Author's response to reviews

**Title:** Inequitable walking conditions among older people: examining the inter-relationship of neighbourhood socio-economic status and urban form using a comparative case study

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**Author's response to reviews:** see over
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Dear Editor:

We appreciated the thorough reviews provided and feel that the changes have improved our article. In the following sections we have included the reviewers’ comments in bold font and provided a response directly after. Much of the revised text is included in this letter in italicized font. Reviewers’ comments and our responses are labelled as such.

Please thank the reviewers for taking the time to provide this helpful feedback.

Sincerely,

Theresa Grant

I. RESPONSE TO REVIEWER #1

Reviewer: Miriam Ryvicker

1. Major compulsory revisions

A. Organization and clarification of key findings

Reviewer comment: The paper would benefit from a clearer statement of the key take-home message(s), as well as tighter organization in the results section. Upon reading I found it difficult to identify and keep track of the overall message. Sections 2 and 3 in the results each could use an introductory paragraph highlighting the key findings for each set of comparisons. For example, in the urban form section (Section 2), an introductory paragraph might say something like: ‘Two major themes emerged in comparing walking experiences suburban and inner-urban older adults: pedestrian infrastructure and walking destinations. For inner-urban residents, sidewalks were important because…For suburban residents, sidewalks were perceived to be more important among low SES…’
Response: As the reviewer suggested, we added introductory paragraphs to sections 2 and 3 of the results section. We also added a table to be inserted at the end of the results section, which summarizes the key qualitative findings and the main conclusions (i.e. take-home messages). Please refer to table 5.

The introductory paragraph for section 2 results is on pages 18-19 as is as follows:

*Two major categories emerged in comparing the walking experiences of inner-urban and suburban older adults across urban form axes: pedestrian infrastructure and walking destinations. The importance of each to older people was further associated with neighbourhood SES as described in the following two subsections. No categorical differences emerged from the urban form comparisons of key informant data.*

The introductory paragraph for section 3 is on page 23 and is as follows:

*Two major categories emerged on older people’s walking experiences when compared across SES axes: traffic hazards and public transit. These issues were experienced differently depending on urban form but generally older people living in lower SES neighbourhoods described greater difficulties with traffic hazards and a greater reliance on public transit. Comparison of key informant descriptions of the socio-political process highlighted four main differences when compared across SES axes. These differences indicated that key informants living in lower SES neighbourhoods described greater challenges in creating walkable places. The following sections elaborate on these SES differences.*
We also added an introductory paragraph to the final subsection of the SES comparison section (page 26) as follows:

*Four differences emerged from comparison of key informants’ descriptions of the socio-political processes associated with walking issues identified by older people: 1) neighbourhood association size; 2) residence of political representatives; 3) accessing information; 4) salient neighbourhood association issues. Each difference is further described in this subsection.*

The purpose of the above paragraph is to help the reader keep track of which data set was being presented in the subsection as well as allowing us to collapse 2 previous subsections together in response to the reviewer’s next concern.

**Reviewer comment:** In addition to the overview paragraphs, the subheadings could be revised to better guide the reader. I would remove “older peoples’ walking experiences” from the italicized subheadings since it applies to most sub-sections under Sections 2 and 3. Also, the subsequent ‘neighborhood association’ and ‘political organization’ sections seem to be embedded in the larger Section 3 (according to the format), but it is not clear conceptually why this is so. This is another place where tighter organization and a succinct overview of key findings in each area would help.

**Response:**

As suggested, we removed older people’s walking experiences from the italicized subheadings.
Sections 2 and 3 of the results sections correspond to the methodological approach used. Section 2 presents urban form differences found in both the examination of older peoples’ data and key informant data. Section 3 presents SES differences found in both older peoples’ data and key informant data. There may have been some confusion before since we did not state that using the first comparison strategy we did not find any clear differences in socio-political processes identified by key informants. This is now stated in the introductory paragraph. We still make reference to key informants, however, in this section since they provided some additional information on categories which emerged from older people’s walking experiences.

