PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Contextual characteristics associated with the perceived neighborhood scale, in a cross-sectional study in a large urban center in Brazil
AUTHORS	de Almeida Celio, Fabiano; Friche, Amélia Augusta; Jennings, M. Zane; Andrade, Amanda Cristina; Xavier, Cesar; Proietti, Fernando; Coulton, Claudia J.; Caiaffa, Waleska

VERSION 1 – REVIEW

REVIEWER	Pablo Cabrera-Barona University of Salzburg, Austria, Universidad San Francisco de Quito, Ecuador, Facultad Latinoamericana de Estudios Sociales, Ecuador
REVIEW RETURNED	20-Jan-2018

GENERAL COMMENTS	BMJ Open Paper Title: Contextual characteristics associated with the perceived neighborhood scale in a large urban center in Brazil Recommendation: Major Revision and resubmission for review The manuscript "Contextual characteristics associated with the perceived neighborhood scale in a large urban center in Brazil" is a contribution to better understand the relationships between contextual neighborhood characteristics (including individual covariates) and perceived neighborhood scale. Understanding these relationships can have important implications for human health and wellbeing. However, there are several parts of the manuscript that need to be improved or clarified. BMJ Open could accept the manuscript, subject to Major Revisions. The comments regarding the manuscript are given below: 1. Why did the authors state that territorial neighborhoods are made up of complex social, economic and historical relationships between their residents, if these kinds of neighborhoods are usually defined by census units boundaries? In general, census units do not consider the complex relationships the authors mentioned, but other -more simple- parameters as population size and household density. 2. What are the limitations of using the health vulnerability index? This is a synthetic multidimensional index that may be masking some simple indicators or variables that have a high influence on social vulnerability on the study area. Authors need to justify the use of this index. 3. Were the 149 census tracts and 4408 households randomly chosen? What is the spatial sampling strategy in the second step of the sampling process? 4. What are the criteria to choose residents over 18 years old? 5. It is not clear for me the option 6 of the perceived neighborhood scale. To which size is "Your neighborhood" equivalent? More than 15 blocks, 20 blocks?

6. Using walking time from resident´s households to the perceived limits of their neighborhood is an idea that I find interesting, useful and easy to apply in interviews. However, I differ with the idea of converting the scale of walking times to a smaller scale of blocks. Why did the authors not keep the dimension of time for the perceived scale? What are the equivalences between walking times and number of blocks? I guess that in this case walking speed influence on defining the number of blocks.

7. I do not agree with the "scale" of the contextual variables of aesthetic quality, walking environment and violence. A scale is an expression of different values of a variable. For example, a scale of a variable would be 1) Is it very easy to walk?, 2) Is it easy to walk?, 3) Is it difficult to walk? 4) Is it very difficult to walk? However, authors define different variables for every scale levels of the contextual variables. The "contextual variables" used are actually a set of dimensions, and the scales used are actually a diversity of variables. In this sense, the regressions performed for every respondent may not be comparable. Additionally, how did you express at the contextual level the different individual-level responses of aesthetic quality, walking environment and violence? How did you aggregate these individual-level variables to the areal-level? I think that there is a geographical scale mismatch in defining the contextual variables of aesthetic quality, walking environment and violence.

8. What is the conceptual background to support the choosing of the individual variables? I imagine that authors have some criteria for this choosing and did not choose these variables only because they were available.

9. Do the authors consider variance partition coefficients (random effects) in the multilevel regressions performed?

10. On methods section, it is not clear which independent variables (the variables encompassing the "scales") were found significant in the univariate analysis.

11. In general, the models' results are opaque in the sense that there is not a specification of which variables are significant with the perceived neighborhood scale. For example, authors found that "violence" is a significant variable. But which kind of violence? people being mugged in the neighborhood streets? people fighting using weapon? people being killed by guns? people being victims of sexual violence? etc.

12. Authors need to mention and discuss the limitations of the study.

13. Authors need to discuss ideas of future research related to the topic under consideration.

14. Authors need to discuss about the transferability of the methods applied on his study to other geographical areas, especially to other Latin American cities.

