Structural and functional MRI data differentially predict chronological age and behavioral memory performance

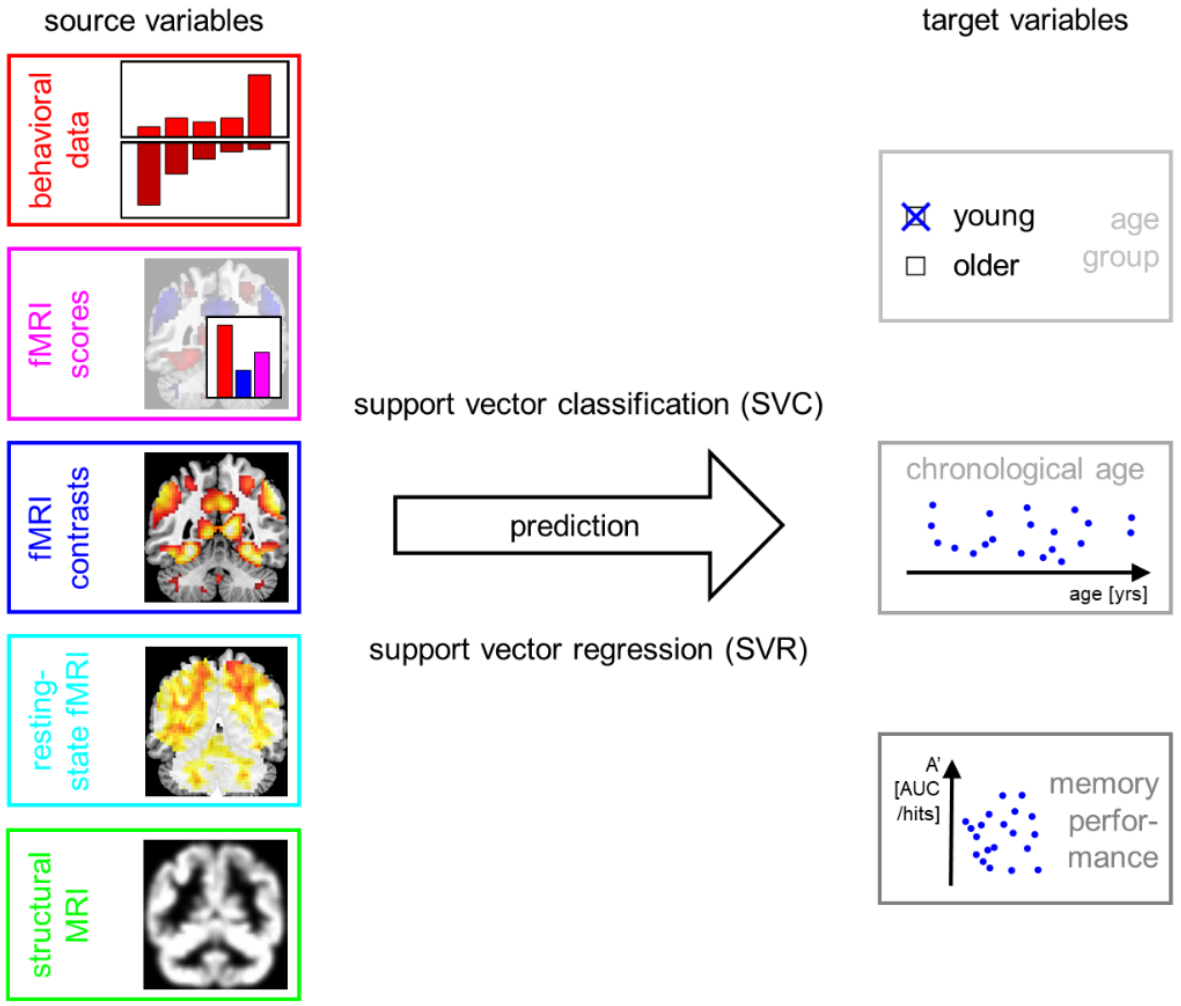
Joram Soch*,[1,2,•], Anni Richter*,[3], Hartmut Schütze[4,5], Jasmin Kizilirmak[1], Björn Schott[1,3,6,7,•]

