Author's response to reviews

Title: Metropolitan-level ethnic residential segregation, racial identity, and body mass index among U.S. Hispanics: a multilevel cross-sectional study

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Dear Editors:

We are pleased to re-submit the original contribution entitled “Metropolitan-level ethnic residential segregation, racial identity, and body mass index among U.S. Hispanics: a multilevel cross-sectional study” to BMC Public Health. We feel our manuscript has been strengthened by addressing the concerns of our reviewers, and we feel this manuscript is now suitable for publication.

Our responses to the reviewers’ comments are detailed below. We look forward to your decision.

Sincerely,

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Reviewer 1:

The authors hypothesize that segregation is salubrious for certain reasons and harmful for other reasons. However they do not name the (sociological) theories that guide these hypotheses. It would help to name these theories in the introduction (e.g. place stratification theory, spatial assimilation theory, or ethnic resurgence theory) and to refer back to them in the discussion section. See Walton 2009 for descriptions of these theories.

We agree with you and have now included a brief description of the sociological theories that guide our hypotheses in the introduction (see page 6). We have also referred back to them in the discussion (see page 13).

The hypotheses articulated by the author on p. 6 are not clear. I don’t understand why one would hypothesize a priori that white Hispanics would exhibit harmful effects of segregation, but that black Hispanics would exhibit beneficial effects of segregation. Since the prior empirical literature is inconsistent on directionality that segregation would have with BMI, and since two prominent sociological theories could both operate, it is not clear in my opinion what one would expect. I think it’s reasonable to expect (and hypothesize) heterogeneity by race. Although I would not have hypothesized a salubrious effect of segregation for blacks a priori. If nativity was conflating/confounding these associations, then perhaps black Hispanics are mostly immigrants, and immigrants in immigrant enclaves might exhibit better health because of tighter social networks or country of origin-specific resources. However white Hispanics may not be primarily immigrants. Although I would save such explanations for the discussion, since I think it is difficult to hypothesize a priori the heterogeneity you found.
Our initial hypotheses as to the direction of the associations between segregation and BMI for black vs. white Hispanics were rooted in the findings by Iceland and Nelson of different assimilation patterns among Hispanics by race and not previous studies of segregation and BMI among Hispanics (because those studies did not stratify by race). However, we recognize that our hypotheses rested on the assumptions that in areas where Hispanic segregation is low, white Hispanics would be more likely to live with non-Hispanic Whites in relatively higher quality neighborhoods whereas black Hispanics would be more likely to live with non-Hispanic Blacks in lower quality neighborhoods. This assertion could be justified based on the literature relating segregation to health among Blacks. But given the mixed findings relating Hispanic segregation to health, we agree that it is not clear whether BMI and health outcomes in general would be better or worse for white Hispanics living in higher or lower Hispanic segregation areas. Thus, we have removed our hypotheses and instead stated that, consistent with the segmented assimilation theory, we hypothesize that the association between segregation and BMI will vary by race (see pages 6-7).

Related, I think the interpretation of the opposite findings by race needs to be clarified in the discussion. The explanation on p. 12 was particularly confusing. I had to read it several times to understand the argument, and I think perhaps the reference to longitudinal assimilation patterns do not help clarify. I think perhaps the authors mean this: that when Hispanic whites are living in low Hispanic segregation areas, they are likely integrated with nonhispanic whites, and therefore, in (relatively) high quality neighborhoods. But when Hispanic blacks are in low Hispanic segregation areas, they could still be living in highly black segregated areas/black neighborhoods, which are relatively low quality. I think the authors are saying that racial segregation could be conflated here with Hispanic (ethnic) segregation. Although the authors do not have neighborhood level racial composition measures to be able to test this, I don’t think neighborhood level data is necessary. They could adjust for racial segregation (e.g. white isolation or black isolation, for example) in their models, or they could describe the correlations or cross tabulations of racial segregation with Hispanic segregation. Doing so would inform whether these speculations are consistent with the data. Related, I think the authors take too much space to explain what they are trying to say about why the quality of neighborhoods might be differential along the gradient of Hispanic segregation for white hispanics vs. black Hispanics, which might more concisely be stated that Hispanic segregation is co-occurring with black and white segregation, meaning that even though black Hispanics might be less segregated from Hispanics in low-Hispanic-segregated areas, they are likely still highly segregated from whites.

