Review of: "Coupling between Human Brain Cortical Thickness and Glucose Metabolism from Regional to Connective level: a PET/MRI study"

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Potential competing interests: No potential competing interests to declare.

This paper delves into the relationship between brain cortical thickness and glucose metabolism and extends this relationship to the network level, providing new insights into the behavior of brain networks in health and disease. Although the methods and results of this article have value for the scientific community, there are some aspects of the methodology, statistical analysis, and result interpretation that need improvement and clarification. Here are some specific suggestions for these areas:

1. There are some obvious formatting issues in this article. For example, the paragraph alignment is not adopted, resulting in varying lengths for each line; the equations in the "Network properties" section are also aesthetically lacking; Figure 1 and its legends are not on the same page; there is a large blank on page 5, and only a symbol "<" on the first line of page 10; each subfigure in the article is distinguished by lowercase letters, but uppercase letters are used when explaining in the legends. These formatting and typesetting issues greatly affect the reading experience of the reader and it is recommended that the authors carefully check and amend these issues.
2. The author is vague in some descriptions. For example, in the second point of "Key points", "Brain cortical thickness and glucose metabolism were negatively coupled at the regional level but positively correlated." the author did not clearly point out in what aspect Brain cortical thickness and glucose metabolism are positively correlated. These descriptions are somewhat ambiguous and can easily confuse readers, I hope the author can make it clearer.
3. In the study, the authors explored the structural-functional (SC-FC) coupling between different brain regions, but the description of the specific method for calculating the SC-FC coupling of each brain region in the article is not detailed and clear enough. Although the article mentions that the Spearman rank correlation coefficient is used for calculation, no specific calculation steps are given, nor is it clearly explained how to determine whether the coupling of a certain area is significant. It is suggested that the author further elaborate on this part in the revised manuscript, which will help readers better understand the research methods and results of the article.
4. There are some very unsophisticated parts in the article, such as in the "S-F Coupling" part of the Results, it says "which were also confirmed when the FDG images were partial volume corrected (R=-0.27, p=0.0017, sFig 1)", but this result is not reflected in Fig 1, and there is an extra letter s in front of Fig 1, which is a grammatical error; moreover, the vertical axis values of subfigures (a) (b) (c) in Fig 2 are 1000 times different from the actual values; moreover, the p value of Figure (a) in Fig 2 is 0.36>0.05, which does not meet the requirement of significant negative correlation. I don't understand why it is considered as a qualified result and displayed. It is recommended that the

author amend these contents one by one to avoid misleading the reader.

5. In the "Network Similarity" part of the article, the author described the similarity between FC and SC in the middle-aged group and the elderly group, but the content of the second paragraph of this part may confuse the reader. It is suggested that the author explain what data the calculation in the second paragraph is based on, and also explain why the results of these two analyses (the similarity of SC and FC between the middle-aged group and the elderly group, and the influence of age on FC and SC) are different.