Instead of using the subheadings *neighbourhood associations* and *political organization* in section 3, we have decided to use the subheading *socio-political processes* (page 26). Under this subheading we describe four key differences reflected among high and lower SES neighbourhood key informants. These differences are presented in the beginning of the subsection in list form (page 26) and then highlighted in bold font at 4 points in this section to also help guide the reader. We feel that this change addresses the concern over the need for tighter organization and clarification as well as some of the concern over interpretation of these differences, which we have also been addressed in the discussion section.

**Reviewer comment:** Along similar lines, the results section in the abstract could be more specific in describing key findings. For example, rather than saying “differed
on the basis of urban form,” I would state briefly what some of the key differences are.

Response: As the reviewer suggested we have clarified key findings in the abstract. Instead of saying “differed on the basis of urban form” we have briefly stated what some of the key differences were in the abstract’s results and discussion section. The new text we have inserted in the paper is as follows:

Examining the inter-relationship of neighbourhood SES and urban form characteristics on older peoples’ walking experiences indicated that urban form differences were accentuated positively in higher SES neighbourhoods and negatively in lower SES neighbourhoods. Older people in lower SES neighbourhoods were more affected by traffic hazards and more reliant on public transit compared to their higher SES counterparts. In higher SES neighbourhoods the disadvantages of traffic in the inner-urban neighbourhood and lack of commercial destinations in the suburban neighbourhood were partially offset by other factors including neighbourhood aesthetics. Key informant descriptions of the socio-political process highlighted how lower SES neighbourhoods may face greater challenges in creating walkable places. These differences pertained to the size of neighbourhood associations, relationships with political representatives, accessing information and salient neighbourhood association issues. Findings provide evidence of inequitable walking environments.

Reviewer comment: Likewise, the title could be more illustrative and highlight the major findings, for example, “Inequities in walking conditions among older people
living in neighborhoods with different SES and infrastructure: A comparative case study.”

Response: The revised title is as follows:

Inequitable walking conditions among older people: examining the inter-relationship of neighbourhood socio-economic status and urban form using a comparative case study

B. Interpretation of data on socio-political processes

Reviewer comment: While I think the conclusions about older people’s walking experiences are reasonable, I believe the interpretation of the socio-political processes from the key informant interviews is on shakier ground. The way it is presented, I am not sure it is possible to make the claims that are being made in this section. Some examples are provided of SES differences the facilitators and barriers to improving walking conditions. Then the authors delve into an interpretation of these examples, informed by insights from the literature. More information is needed to make convincing claims about the relationship between neighborhood SES and the political processes around walkability. Additionally, there is a large literature on neighborhood social capital and health disparities that should be integrated/acknowledged if you want to address these questions. (For example, see work by Kawachi et al.) Some kind of conceptual model or framework for interpreting these issues would be helpful.

My impression is that to adequately address the socio-political issues you would
need a more detailed analysis that might be outside the scope of this paper. I actually think that, with a clearer message about the key findings, the discussion of inequities in older peoples’ walking experiences could stand alone, with one of the conclusions/further questions being that further analysis is needed of the socio-political (and political-economic?) processes that influence inequities in walking conditions. Then you could save the more detailed discussion of socio-political processes for another paper.

Response:

We agree that findings on socio-political processes are tentative and no association can be confirmed. However, examining the SES differences in socio-political processes was one of our original research questions and there are some findings which provide direction for further research since they seem to suggest some potential relationships not previously noted in the literature. Our general approach to this concern has been to be clearer about the tentative nature of conclusions that can be based on the available data.

In the discussion section we talk about how socio-political differences identified through key informant data may present greater challenges for lower SES neighbourhoods to create walkable places. Before doing this, however, we have changed a final sentence of the proceeding section to state more clearly the tentative nature of the association between neighbourhood SES and socio-political processes around walkability:

Please refer to page 33 for the revision as follows:
The following section considers the sociopolitical process differences identified in this study and provides an interpretation of how they may be contributing to inequitable walking conditions.