We see your point and have now reworded this section to concisely state that white Hispanics living in low Hispanic segregation areas may be more likely to live in predominantly White neighborhoods while black Hispanics living in low Hispanic segregation areas, through forces like housing discrimination or neighbors’ hostility, may be more likely to live in poorer, predominantly Black neighborhoods (see page 13). We have also included statements describing how these conditions might influence BMI (e.g., differential access to healthy foods). In addition, per your suggestion, we have now included a table showing the distribution of the non-Hispanic Black and non-Hispanic White isolation index score among black, other race, and white Hispanics living in low Hispanic segregation areas (defined as the lowest quartile).

The discussion did not sufficiently address *why* Hispanic segregation may be salubrious/beneficial for black hispanics, but harmful for white Hispanics, aside from this conflation with other racial segregation measures argument, which was unclear. I think the authors need to refer to specific theories to explain their findings, and relate back to BMI and its neighborhood mechanisms. For example, white Hispanics living in Hispanic enclaves may live in higher poverty higher crime areas, which may have worse
environments for healthy diet, exercise, and stress -- evidence in support of place stratification theory. However black Hispanics may exhibit beneficial effects of segregation if for example black Hispanic enclaves shield blacks from discrimination or racism, or offer social networks or immigrant-specific resources that lower stress (one pathway to obesity), or offer healthy food specific to one’s country of origin (e.g. Dominican Republic). Notably, the results for black Hispanics may indicate support for ethnic resurgence theory, especially if black Hispanics are dominated by immigrants. (You might look to Susan Mason’s paper on black immigrant enclaves and preterm birth in New York City). The authors should cite some theories, as well as some demographic evidence here to speculate how nativity plays a role or not (e.g. what % of black (vs. white) Hispanics are foreign born?)

We agree with your comment, and we have now included a paragraph describing why living in high Hispanic segregation areas may be beneficial for black Hispanics but not for white Hispanics (see page 14). Specifically, we drew on the ethnic density hypothesis to explain findings for black Hispanics and place stratification theory to explain findings for white Hispanics.

Why are there so many other race Hispanics (e.g. 10 times as large as the number of Hispanic blacks)? This seems really large to me. Do you have further racial breakdowns (Asian, Native American, or multiple races)? Since they are in such large numbers, I think you need to consider that there are reporting differences for Hispanics who self-identify as a specific race, vs. those who do not, for example, if this ‘other race’ category includes people who did not select a race (missing). You should cite something about racial vs. ethnic classification. Does the BRFSS clarify this category? This ‘other race’ category may also indicate immigrants who are not familiar with the US system of racial/ethnic classification, and therefore don’t answer the question.

The distributional breakdown by race among Hispanics in our sample is consistent with what is reported in the 2000 U.S. Census. In both the census and in the BRFSS, individuals are first asked, “Are you Hispanic or Latino?” (yes/no); this is followed with a question that asks individuals to select a race from the following categories: white, Black or African-American, Asian, Native Hawaiian/Pacific Islander, American Indian/Alaska Native, Other race. According to the 2000 Census report, among individuals that selected ‘yes’ when asked whether they identified as Hispanic, 48% reported themselves as only white, 42% reported only ‘Other race,’ and only 2% reported black or African-American. The race distribution of our BRFSS Hispanic sample was 53%, 43%, and 3.8%, respectively, which closely approximates the race distribution for Hispanics from the census. In the BRFSS, the category of “other race” does not include individuals who did not select a race – categories for ‘don’t know/not sure’ and ‘refused’ are also available.

We have added a sentence in the introduction to note the high proportion of Hispanics (42%) that identify as ‘Other race’ in the census (see page 5). This is followed a sentence which provides one reason why some Hispanics tend to choose this ‘other race’ category - because it allows them to choose a category that reflects a more racialized Hispanic identity than what is represented by the race categories provided in the census and in other surveys. We also added a sentence in the methods section which states why we chose these race classifications (see page 7).

Please report the magnitude of the associations between segregation and BMI for white Hispanic and black Hispanic women (and other Hispanic women I guess) from the interaction model, for example, in the Figure notes, or in the text. It would also be helpful to report whether each of these associations is significant from zero, rather than whether they are just significantly different from each other (which I believe is what your statistical test is testing).
We have now included the magnitude of the associations, with standard errors and p-values, in the text (see page 12).