REVIEWER	Jasneth Mullings
	The University of the West Indies, Mona
REVIEW RETURNED	13-Feb-2018

GENERAL COMMENTS	The paper makes a case for considering and refining the definition of neighbourhood scale, especially given the relevance for health outcomes. Statistical approach appears fit for purpose.
	Macintyre (1997) posited three explanations for geographical differences in health:
	- Compositional (focused on the characteristics of individuals in a location)
	- Contextual (focused on 'opportunity structures' in the environment)

	- Collective (focused on the culture and history of the community). While the authors discuss the individual and collective context, more focus is needed for the collective aspects which may help to explain some of the findings. For example, culture and history of the study area. Such a description should be included in the background. Also - the availability/unavailability [authors to confirm] of such data discussed as a potential limitation. Additionally, the authors should discuss the findings on the role/contribution of gender (OR 0.81). What are some of the possible explanations? Authors need to review paper for grammar - e.g. line 35 'not' vs no; line 55 - 'adjusted' vs adjust

VERSION 1 – AUTHOR RESPONSE

Dear reviewers,

We greatly appreciate the suggestions. The text has been completely revised to meet the requests.

Reviewer 1

1) *Why did the authors state that territorial neighborhoods are made up of complex social, economic and historical relationships between their residents, if these kinds of neighborhoods are usually defined by census units boundaries? In general, census units do not consider the complex relationships the authors mentioned, but other -more simple- parameters as population size and household density.*

Indeed, we do agree with the reviewer's comments. Census units do not consider social, economic and historical relationship. However, due to a traditional systematic revision of the census unit in Brazil, there is constant re-discussion of the census definition in urban areas, taking into account geographic barriers and social boundaries, besides parameters as population size and household density. For example, as a rule, a census unit in a given slum area never is part of the same census tract of a formal city located in the boundaries, given their distinct environmental, cultural and socio-demographic characteristics. But of course, this caution is not sufficient to transform the census unit in a perfect measurement of a territorial neighborhood. For this reason we adopted in this paper a specific strategy for characterization of the territorial unit (please, see comment number # 7).

In order to accommodate the above, the text has been changed to be consistent with the reviewer's comment (4º paragraph of the introduction).

2) *What are the limitations of using the health vulnerability index? This is a synthetic multidimensional index that may be masking some simple indicators or variables that have a high influence on social vulnerability on the study area. Authors need to justify the use of this index.*

Health vulnerability index is a proxy of a spatial social segregation index associated with socioeconomic variables, summarized into a single variable. It is a very pragmatic georeferred indicator created by the municipality is order to allocate health care (such as family health program, for example) to the more needed neighborhoods. Its objective is to show the inequalities within the epidemiological profile among different social groups. So, we used this indicator during the sampling stratification in order to include proportionally in the sampling frame the existent inequity within the city.

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3) *Were the 149 census tracts and 4408 households randomly chosen? What is the spatial sampling strategy in the second step of the sampling process?*

The census tracts were chosen with different selection probabilities to meet secondary objectives of the survey. For this reason, the analyzes were performed with the svy stata command, that takes into account the complex sample design. The second stage of the sampling process was done by simple random sample where the households were selected. The households that were on a list of the city hall were randomly selected. No spatial strategy was used at this stage.

4) *What are the criteria to choose residents over 18 years old?*

One resident over 18 years old was randomly selected in each of the identified households. For the complete survey, we included residents from age 10-18 years, because we have a sub-study on adolescents as well. However, regarding the aim of the neighborhood perception, the purpose of this current study, by design, we had questions only for adult population. Information provide by younger age group would certainly make the study much more enlightening. This limitation was mentioned in the paper.

5) *It is not clear for me the option 6 of the perceived neighborhood scale. To which size is "Your neighborhood" equivalent? More than 15 blocks, 20 blocks?*

Option 6 corresponds to what Brazilian people generally understand by the word neighborhood (bairro in Portuguese). In the studied city, one block, on average is about 100 meters and one neighborhood it is an area bigger than 15 blocks. Those questions, besides to be used in other surveys, were exhaustively piloted and pre-tested before the survey started by well-trained interviewers.