We also start the section with the following sentence:

Page 33: Results suggest that lower SES neighbourhoods may face greater challenges in creating walkable places.

To further re-iterate the fact that the discussion of the socio-political differences found in this study represent one interpretation and not definitive evidence of a relationship between neighbourhood SES and the socio-political processes around walkability we have added the following in the discussion section:

Page 36: The differences identified in the current study do not establish a clear relationship between neighbourhood SES and the socio-political processes around walkability. However, they highlight the need for further research and analysis regarding this relationship. There have been a number of conceptual approaches used to interpret differences in socio-political processes on health outcomes including differences in a neighbourhood’s place within a larger political structure and ideology [78] as well as sources of social capital [79-81]. Although the results of the current study do not fall completely into one conceptual model, findings support the importance of further research that examines both the relationships that neighbourhoods establish across neighbourhood boundaries (i.e. role of vertical and bridging social capital) as
well as within a larger ideological context that equates property ownership with citizenship [82,83].

In the paragraph above we have taken the reviewer’s suggestion of emphasizing that further analysis is needed of the socio-political processes that influence inequities in walking conditions. We have also referenced two major conceptual approaches which are relevant to the findings but agree that the application of these go beyond the scope of this paper. We hope that the presentation of this discussion as it has been restated does not claim to draw associations that we have no evidence of, but rather to reflect on the potential implications of the findings that can be further tested in future research.

C. Information on levels of walking activity, addressing potential selection bias.

Reviewer comment: A bit more descriptive information on how much the participants walk would be helpful. Do the authors have information on the variation among participants? Was there a lot of variation? Some comments on this and how it might influence participants’ responses would be useful – this could probably be done in just a couple of sentences. On a related note the authors should comment on the possibility of selection bias and whether/how it might have influenced the findings. Were the participants particularly active walkers? Although the selection criteria do not seem that restrictive (needed to have walked only once in the past year), it is worth acknowledging that the study design leaves out perspectives of non-walkers, who may either be disabled and/or deterred by neighborhood conditions.
Response: This concern has been addressed both in the results and limitations sections with the addition of two new paragraphs.

Information on walking levels has been added on page 16 (results):

*The sample included older people who ranged from sedentary (10.2 % reported walking rarely and 21.1 % reported walking less than 20 minutes per day) to very active (24.9 % reported walking five to seven days per week and 7.6 % reported walking more than 60 minutes per day). The majority of participants reported walking from one to four days per week (64.9%) and between 20 and 60 minutes per day (71.3%).*

The following section has also been added to page 39 (limitations):

*The majority of participants in this study walked moderately and regularly in their neighbourhoods. A smaller segment walked occasionally but all participants had walked at least once in their neighbourhoods in the year prior to being interviewed. This selection approach leaves out the perspectives of non-walkers who may be disabled and/or deterred by neighbourhood conditions. Since environmental conditions can create disability for some individuals [91], future research should consider the perspectives of these non-walkers.*

2. Minor essential revisions

Reviewer comment: On p. 31 the authors state that “the problems associated with living next to a heavily trafficked area are created by society as a whole and sustained by transportation policy decisions.” I would avoid referring to “society”
as an actor. Try to specify which processes, institutions, etc. are relevant or just keep the transportation policy piece and leave it at that.

**Response:** Page 33: The sentence has been revised as follows:

*The problems associated with living next to a heavily trafficked area are created and sustained by transportation policy decisions.*

Society as an actor has been removed as suggested by the reviewer.

