Author's response to reviews

Title: Sharing good NEWS across the world: developing comparable scores across 12 countries for the Neighborhood Environment Walkability Scale (NEWS)

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Author's response to reviews: see over
Dear Dr Draper,

We thank the Editors for the interest in our manuscript and for giving us the opportunity to revise it. We are pleased that the reviewers were very supportive of the value of the manuscript and thank them for their recommendations for further improvement. We believe we have addressed all comments and have made the relevant revisions to the manuscript, which have helped to improve it significantly.

Reviewer: Cheryl Kelly

Comment 1:
This is a well-written manuscript with implications for research. I think it is a well done study and well thought out analyses.

Our reply:
We thank the reviewer for her encouraging comments and appreciation of our study.

Comment 2:
I have a couple of revisions. Minor essential revisions.
It was not until halfway through the manuscript, I understood that the purpose of this study was to compare analyses that did not use common protocols. On page 8, it was obvious they had used different methods. On page 6, the authors reference a prerequisite for pooled analyses is common protocols. The purpose needs to be more clearly stated early in the manuscript.

Our reply:
We agree with Dr Kelly’s comment that it is important to highlight the fact that the analyses presented in this paper were primarily motivated by the between-country differences in the sets of NEWS items they used in their local study. Thus, in the Background section of our revised manuscript (page 7), we have now explained:

A prerequisite for conducting pooled analyses of multi-country data is the use of common protocols, including comparable exposure and outcome measures. In the case of the IPEN Adult project, a requirement for a country’s inclusion was measurement of perceived neighborhood attributes using the NEWS or NEWS-A, representing one of the main exposure measures. However, IPEN Adult was not a multi-center study that was funded at the outset with all countries required to follow an exact protocol. To optimize resources, some IPEN countries were able to receive local funding and proceed with their study before a funded coordinating center was in place to implement tight quality control. This funding model enabled more countries to contribute data, strengthened the study, and allowed countries some level of flexibility in matching the protocol to the local context, thereby making the study more relevant to their national situation. However, the downside was lack of comparability in some study elements, including the set of NEWS items used. Hence, the aim of the present paper was to compare subsets of comparable NEWS/NEWS-A items used across the 12 IPEN countries and, based on empirical evidence on their CFA-derived individual-level measurement models, propose scoring protocols that maximize cross-country comparability of responses.
This information was originally presented in the Methods section (as noted by this Reviewer). Given that it now appears in the Background section, it has now been omitted from the Methods section to avoid redundancy.

**Comment 3:**
2. The authors mention physical activity measurement but never go into how that data was used. Was this used to stratify? Or should it be used to stratify? Are there differences based on activity level? Could it be used a descriptive data to describe the population?

**Our reply:**
This is indeed an interesting idea. However, the aim of this manuscript was to develop a measurement model of the Neighbourhood Environment Walkability Scale (NEWS) that would produce subscale scores comparable across countries/geographical areas that participated in the IPEN Adult project and those who may want to use this instrument in future studies. The aim of this paper was not to report on physical activity data.

The NEWS is one of the main exposure measures employed in the IPEN Adult project (see our reply to the previous comment). Physical activity behaviours represent our main outcomes. We will examine and report on physical activity levels and their associations with the NEWS scores in other manuscripts. However, in order to do this, we first needed to develop a way of operationalizing our exposure variables (NEWS scores) so to ensure that exposure data are comparable across study sites. This was achieved in this manuscript.

As to stratification, we stratified recruitment sites within each participating country according to socio-economic status and walkability, which could be determined prior to recruiting study participants. This is explained on page 8 of the revised manuscript. We did not stratify study sites by physical activity levels since such data are available only post-recruitment and represented our main IPEN Adult project outcomes (to be reported in future manuscripts). We believe that stratifying NEWS scores by physical activity levels would not be in line with the main aim of this manuscript, which is to develop and describe how data from the NEWS can be summarized into scores that are comparable across countries.

**Reviewer:** Daniel Arvidsson

**Comment 1:**
Dear authors!
This is a well-written paper describing a high-quality study contributing to the development of the research field built environment and physical activity and to the performance of inter-country comparisons and pooled analyses based on NEWS/NEWS-A data. It provides support to individual researcher/research groups how to use NEWS/NEWS-A, to perform the scoring and to use statistical approaches to determine useful items/country-specific modifications of items. Specifically, tables 2, 4-6 provide good practical guidance. Hence, below I only provide suggestions for discretionary revisions.
Our reply:
We are very pleased that both Reviewers are enthusiastic about our study. We thank Dr Arvidsson for his comments.

Comment 2:
Discretionary Revisions
Introduction, page 6, Paragraph 2 concerning CFA:
As confirmatory factor analysis (CFA) is central in this paper providing the method and the evidence to determinate the use of NEWS and its subscales with items, and that this paper may work as a guiding document to researchers with varying backgrounds and skills (as this research field concerns a broad spectrum of professionals), I would suggest to provide a more illustrative description of CFA (including an example based on NEWS subscales and their items describing how the latent factor is assessed and the meaning of high versus low factor loading, etc.). It is true that each reader may access this knowledge by other sources (from suggested references in this paper). Although I believe that this additional information may further facilitate the use of this paper as a guiding document in this field.

