components. Since more emphasis
   has been put on environmental aspects, it was considered worthwhile to emphasize the
   biological components in this paper.
2.24. Environmental constraints on physical activity are addressed more clearly in the
   discussion, but as previously stated biological aspects related to physical activity need
   to be considered when examining the role of physical activity and sedentary behavior
   on public health.
2.25. Blanc’s results are based on human subjects.