[1] German Center for Neurodegenerative Diseases (DZNE), Göttingen, Germany
[2] Bernstein Center for Computational Neuroscience (BCCN), Berlin, Germany
[3] Leibniz Institute for Neurobiology (LIN), Magdeburg, Germany
[4] German Center for Neurodegenerative Diseases (DZNE), Magdeburg, Germany
[5] Medical Faculty, Otto von Guericke University, Magdeburg, Germany
[6] Center for Behavioral Brain Sciences (CBBS), Magdeburg, Germany
[7] Department of Psychiatry and Psychotherapy, University Medical Center Göttingen

DZNE Göttingen

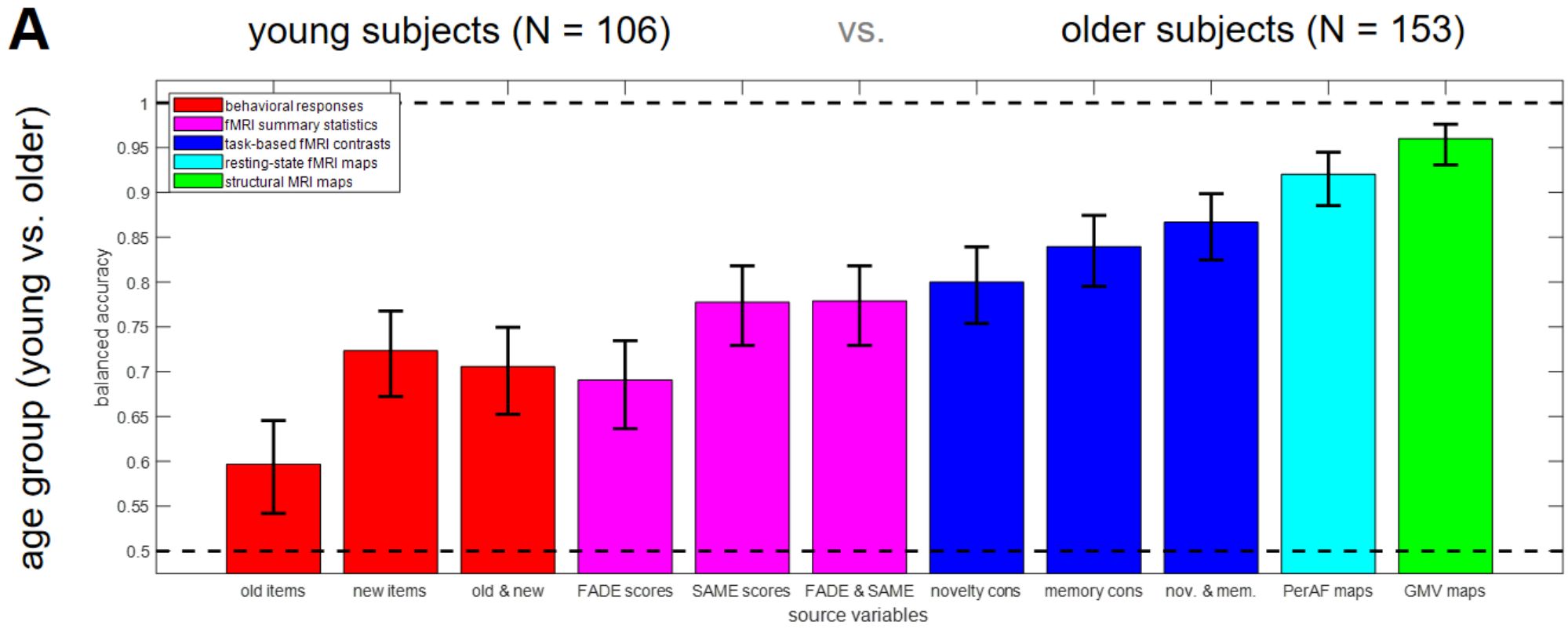
LIN Magdeburg

We predicted chronological age and memory performance from a number of source variables / feature sets.



