Reviewer Report

Title: Population modeling with machine learning can enhance measures of mental health

Version: Revision 1   **Date:** 7/28/2021

Reviewer name: Bo Cao

Reviewer Comments to Author:

The substantial revision improved the paper and is appreciated by the reviewer. The details have been enhanced. However, the reviewer still has some concerns about the basic logic and its presentation of the paper after reviewing all the comments from other reviewers and the feedback from the author. Figure 1 is helpful (BTW, the font is too small and smaller than other figures). But if we consider the current approach again, when the machine learning (ML) has perfect performance to generate the so called "proxy measures", these measures should match exactly each individual's age, fluid-intelligence and neuroticism. What the author claimed about proxy measures providing better assessment to other health related variables might be simply due to the imperfectness or the "residuals" from ML prediction to the real targets (age, fluid-intelligence and neuroticism). The author may need to address this and present the logic of the paper in a clearer way to help the readers understand the main point and results of the paper. In this regard, Figure 1 is incomplete in addressing the full flow of the paper, which is necessary for such a seemingly complex paper in the reviewer's opinion.

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