Reviewer’s report

Title: Physical activity types and risk of dementia in community-dwelling older people: the Three-City cohort.

Version: 0 Date: 18 Nov 2019

Reviewer: Roger Watson

Reviewer's report:

This is a really excellent study; such well conducted longitudinal studies are rare and this represents a substantial panel study over 15 years with intermediate waves. I have recommended to the editor that an expert statistician review the work as I am not able fully to verify them but the general methods applied are appropriate and you have taken what steps you can to minimize the obvious criticism of reverse causation - while remaining modest about the possibility. This seems to me to be a substantial contribution to the field. There is a wide-held belief - mainly erroneous - that mental activity and 'mind games' or 'brain training' is protective when it seems that physical activity is the key or the main correlate. You isolate the effect of domestic activity from general sports activities, which may surprise and disappoint some; nevertheless, you do indicate that this was low in your sample. The study is so good and deserves to be widely read and appreciated that I would want it to be as clear as possible and accessible beyond an expert audience so, when you report the J-shaped curves in the results it would be very helpful is you could simply add: '...which means that...' by way of clarification. Also, and this is something I was not entirely clear about, what is the 'transportation' element of the 'domestic/transportation' construct? Forgive me it is it exemplified in the manuscript; if so I must have missed it; if not, could you explain and this will increase the readability and comprehension.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

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