6) *Using walking time from resident´s households to the perceived limits of their neighborhood is an idea that I find interesting, useful and easy to apply in interviews. However, I differ with the idea of converting the scale of walking times to a smaller scale of blocks. Why did the authors not keep the dimension of time for the perceived scale? What are the equivalences between walking times and number of blocks? I guess that in this case walking speed influence on defining the number of blocks.*

Indeed, the time to walk to the end of the neighborhood was used to represent the average size of the neighborhood. However, this variable could not be used because it presented a high degree of rounding bias as many people answered round numbers such as 5, 10 or 15 minutes. Therefore, the time to walk to the end of the neighborhood was used to recode the response variable. It is worth mention that there is a linear equivalence between the number of blocks and time to walk to the end of the neighborhood. For the participants who considered their neighborhood to be their own house until the end of the block, they spend on average 6.1 minutes to walk to the end of what they consider to be their neighborhood; for those who considered their neighborhood to be the 5 closest blocks this time was 13.5 minutes, the participants who considered the nearest 10 blocks this time was 19.8 minutes; and for who that considered their neighborhood to be larger than 10 blocks the avarege time was about 29.2 minutes.

7) *I do not agree with the "scale" of the contextual variables of aesthetic quality, walking environment and violence. A scale is an expression of different values of a variable. For example, a scale of a variable would be 1) Is it very easy to walk?, 2) Is it easy to walk?, 3) Is it difficult to walk? 4) Is it very difficult to walk? However, authors define different variables for every scale levels of the contextual variables. The "contextual variables" used are actually a set of dimensions, and the scales used are actually a diversity of variables. In this sense, the regressions performed for every respondent may not be comparable. Additionally, how did you express at the contextual level the different individual-level responses of aesthetic quality, walking environment and violence? How did you aggregate these individual-level variables to*

the areal-level? I think that there is a geographical scale mismatch in defining the contextual variables of aesthetic quality, walking environment and violence.

The scales (or scores, or domains) used in this article are the same ones used in the published article by our research group in the Journal of Urban Health (20XX) entitled: "Assessing the psychometric and ecometric properties of neighborhood scales in developing countries: Health in Beagá Study, Belo Horizonte, Brazil, 2008-2009". The domains of neighborhood perceptions were created using a three-level model. Level 1 model (item responses within individuals) modeled individual responses (i) for person (j) in neighborhood (k); level 2 model (persons within neighborhoods), the estimated mean scale for person (j) in neighborhood (k) was modeled as a function of a neighborhood mean and a person-specific deviation and, level 3 model (neighborhoods) estimated the neighborhood-specific mean as a function of an overall mean and a neighborhood specific deviation. The level 1 error and the levels 2 and 3 random effects were assumed to be normally distributed. These scales (or domains) used multiple individual responses according to their internal consistency. These variables were aggregated to the level of the census tract forming a scale (or domain) that ranges from 1 to 4.

8) What is the conceptual background to support the choosing of the individual variables? I imagine that authors have some criteria for this choosing and did not choose these variables only because they were available.

The individual variables were selected according to previous study using this database where we investigated the association between neighborhod scale and individual factors (Célio F et al. Características individuais associadas à autopercepção da extensão territorial da vizinhança. Cadernos de Saúde Pública 2014;30:1935-46). We also used a conceptual framework to guide this current study, as well as analytical approach and epidemiological meaning.

9) Do the authors consider variance partition coefficients (random effects) in the multilevel regressions performed?

Yes, the multilevel analysis considered the random effect for the intercept.

10) On methods section, it is not clear which independent variables (the variables encompassing the "scales") were found significant in the univariate analysis.

We agree. This is not really clear in the text. The change was made to show the variables that were significant in the univariate analysis. The p values can be found in table 2.

11) In general, the models' results are opaque in the sense that there is not a specification of which variables are significant with the perceived neighborhood scale. For example, authors found that "violence" is a significant variable. But which kind of violence? people being mugged in the neighborhood streets? people fighting using weapon? people being killed by guns? people being victims of sexual violence? etc.