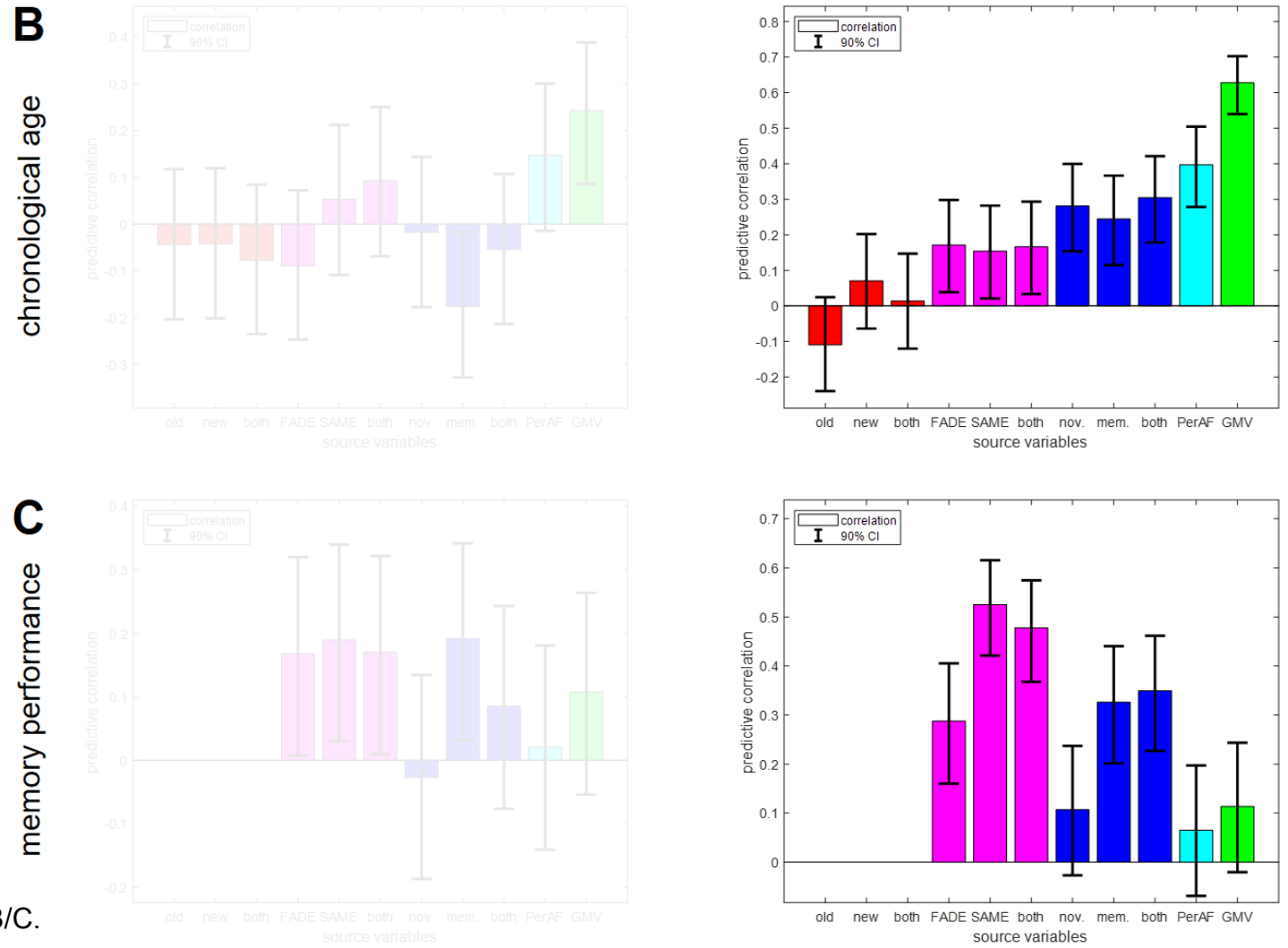
Soch*, Richter* et al., in review, Fig. 1.

Age group can be classified based on all these variables.



