Author's response to reviews

Title: The association of leisure-time physical activity and active commuting with measures of socioeconomic position in a multiethnic population living in the Netherlands: results from the cross-sectional SUNSET study

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Author's response to reviews: see over
We thank both reviewers for their very detailed review of our paper. We have incorporated their critiques and suggestions, and value that this has improved the quality of the paper.

**Reviewer:** Christopher Gidlow  
**Reviewer's report:**  
Overall, the study appears to have been undertaken well, explores an interesting area, and most limitations are acknowledged.

*Answer: We thank the reviewer for his positive comments on our paper.*

**Major Compulsory Revisions**  
In addition to some specific issues that need to be addressed, there are two general but fundamental comments:  
1. The specific inquiry (and associated measures/indicators) is not sufficiently justified; i.e., why LTPA and active commuting? Why these specific population groups? As highlighted in some more specific comments below, the reviewer feels there are several areas where the authors need to provide a robust rationale that underpins these analyses and makes clear the contribution of this work.

*Answer: The rationale for this study is now more clearly formulated in the introduction, according to the comments of the reviewer. We have highlighted the relevance of the included measures and indicators presented in this paper as well as our focus on the specific population groups. The included ethnic minority groups are in terms of size relative large groups in the Dutch society, with a higher CVD risk. The focus on understanding ethnic differences in patterns of physical activity might therefore be of large public health importance. We wanted to focus on activities that are easily engaged in and conducive to active living; this included a broad measure of LTPA and active commuting, and this is also relevant in terms of current scientific interest [1,2]. Please see the updated paragraphs. (Heading background, page 4, lines 1-19 and page 5, lines 12-16.)*

2. The use of the occupational classification (more detailed comment below) – in the context of this study and given the nature of the physical activity measures (which do not take occupational activity into account), it might be wise to dismiss manual/non-manual occupation and focus on education and the sole socio-economic indicator. Unless the authors can explain otherwise, there appear to be some fundamental issues with this that could seriously confound any patterns observed.

*Answer: We have recoded occupational class according to the reviewer’s suggestion to take into account the socioeconomic scale rather than the type of occupation. In short, we have moved the ‘higher grade routine non-manual’ into the higher category and the ‘lower grade routine non-manual’ into the lower category of occupational class (e.g. the lower grade routine non-manual receive now equal status as the other manual professions in our definition). After also consulting with Dr. Anton Kunst, this has been
updated in the manuscript (See methods section heading socioeconomic position, page 7/8 lines 21-2). All analyses, presentation of results in the text and tables, and discussion have been updated regarding this new classification.

Minor Essential Revisions

ABSTRACT
A general re-write of the results section to make the headlines findings more obvious to the reader. For example:
- Report whether or not ethnic differences in physical activity were found

Answer: We now report the ethnic differences in activity in our abstract. (see Abstract, page 2, lines 20-23)

- Then make the direction of the socio-economic gradients more obvious for the reader, rather than relying on them to interpret your Beta coefficients.

Answer: The gradients have been rewritten to be more obvious to the reader. (See Abstract, page 2 line 23, and page 3 lines 1-4)

- Insert ‘an’ to read ‘… we observed an ethnicity interaction for active….’
- Insert ‘but’ to read ‘…lower socio-economic groups), but this strategy…’

Answer: The first suggestion has been rewritten as part of a previous point. The second suggestion has been rewritten according to the reviewer’s suggestion (See Abstract page 3, line 14)

BACKGROUND
P4 para 1:
Arguably, lifestyle activity/habitual activity associated with daily living has the most public health potential and is of greater interest to physical activity researchers at present; LTPA can often contribute little to overall physical activity levels (Cochrane et al., 2009). Traditionally, physical activity interventions have focused on promoting more leisure-time activities (e.g., structured exercise programmes). But, lack of evidence for effectiveness and sustainability of any changes, which tend to be modest and short-term increases at best (Bauman, 2005), has led to growth in interest in environmental determinants and designing environments that are conducive to active living (e.g., walkable and therefore promote active commuting) (Sallis, Bauman, & Pratt, 1998). The authors should do more to early on in this paper to make it clear why LTPA and active commuting are two measures that we should be interested in. At present, this is not strong enough.

