***eLife’s* transparent reporting form**

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**Sample-size estimation**

* You should state whether an appropriate sample size was computed when the study was being designed
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We used the public Cam-CAN dataset and did not participate in the process of data acquisition. Hence this problem does not apply.

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* You should report how often each experiment was performed
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* High-throughput sequence data should be uploaded before submission, with a private link for reviewers provided (these are available from both GEO and ArrayExpress)

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We did not perform experiments but used the public Cam-CAN dataset and did not participate in the process of data acquisition. We did not purposefully exclude any subjects. Some analyses failed due to data quality issues. Since we used purely automated processing, we did not correct such cases. Instead, we analyzed the impact of the resulting missing values as such. All procedures are detailed in the Methods section.

**Statistical reporting**

* Statistical analysis methods should be described and justified
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Our Methods section includes comprehensive description and motivation of all statistical procedures. Please note that the points related hypothesis testing are undefined for the predictive analyses in this paper (which makes the majority of analyses), which are validated in terms of expected generalization error and dedicated uncertainty estimates.

(For large datasets, or papers with a very large number of statistical tests, you may upload a single table file with tests, Ns, etc., with reference to sections in the manuscript.)

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* Indicate how samples were allocated into experimental groups (in the case of clinical studies, please specify allocation to treatment method); if randomization was used, please also state if restricted randomization was applied
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We used the public Cam-CAN dataset and did not participate in the process of data acquisition.

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* Include model definition files including the full list of parameters used
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Please indicate the figures or tables for which source data files have been provided:

The code used to produce the figures is openly available: https://github.com/dengemann/paper-multimodal-stacking-figures

The code for computation is also openly available:

https://github.com/OlehKSS/camcan\_analysis

All analysis are based on the openly available Cam-CAN dataset