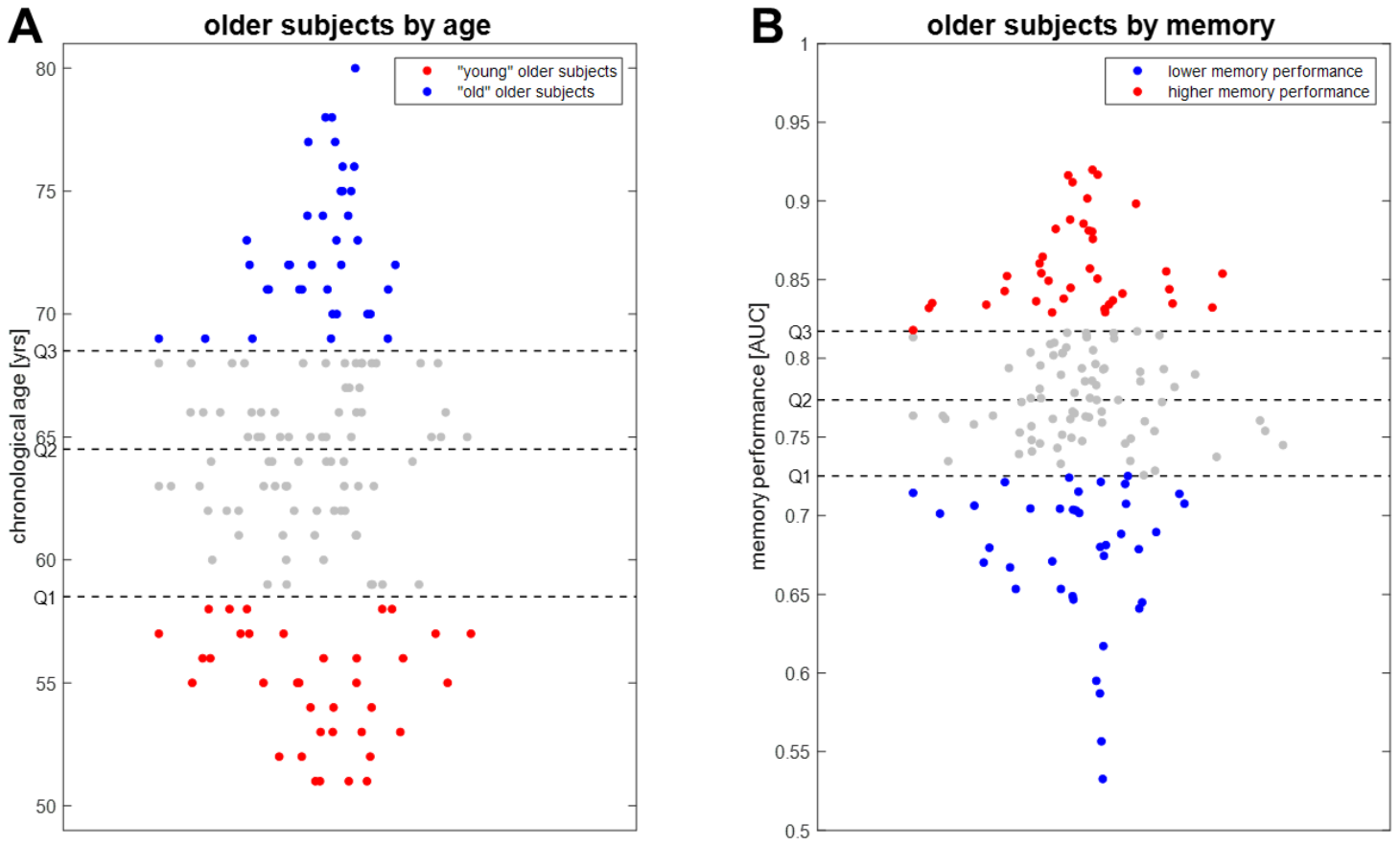
Soch et al., OHBM, 2022, Fig. 1A.

Chronological age is best predicted from structural MRI, but memory performance is best predicted from functional MRI.