Answer: We are very grateful that the reviewer points out this well structured background rationale. We have incorporated the text as suggested by the reviewer in the first paragraph of the background. (See manuscript background section, first paragraph, page 4 lines 3-9)
P5 para 1:
- It would be useful to provide some more background on your ethnic groups; brief context on South Asian and African groups in Netherlands (e.g., % of population they comprise; evidence of lower activity levels or greater health need in these groups). Again, make it clear that these are population groups we should be interested in studying.

Answer: This has now been added in the text (page 4 lines 13-17).

- Then reiterate why LTPA and active commuting in these populations should be a focus of study.

Answer: This has been reiterated (page 5 lines 13-15).

METHODS
P6 para 2:
Focus on MVPA and not light intensity physical activity could also relate to the fact that MVPA is associated with health benefits, rather than limitations of recall for light intensity activity only. Also, what are the implications for ‘active commuting’ if you exclude activity below moderate intensity? This has the potential to exclude walking for many people.

Answer: We agree with the reviewer. We have mentioned this consideration briefly in the methods section (See page 7 lines 13-15). The limitation section describes the implication that light intensity physical activity such as light walking was potentially excluded based on this definition. (See page 16 lines 7-8)

P7 para 1:
As you go on to recognise in the limitations section, there are some problems with the manual/non-manual occupational classifications. I feel that this is a particularly unsatisfactory socio-economic indicator for the purposes of this study and that you should consider excluding and relying on education, a far more stable socio-economic indicator (assuming all educated in Netherlands/similar system):

Answer: We have recoded our occupational classification based on the reviewer's comments below. It is now more a socioeconomic indicator in terms of high/low than a reflection of type of job (manual/non-manual). (see methods section page 7/8 lines 21-2) As the reviewer suggested, education has indeed been identified as a stable socioeconomic indicator in the Netherlands. However, we were limited to a very crude comparison in only high/low. Therefore, by presenting multiple indicators (and by acknowledging the crude measure of each indicator) we feel that we can be more certain that the identified ethnic differences in the relation between active commuting
and socioeconomic position are truly important socioeconomic differences. This has been clarified further in the limitations section (page 15 lines 9-12).

(a) if used as an socio-economic indicator, 'routine non-manual' work should perhaps place someone equivalent or lower down the social strata than ‘highly skilled’ or ‘semi-skilled manual work’;

Answer: We have recoded our occupational classification taking better into account the social strata than our previous indicator that focused only on manual/non-manual type of work. The 'higher grade routine non-manual' are now recoded into the high occupational class group; the 'lower grade routine non-manual' are now recoded into the low occupational class group placing them equivalent with people performing manual work. Additionally, we have rephrased ‘highly skilled and semi-skilled’ into ‘skilled’ and ‘unskilled’. This was a labeling/typing error: there were no ‘highly skilled’ and semi-skilled categories in the original scale for manual work. We hope this clarifies the situation. (see methods section page 7/8 lines 21-2).

(b) in the context of physical activity research, as you are not taking occupational activity into account and focusing on commuting and LTPA, likely and unaccounted impacts on peoples LTPA (and perhaps, to a lesser extent, commuting activity) of having active jobs, could seriously confound your results. Unless you can try to explore this, consider removing the occupational classification. In any case, you need to justify and provide references for your choice of socio-economic indicator.

Answer: The reviewer mentions a very important point about possible confounding by job activity. This could have been an important confounder in our study if job activity differed by social class across ethnic groups. The results from additional analysis suggested that the presented patterns are not likely to originate from an ethnic difference in job activity. This is now briefly mentioned in the manuscript. (see discussion section, page 16 lines 8-10).