To interpret the results it is necessary to take into account the constructs of the variables. For example, the security scale, intend to show the sense of security of a census tract taking into account the internal consistency of the scale. In the other side, higher scores of violence scale means that people have a higher perception of violence (as a domain that include the variables described in the original paper) in their neighborhhod. We agree with the reviewer that the scales may not specifically show the outcome for specific issues. But given the internal consistency of the scales it is possible to evaluate the census tract, on the domains constructed using the scales.

Further details on the construction of the scales can be found in Friche et al. Assessing the Psychometric and Ecometric Properties of Neighborhood Scales in. Journal of urban health: bulletin of the New York Academy of Medicine 2012 doi: 10.1007/s11524-012-9737-z[published Online First: Epub Date]|.

12) Authors need to mention and discuss the limitations of the study.

The following limitations were included: 1) response variable did not correspond to the places actually experienced by the individuals. 2) because the cross-sectional design of the study limits the interpretation of the result due to the possibility of reverse causality. 3) the results of the study, because it is for a large urban center, may not be extrapolated to smaller cities. 4) as the study used more than 18 years, it was not possible to identify the factors associated with the size of neighborhood for children and adolescents.

13) Authors need to discuss ideas of future research related to the topic under consideration.

Future studies on neighborhoods, wherever possible, should adopt georrefering techniques. GPS also could be useful tools for creating specific neighborhoods for each individual. The individuals are exposed in a heterogeneous way to the neighborhood, whenever possible, the neighborhood of individuals must be constructed individually. Many of the studies are performed on adults. Future studies should also focus on neighborhood of children and adolescents.

14) Authors need to discuss about the transferability of the methods applied on his study to other geographical areas, especially to other Latin American cities.

With some adaptations, the methods of this study can be applied to any other area of study, especially in Latin America, where urbanization presents several commonalities. However, the interpretation of the results should be done with caution since the findings of this study may vary in different cities and contexts.

Revisor 2

1) *While the authors discuss the individual and collective context, more focus is needed for the collective aspects which may help to explain some of the findings. For example, culture and history of the study area. Such a description should be included in the background. Also - the availability/unavailability [authors to confirm] of such data discussed as a potential limitation*

It was not really possible to evaluate the collective context of the study site. This is one of the restrictions of the study that was not mentioned in the paper. Collective aspects such as a culture and history of the community are factors that can modulate the interpretation of the size of a certain neighborhood. For example, in older communities as people may know more about each other or have more relatives and friends in the neighborhood, these variables are already known to be associated with neighborhood scales.

2) *Additionally, the authors should discuss the findings on the role/contribution of gender (OR 0.81). What are some of the possible explanations?*

The association between female gender and less broad-based neighborhood perceptions is already reported in the literature. The most plausible hypothesis may be that man has larger perceptions for feeling safer than women to explore the neighborhood. However, this was not included in the discussion because the focus for this work was not an individual variables.

3) *Authors need to review paper for grammar - e.g. line 35 'not' vs no; line 55 - 'adjusted' vs adjust*

The English of the paper has been completely revised by a native English speaker.

VERSION 2 – REVIEW

REVIEWER	Jasneth Mullings
	The University of the West Indies, Mona Campus, Jamaica
REVIEW RETURNED	11-Apr-2018

GENERAL COMMENTS	The authors have addressed the issues previously raised and substantiated their position.

REVIEWER	Pablo Cabrera-Barona
	Instituto de Altos Estudios Nacionales, Quito-Ecuador.
REVIEW RETURNED	16-Apr-2018

GENERAL COMMENTS	I strongly recommend to change the word "scale" to "domain". The term "scale" to represent contextual variables can be confusing for many readers.

VERSION 2 – AUTHOR RESPONSE

Dear editor, we greatly appreciate the recommendations and suggestions.

1) The STROBE checklist has been updated as requested to show the page numbers.

2) We sent the manuscript to the American Journal Experts who reviewed the manuscript.

3) We remove as suggested the 'what is already known' and 'what this study adds' sections on page 2

4) We modified the patient and public involvement statement to meet the recommendations

5) In order to meet Reviewer suggestion   we replace the, when possible, the word "scale" to "domain".