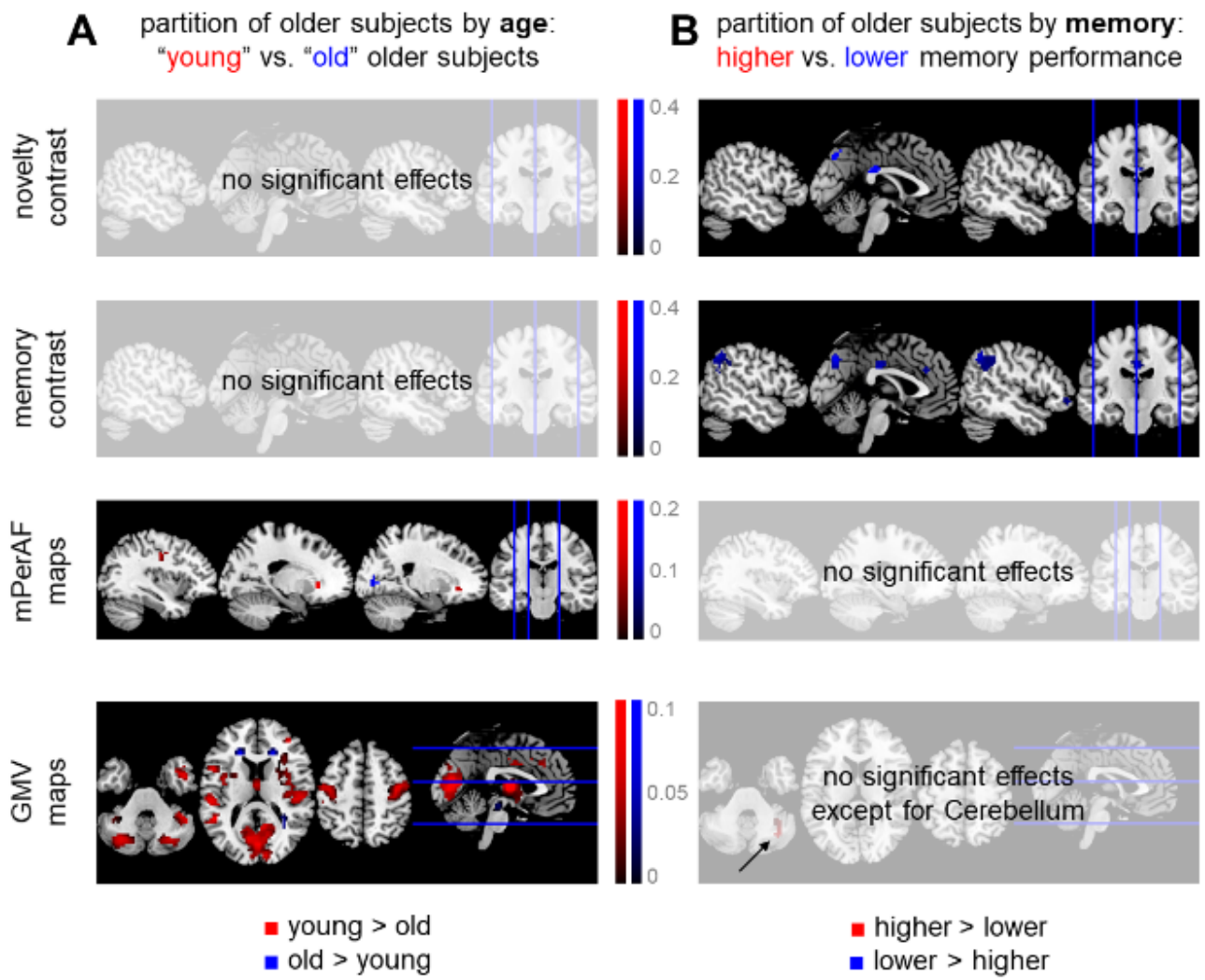
Soch et al., OHBM, 2022, Fig. 1B/C.

In order to follow up, we partitioned older subjects based on chronological age and memory performance.



Soch*, Richter* et al., in review, Fig. S3.