As we mentioned earlier in this rebuttal, the occupational class socioeconomic indicator has been recoded according to the reviewer’s suggestion and we have provided reference to the updated classification. (see methods section, page 7/8 lines 21-2)

P7 para 3:
'MET hours per week were skewed and therefore square-root-transformed' – at which point did you transform the physical activity data? Should this sentence come earlier?

Answer: We have moved this sentence up to the heading “physical activity” in the methods section. (page 7 line 9-10)

RESULTS
It would be interesting to know the contributions of LTPA and active commuting to overall physical activity. This could help to justify your choice of outcomes.
Answer: We did not calculate contributions of each domain to overall physical activity, but we published previously on the ethnic differences in the contribution of each domain of activity to the recommended level of physical activity [3]. In our exploratory analyses, the relative largest contribution to recommended physical activity was from the LTPA domain and the relative lowest contribution was from commuting activity with intermediate contributions of occupational and household activity. Our previous work, also shows a relative lower contribution of commuting activity to recommended level of activity in the ethnic minority to the majority, which shows the potential health gain in terms of the possibility for increasing the level of physical activity in these groups. This is now briefly mentioned in the introduction of the paper. (See background page 4 lines 14-16)

P10 para 3:
Include 'data not shown' as additional file.

Answer: We have included the output of the ordinal regression as additional file 3. (page 11 line 2)

DISCUSSION
Consider re-ordering so that Limitations comes after Discussion of findings (before Conclusion)

Answer: We have switched sections according to the suggestion made by the reviewer.

P10 para 4: re-write to read
'We found a positive association between socioeconomic position and physical activity, in terms of active commuting and LTPA.

Answer: The sentence has been re-written according to the reviewer's suggestion. (page 11 line 6-7)

P11 para 2:
See previous comments re socio-economic indicators. Occupational social classification is historically much debated and difficult to measure (Jones & Cameron, 1984). Education is potentially far more stable.

Answer: We acknowledged the fact that education is potentially a more stable indicator, but that we include an updated version of occupational class as an additional measure of social class because of our crude measure of education. (see limitation section page 15 lines 8-12)

P13 para 2:
‘Although the estimates for LTPA in most of the higher socioeconomic position groups seemed to be in a positive direction, there was a lack of statistical significance in all groups.’
- Reword sentence to: ‘In our study, the low socioeconomic groups engaged in levels of LTPA that were comparable to (or in once case higher than) their high socioeconomic position counterparts; this diminishes the likelihood of a socioeconomic gradient’.

Answer: this sentence has been reworded (page 13, lines 7-9).

- ‘There may have also been differences in the methods used’ – you need to elaborate on this, not just speculate; if there were differences, what were they and what are the implications?

Answer: We have elaborated further on this methodological difference (page 13, lines 9-15).

P14 para 2:
‘Differences in occupation might be associated to LTPA through, for example, job strain [37]’ – Explain this?

Answer: Both reviewers thought this was unclear. Given that it was not a discussion of our results, but merely a speculative explanation for an observed finding, we have decided to omit this whole paragraph.

P14 para 3:
Delete ‘... we wish to point out that...’

Answer: This part of the sentence has been deleted.

P15 para 1:
Did you measure duration of residence? If not, why? And acknowledge in limitations.

Answer: Duration of residence was measured, but not included in this analysis because of a lack of variation in our study population. Overall, the ethnic minority groups in this sample have a relative long duration of residence (mean >20 years). In addition, a duration of residence analyses was of limited value in this cross-sectional study, because of the inability to distinguish between age, period, and cohort effects in our data, therefore, in this context such an analysis was not the best way to get further insight into longitudinal patterns. This is now briefly mentioned in the limitations section as separate paragraph (see page 15 lines 17-23, page 16 lines 1-2).

P16 para 2:
‘Our findings imply that, contrary to the low socioeconomic position approach often currently used in European-origin populations’ – this is not quite specific enough. Do
you mean the typical targeting of physical activity interventions to lower socio-economic groups?