**II. RESPONSE TO REVIEWER # 2**

Reviewer: Neville Owen

1. Reviewer comment: In the Abstract, and also in the second paragraph of the Introduction section, there is an element of ambiguity in how the ‘walkability’ construct is construed. While there is an excellent case for the ways in which urban form and socio-economic position might interact, and the limitations of studies that have controlled for SES interactions in their study design and analyses, there are some changes that are required in order to avoid potential ambiguity. In the third sentence of the second paragraph on page 5, this apparent ambiguity can be seen in the case that is made about how urban form and neighborhood socio-economic status are dimensions of the neighborhood of the environment that have been shown to influence walkability. It is actually the case that these two attributes have been shown to influence walking behaviours. Walkability is a construct that pulls amalgamates more particular elements of urban form (typically attributes such as street collectivity, residential density, access to destinations); in the context of the
research on which the authors are building, walkability interacts with socio
economic status to influence walking behaviours of residents. It is thus somewhat
misleading to explain that aspects of urban form and SES influence walkability, as it
is walking that it is being influenced in the studies that are cited. The author's
argument is an excellent one, but this element of it does need to be tidied up.

Response:

The reviewer makes the point that it is somewhat misleading to explain that aspects of
urban form and neighbourhood SES affect walkability – more correctly they can
influence walking behaviours. Therefore, the word walkability has been changed to
either walking or walking behaviours in the abstract and introduction (refer to pages 4, 5,
7 and 8.)

2. Reviewer comment: In the last sentence of the second paragraph on page 6 (In
other words….), the case in relation to neighborhood preference has been addressed
by previous studies, and these studies need to be cited. There is a paper in the
American Journal of Preventive Medicine (Owen and colleagues, 2007) which
addresses this issue, and which would also lead the authors to other relevant studies.

Response:

The last sentence of the second paragraph on page 6 (in other words…) now includes a
citation to Owen et al. 2007 as well as Frank et al. 2007 – two papers that addressed the
issue of neighbourhood preference. The reference to the Owen et al. paper is further expanded upon in the following paragraph added to page 7:

Recent studies using statistical regression models to examine the interaction effects of urban form and SES on walking have provided two particularly relevant insights [28,35]. One is that individual attributes moderate the relationship between the neighbourhood environment and walking behavior. For example Owen et al. [28] found that individuals who self selected to walkable neighbourhoods walked more weekly minutes compared to those with a lower preference for walkable neighbourhoods. This finding provides support for an ecological view of walking behavior. In other words, there is evidence of an inter-relationship between individual and environmental characteristics. The second important insight is that area-level SES is associated with differences in perceived environmental attributes and partially explains differences in walking across income groups [35].

3. Reviewer comment: The narrative of the Results section presents several important insights, but it is not easy for the reader to keep track of all of these. The first section of the Discussion has an excellent summary of findings, but it is still nevertheless the challenge for the reader to see clearly what the main findings are. The authors should give serious consideration to presenting a concise summary table, in which the main findings are consolidated in a brief form, and can be seen collectively in the one place. The first part of the Discussion comes close to doing
this, but the feeling of this reviewer is that readers may need a little more help in this regard.

Response:
As suggested by this reviewer, we have added a table to be inserted at the end of the results section, which summarizes the key qualitative findings and the main conclusions (i.e. take-home messages). Please refer to table 5. We have also incorporated a number of other changes to clarify and highlight the main findings as suggested by the first reviewer. These include introductory paragraphs in section 2 (p 18-19) and section 3 (pages 23 and 26) of the results section as well as clarification of main findings in the title and abstract. These are further elaborated in the response to the first reviewer.

4. This paper is well written and meticulously proofread. On page 29 in the first sentence of the discussion section, it would be more correct to describe interrelationships of neighborhood SES and urban form characteristics ‘with’ older people's walking experiences, rather than ‘interrelationships on’. On page 25, in the paragraph below the quote at the top of the page, in the third line the word ‘principals’ is used, when it should be ‘principles’ in this context.

Response:
4. The first sentence of the discussion section on page 30 now reads:
Examining the inter-relationship of neighbourhood SES and urban form characteristics with older peoples’ walking experiences highlighted the role of compounding effects—some positive and some negative.

The word “on” was replaced with the word “with”

The spelling “principals” has been corrected to “principles” (page 21 of manuscript).