There is a double dissociation between memory vs. age and functional MRI vs. structural MRI (& rs-fMRI)



Soch*, Richter* et al., in review, Fig. 5.

Summary

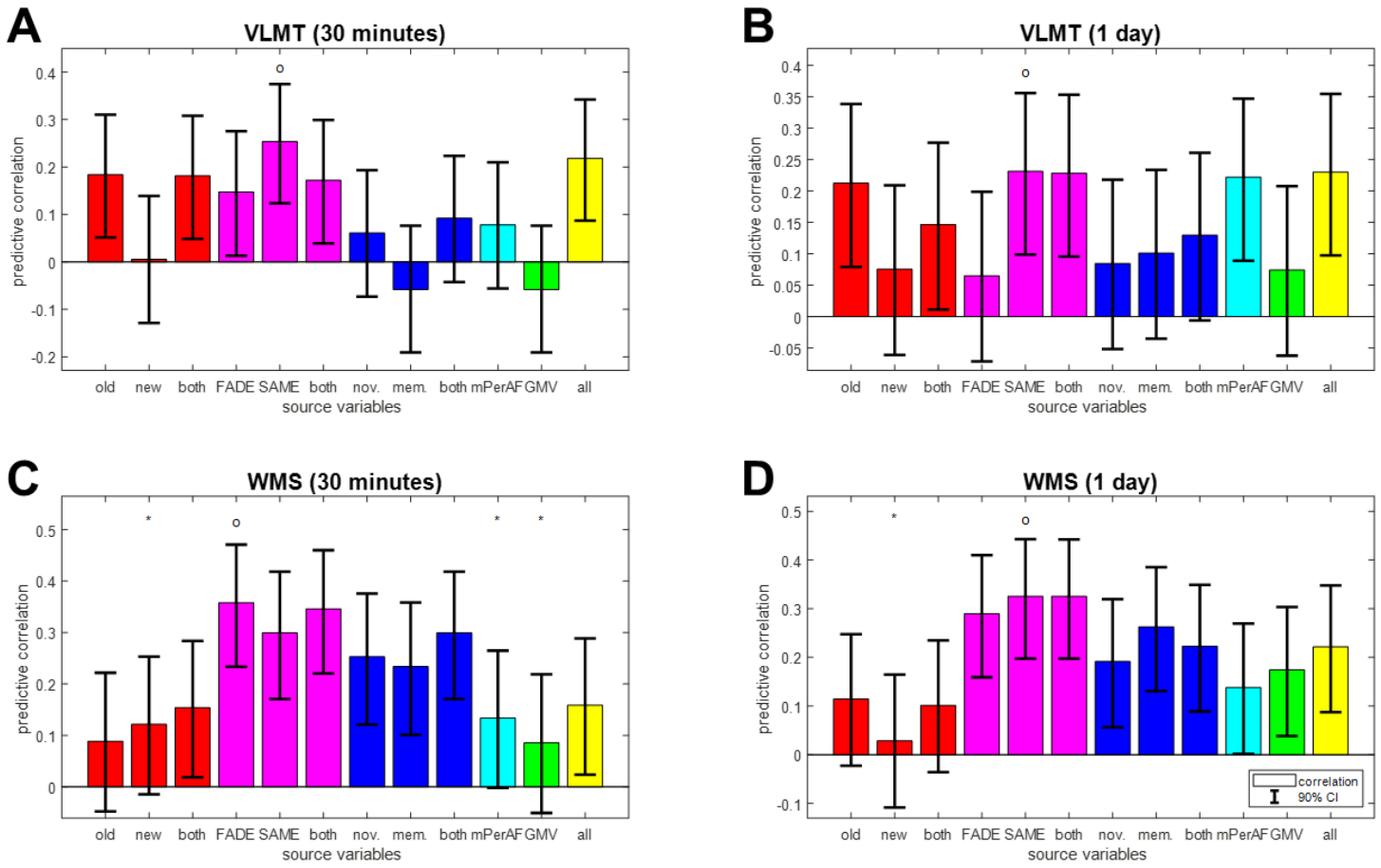
- Chronological age is best predicted from structural MRI, but memory performance is best predicted from functional MRI.
- Single-value fMRI scores outperform whole-brain fMRI contrasts in predicting (independent) memory performance.