Our reply:
On page 6 of the revised manuscript, we have now added the following text to clarify how CFA can be used to assess the measurement model of a questionnaire (here, NEWS/NEWS-A):

To date, four studies have established measurement models of factor analyzable items of the original [13, 25] and adapted versions of the NEWS and/or NEWS-A [16, 17] based on Confirmatory Factor Analyses (CFA). The CFA models describe the patterns of associations between items and their underlying latent constructs (e.g., street connectivity or aesthetics), thereby providing recommendations on how to summarize and score participants’ responses on the subscales [13, 25]. Specifically, CFA can evaluate the extent to which responses to questionnaire items (e.g., perceived high crime rate, feeling unsafe to walk in the neighborhood during the day, or at night) that are hypothesized to measure the same construct, aka latent factor (e.g., safety from crime) share common variance. For each questionnaire item, CFA yields standardized factor loadings that indicate the magnitude and direction of associations between the responses on the items and their underlying latent construct. For example, a standardized factor loading of -0.85 for the item “perceived high crime rate” on the latent factor of crime safety would indicate that its responses are strongly negatively correlated with the factor.

We did not provide further details because we this would distract the reader and compromise the flow of the paper.

Comment 3:
Conclusions:
I found the conclusion part a little bit too long. I would suggest excluding the first three sentences that repeat what have already been told several times previously and focus more on the conclusions corresponding to the aims of this study by starting the first sentence in the conclusions with:
“To improve inter-country comparability in investigations of associations of perceived neighborhood environment with physical activity and health outcomes and to conduct pooled analyses, the IPEN Adult project proposes modifications to the original scoring protocol of the NEWS/NEWS-A and have established country-specific, comparable measurement models to be employed in future analyses.

Our reply:
We thank Dr Arvidsson for his suggestion, which we have taken on board. On page 20 of the revised manuscript, we now state:

To improve inter-country comparability, and allow pooled analyses of data, in investigations of associations of perceived neighborhood environment with physical activity and health outcomes, we have proposed modifications to the original scoring protocol of the NEWS/NEWS-A and have established country-specific, comparable measurement models to be employed in future analyses. A few potential inter-country discrepancies remain with respect to the measurement of street connectivity and traffic safety, which need to be considered in the interpretation of findings based on pooled analyses and comparison of findings from different countries. We recommend that future studies using the NEWS/NEWS-A implement the here proposed scoring protocol to facilitate cross-study comparability and interpretation of the findings. Importantly, the analytical approach presented in this paper could also be used by other multi-site projects with variations in the measurement protocol and requiring optimization of data inclusion and comparability for pooled analyses and cross-site comparisons.

Additional editorial requirement:

Please provide in the manuscript the specific name of the Ethics committee that granted approval for your study.

Our response:

Dr. James Sallis is the principal investigator on the lead grant for the IPEN Adult project. Therefore, primary Ethics Committee approval for the lead grant was obtained from Dr. Sallis’ institution, the University of California, San Diego, Institutional Review Board (Biomedical Committee). However, as a requirement for participation in the IPEN project, all 12 countries providing data obtained approval from the Ethics Committee at each principal investigator’s home institution. To note this, the following has been added to the end of the Acknowledgements section:

Dr. James Sallis is the principal investigator on the IPEN lead grant funded by the NIH. Ethics Committee approval for the lead grant was obtained from Dr. Sallis’ institution, the University of California, San Diego, Institutional Review
Board (Biomedical Committee). Additionally, as a requirement for participation in the IPEN project, all 12 countries providing data obtained approval from the Ethics Committee at each principal investigator’s home institution.

**Other changes made by the authors:**

We have noticed a few typos in the text and tables of our original submission that we have now corrected. These are described below.

1. On page 10, we originally stated that seven countries used all six original items of the Residential Density subscale. The correct number is six rather than seven.
2. In Table 2, Australia should have been listed as a country that did not include item 6 of the Residential Density subscale.
3. In Table 6, Australia should have been listed as using the alternative version 1 of the Residential Density scale.
4. In Table 6, the formula for the standard version of the Street Connectivity subscale is \[(SC1) + (SC3)\] / 2; and alternatives 3 and 4 were changed to alternatives 1 and 2, respectively.
5. In Table 6, the formula for the standard version of the Safety from Crime scale is \[(CR1_R) + (CR2_R) + (CR3_R)\] / 3.

Also, Dr. Cerin’s affiliation with Deakin University has been added, in addition to her affiliation with the University of Hong Kong. The following has been added to the cover page:

> Centre for Physical Activity and Nutrition Research (C-PAN), School of Exercise and Nutrition Sciences, Deakin University, 22 Burwood Highway, Burwood, VIC 3125, Australia.