Answer: The suggestion by the reviewer has been added to the text. (page 17 lines 7-9)

P16 para 2:
'Specifically, public health workers should be aware that recommendations for stimulating physical activity through active commuting among the African-Surinamese and South Asian-Surinamese in the Netherlands should be aimed at both low and high socioeconomic position groups.'
– I think, again, you need to qualify this recommendation with an acknowledgement of the need for more study. You are referring to only one physical activity indicator (active commuting) and have not put that in the context of its contribution towards overall physical activity (i.e., importance to health of this population). Therefore, the importance of this recommendation for practice is not clear from the information presented.

Answer: Our previous research shows that the contribution of commuting physical activity to adherence to recommended level of physical activity is about 10% in the European-Dutch ethnic group, which is much less in the ethnic minority groups included in this study [4]. Our current study shows that the European-Dutch have a strong SES gradient. In the Surinamese groups this SES gradient is much less strong. This shows an opportunity for public health workers to stimulate commuting physical activity in this population and context (room for improvement). This in comparison to the relative similar patterns observed in LTPA and SEP between the ethnic groups, for which a more broad focus seems applicable. This has been (briefly) mentioned in 2 sentences in the conclusion section. See conclusion section page 17 lines 10-14.

Reviewer: Amy A Eyler
Reviewer's report:
Major essential revisions.
1. Please address why the participants were recruited so long ago. Have any major changes occurred in the setting of population to influence the applicability to current time?

Answer: We thank the reviewer for raising this important topic. To our knowledge, there is no major change that occurred in the setting of this population that might limit the use of these data. At present, more recent data for these ethnic minority groups are unfortunately not available. This makes the data we presented in this manuscript unique for the Netherlands. The applicability is now discussed in the last paragraph of the limitations section (see manuscript limitations section page 16 lines 16-18).

2. Please address why environmental factors (neighborhood, car/bike ownership, distance to employment) were not assessed in relation to active commuting.
Answer: Environmental factors could be an important explanation for the observed patterns between ethnic minority groups. However, participants resided in a limited number of neighbourhoods in Amsterdam, leading to a lack of variability. The distance to employment and car ownership was unfortunately not measured. This has now been addressed in the manuscript (page 12, lines 15-19).

Minor essential revisions
1. Please describe if the tailored questionnaire was pilot tested for the minority participant groups.

Answer: The SQUASH questionnaire was validated in the Dutch participants. After consulting with researchers familiar with the target population of our study, we adapted the questionnaire to include additional activities more common in these minority groups. An open ended question was also included to identify any other (culturally) specific physical activity. The tailored questionnaire was judged on face validity by minority participants from the same background, but not formally validated. This information has now been updated in the manuscript (see methods section, page 6 line 23, page 7, lines 2-4).

2. Page 14, paragraph 2. What do you mean by "could be of a higher level than the non-manual occupations in ethnic minority groups"?

Answer: This paragraph has been omitted from the discussion (see points below).

3. Page 14. Elaborate on job strain and what this implies related to your findings.

Answer: This paragraph has been omitted from the discussion.


Answer: The paragraph indeed speculated on a possible explanation for the observed patterns. Both reviewers thought this was unclear. Therefore, we followed the suggestion of the reviewer and omitted this paragraph from the discussion.

5. Page 15. The authors might include the concept of acculturation to their discussion.

Answer: We have now included the concept of acculturation in the discussion (see page 15 lines 17-21).

Reference List


3. de Munter JS, van Valkengoed IG, Agyemang C, Kunst AE, Stronks K: Large ethnic variations in recommended physical activity according to activity domains in amsterdam, the netherlands. *Int J Behav Nutr Phys Act* 2010, **7**: 85.

4. de Munter JS, van Valkengoed IG, Agyemang C, Kunst AE, Stronks K: Large ethnic variations in recommended physical activity according to activity domains in amsterdam, the netherlands. *Int J Behav Nutr Phys Act* 2010, **7**: 85.