THANK YOU!
QUESTIONS?

Joram.Soch@DZNE.de

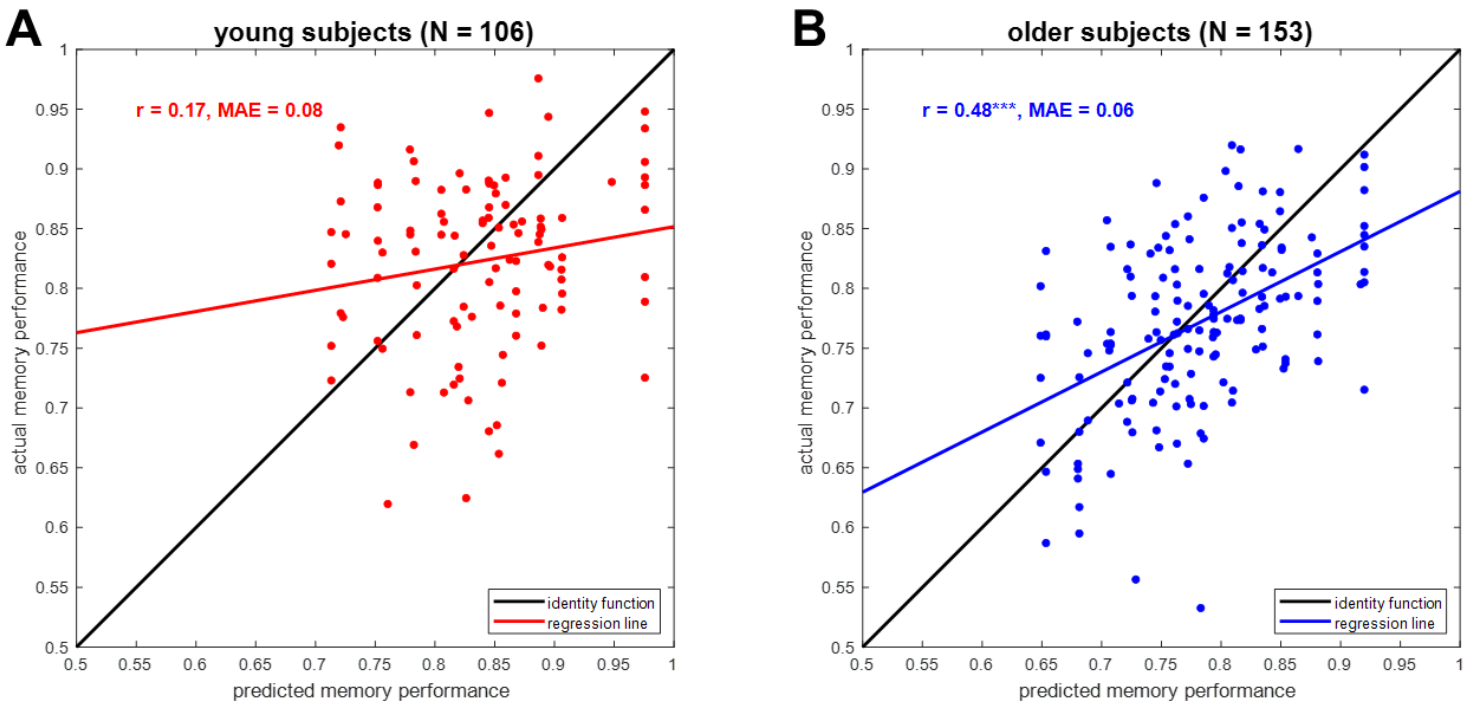
Appendix

Single-value fMRI scores outperform whole-brain fMRI contrasts in predicting independent memory performance.



Soch*, Richter* et al., in review, Fig. 4.

The predictive utility of fMRI scores for memory performance is still moderate.



Soch*, Richter* et al., in review, Fig. 6.