*It is not clear how isolation is modeled. It ranges 0-1 in its original form. On p. 9, the text reads “estimates... correspond to a difference equivalent to a 1-Standard Deviation unit increase”. This is unclear, and if isolation is modeled in units of 1 standard deviation, then this sentence should be amended to denote that "isolation" is modeled in one standard deviation units because I assume BMI is modeled in one-unit increases.*

We see your point, and we have now rephrased this to say that estimates of the association between the isolation index and BMI correspond to mean differences in BMI per 1-standard deviation (SD) unit increase in the isolation index score (see page 10).

*Please clarify whether nativity is available in the BRFSS data. I would recommend adjusting for nativity if so. In the manuscript, the authors discuss the lack of data to adjust for country of origin, which is distinct from country of birth (nativity). I think if the data lacks both, then this needs to be enumerated as limitations of the dataset. (Currently these are not in the limitations). I think this lack of control for nativity could explain the divergent segregation-BMI patterns for white and black Hispanics, if there is differential immigrant composition of these racial hispanic groups. Therefore, the fact that BRFSS does not have this variable available is a rather large limitation to any analysis among Hispanics.*

Unfortunately, nativity is not available in the BRFSS data. However we recognize why adjusting for nativity would be important since other studies have shown that associations between residence in ethnic enclaves and health vary by the nativity status of the residents. We had attempted to address this issue by adjusting for ‘language of exam’ instead. Although this language measure may not be perfectly correlated with nativity, it serves as a reasonable proxy for assimilation. We have added a sentence in the methods section to highlight the fact that nativity information is unavailable in BRFSS and instead, we used language of interview as a measure of acculturation (see page 8). We also included this as a limitation in the discussion section (see page 16). However we also cited data from the 2000 U.S. Census that indicates that black Hispanics are actually less likely to be foreign-born than Hispanics of other races. In light of this fact, it is unlikely that the heterogeneity by race resulted because of a higher proportion of immigrants among black Hispanics. We nevertheless emphasize the importance of including other measures of assimilation in future work.

*p. 14 “cross sectional studies do not allow us to assess the longitudinal association of residential segregation on health”. This is self-evident, since cross sectional studies are not longitudinal. I think perhaps the authors meant that a cross sectional study does not allow assessing the temporal order between segregation and health, to rule out reverse causation.*

We decided to remove this sentence, since we agree that it is self-evident. We spent time earlier in that paragraph describing how factors associated with obesity may influence selection into certain metropolitan areas.

*I feel that the discussion was underreferenced. Every factual assertion should be supported by a reference. For example these assertions need references:*

“*residential segregation is hypothesized to act on health across the life course***
“the persistence of race in the US as a driver of structural processes that may limit exposure to health promoting aspects of residential environments” …
“blocked opportunities for mobility”
“given the considerable heterogeneity of the Hispanic population with respect to characteristics like immigration status, country of origin, and race”
References are needed throughout p. 12.
p. 13 “reasons for classifying themselves as other race” “observed race influences housing discrimination”

We have now included more references throughout the discussion.

Reviewer 2:

Yes publish this article; it adds value to the analysis of the role of segregation and how it may manifest differently among racially stigmatized communities. However please encourage the authors to recognize more limitations. First, the BRFSS does not allow for “some other race” as an option that read to participants so the data underestimate the number of people who would have chosen this option. Given this important shortcoming the findings need to be interpreted with more caution.

We agree this would be an important shortcoming. However, we looked at the BRFSS questionnaires for the years we included (2003-2008) and the option of “other” was indeed read to participants. The ‘other race’ category was no longer read out loud to participants in BRFSS 2013, but these data were not included in our analyses.

Second there is valuable health related research that examines the value added by socially defined race that should be included:
Camara et al. 2008 Socially Defined Race and Health Status
Gravlee et al 2005 Blood pressure in Puerto Rico
Lopez & Gomez 2013 “Mapping ‘Race’: Critical Approaches to Health Disparities Research”

We agree with your suggestion and have now included a paragraph documenting this research on socially defined race and health in Hispanic populations (see page 5).

And finally if this article is to be read by a wider audience, the authors may want to consider making it more readable and less technical. For example, they need to explain how segregation was conceptualized more fully. Was segregation simply living in an area that had a high percentage of any kind of Hispanic or was it limited to just Black neighborhoods? Whatever the operationalization of segregation was a bit hard to grasp conceptually.

We see your point, and we have now included sentences detailing how segregation was conceptualized (see page 7). Specifically, we noted that our measure of segregation reflected the extent to which Hispanics were only exposed to other Hispanics (of any race).