III. RESPONSE TO REVIEWER # 3

Reviewer: Ester Cerin

Major Compulsory revisions:

1. Reviewer comment: Abstract: 'previous studies have focused on either the effect of urban form or neighborhood SES on walkability'. This is not correct. See comment # 2 below.

   Response: The statement ‘previous studies have focused on either the effect of urban form or neighbourhood SES’ has been removed from the abstract.

2. Reviewer comment: Page 6; paragraph 2: I don't fully agree with the information presented in this paragraph. In our study (PLACE; see Owen et al., 2007; Cerin et al., 2007, 2008), we selected neighborhoods that varied in urban form AND socio-economic status. In other words, neighborhoods were not homogeneous in SES. The study attempted to disentangle context from compositional effects in two main ways. Firstly, we controlled for individual-level SES indicators (e.g., education
and income). Secondly, we controlled for selection bias by including 'reasons for living in a specific neighborhood' as covariates. We also examined the interaction effects of neighborhood walkbaility and neighborhood SES on walking (in adults) (see Owen et al., 2007; AJPM).

**Response:** Page 6, paragraph 2

The word homogeneous has been changed to comparable. The particular studies cited in this paragraph used comparable neighbourhoods but didn’t use regression / multilevel models to disentangle contextual and compositional effects. Our revised wording now correctly conveys what the cited studies show.

We have also added another paragraph on page 7 that talks about the results of the PLACE study and cites Owen et al. 2007, Cerin et al., 2007, 2008. It starts with the phrase *Recent studies using statistical regression models to examine the interaction effects of urban form and SES on walking …..* (See our response to reviewer #2, where we have also outlined our approach). We go on to refer to two main findings that have particular relevance to the current paper. The first is evidence of an interrelationship between individual and area-level characteristics, which supports and ecological view of walking behaviour. The second is that area-level SES has been associated with differences in perceived environmental attributes and partially explains differences in walking across income groups (Cerin et al., 2008). We believe this leads nicely into the next section on differential neighbourhood walking conditions.
3. Reviewer comment: Pages 6-7: in relation to the statement: 'adjusting for individual occupational status may yield an underestimation of area-level effects'. I agree. However, by running separate analyses with and without adjustment for individual-level SES variables we can obtain estimates of minimal and maximal area-level effects, respectively.

Response: We have omitted the first limitation of multilevel models which was previously on pages 6-7 (i.e. adjusting for individual occupational status may yield an under-estimation of area-level effects) since the reviewer correctly made the point that separate analyses can estimate minimal and maximal area level effects.

4. Reviewer comment: Page 12; line 2: How much of an overlap there was between the sample of older people and neighborhood key informants? Is this likely to be a problem?

Response:

We have specified the overlap between the sample of older people and neighbourhood key informants on page 17 as follows:

*Four older people (one from each neighbourhood) who participated in phase one volunteered to be re-interviewed as key informants because of relevant knowledge.*
This overlap of 20 percent of the key informant sample is appropriate since phase 1 and 2 interviews focused on different areas of knowledge and because phase 1 attracted some older people who were knowledgeable about walking in their neighbourhoods and had been involved in socio-political processes that affected their neighbourhood walking conditions.

Minor Essential Revisions

1. Reviewer comment: Page 33; 1st sentence: This is unclear.

Response:

This section of the discussion has been re-organized. The previous sentence referred to was:

The second influence on neighbourhood capacity to influence municipal-level decisions related to differences in municipal officials’ receptivity and greater challenges in obtaining information about various procedures and standards as expressed by the key informants in lower SES neighbourhoods compared to their higher SES counterparts.

The sentence now can be found on page 35 and is worded as follows:

The third set of challenges for lower SES neighbourhoods, identified by key informants, related to greater difficulties obtaining information about municipal procedures and standards.

2. Reviewer comment: Page 37; line 7: 'pubic' should read 'public'.

Response: Page 39; line 1, pubic now reads public