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POSTER PRESENTATIONS

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Neuroimaging / Optimal neuroimaging measures for tracking disease progression

Distinct relationships of self-reported subjective memory decline to neurodegeneration across the Alzheimer's clinical continuum

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Abstract

Background: Self-reported memory decline (SMD) is associated with increased risk of cognitive decline and neurodegeneration in patients with no or mild cognitive deficits, while diverging findings are reported in later clinical stages of the Alzheimer's clinical continuum. Our aim is to provide a comprehensive overview of the relationships of SMD to brain volume and glucose metabolism across the entire cognitive spectrum, from normal cognition to dementia.

Method: We used data from two independent cohorts, including 180 participants from IMAP+ (64 controls, 30 subjective cognitive decline (SCD), 50 mild cognitive impairment (MCI) and 36 AD-dementia patients) and 731 participants from ADNI (147 controls, 84 SCD, 369 MCI and 121 AD-dementia). We assessed the voxelwise links between SMD and neuroimaging measures of atrophy (T1-MRI GM volume) and hypometabolism (partial volume effect (PVE)-corrected FDG-PET data) within each cohort, and tested for an interactive effect of clinical stage or global cognitive impairment, to assess whether these links differed across cognitive/clinical stages. All analyses were adjusted for age, gender and education ($p<0.005$, cluster-level corrected for multiple comparisons).

Results: We found only negative interactive effects of the cognitive/clinical stage, such that SMD and neuroimaging measures were negatively associated (more neurodegeneration with higher SMD) in early stages, while they were positively associated (more neurodegeneration with lower SMD) in late stages. This effect was particularly clear-cut and similar in both cohorts for glucose metabolism and when splitting participants by cognitive stages (tercile of MMSE score; Figure 1), rather than by clinical groups (Figure 2), likely as the sampling of SCD and MCI patients differ between cohorts. Findings were recovered when using an episodic memory score instead of the MMSE to grade cognitive deficits' severity, using PVE-uncorrected FDG-PET data, and restricting the analyses to the amyloid-positive participants.

Conclusion: Our findings reveal a reverse relationship of SMD to neurodegeneration, indicating that SMD should be interpreted differently in early versus late stages of the Alzheimer's clinical continuum. At early (e.g. SCD) stage, greater SMD is indicative of greater neurodegeneration, while at later stages (late MCI or dementia), lower SMD is indicative of greater neurodegeneration, probably as a reflect of anosognosia.

Figure 1: Interactive effect of global cognitive impairment on the voxel-wise relationships between self-reported memory decline and brain volume (blue) or glucose metabolism (green), visualized by tercile within the entire group in two cohorts (IMAP and ADNI). All age, education and gender adjusted.

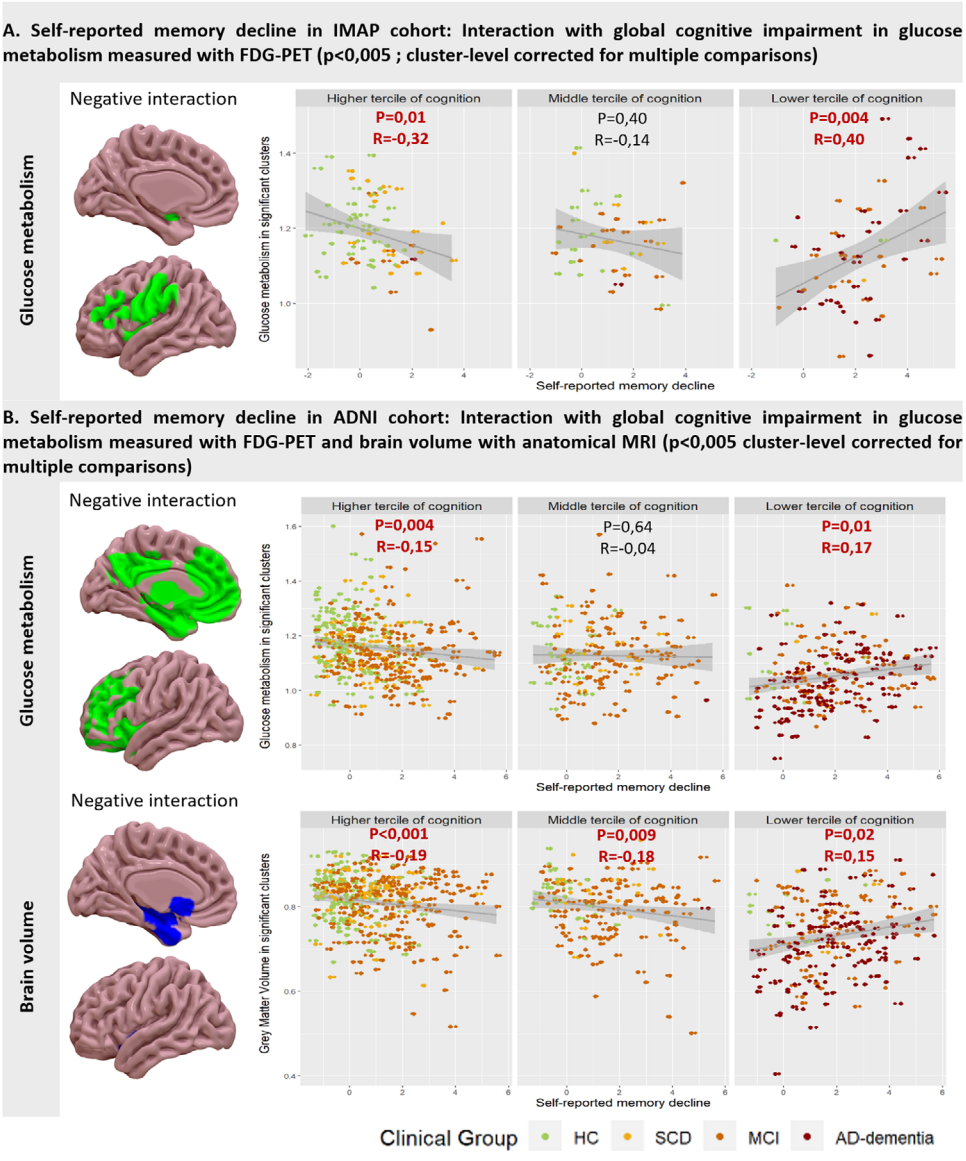

FIGURE 1

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Figure 2: Relationships between self-reported memory decline and neuroimaging data through voxel-wise multiple regressions assessed within each clinical group (SCD, MCI and AD-dementia) in two cohorts (IMAP and ADNI). All age, education and gender adjusted.

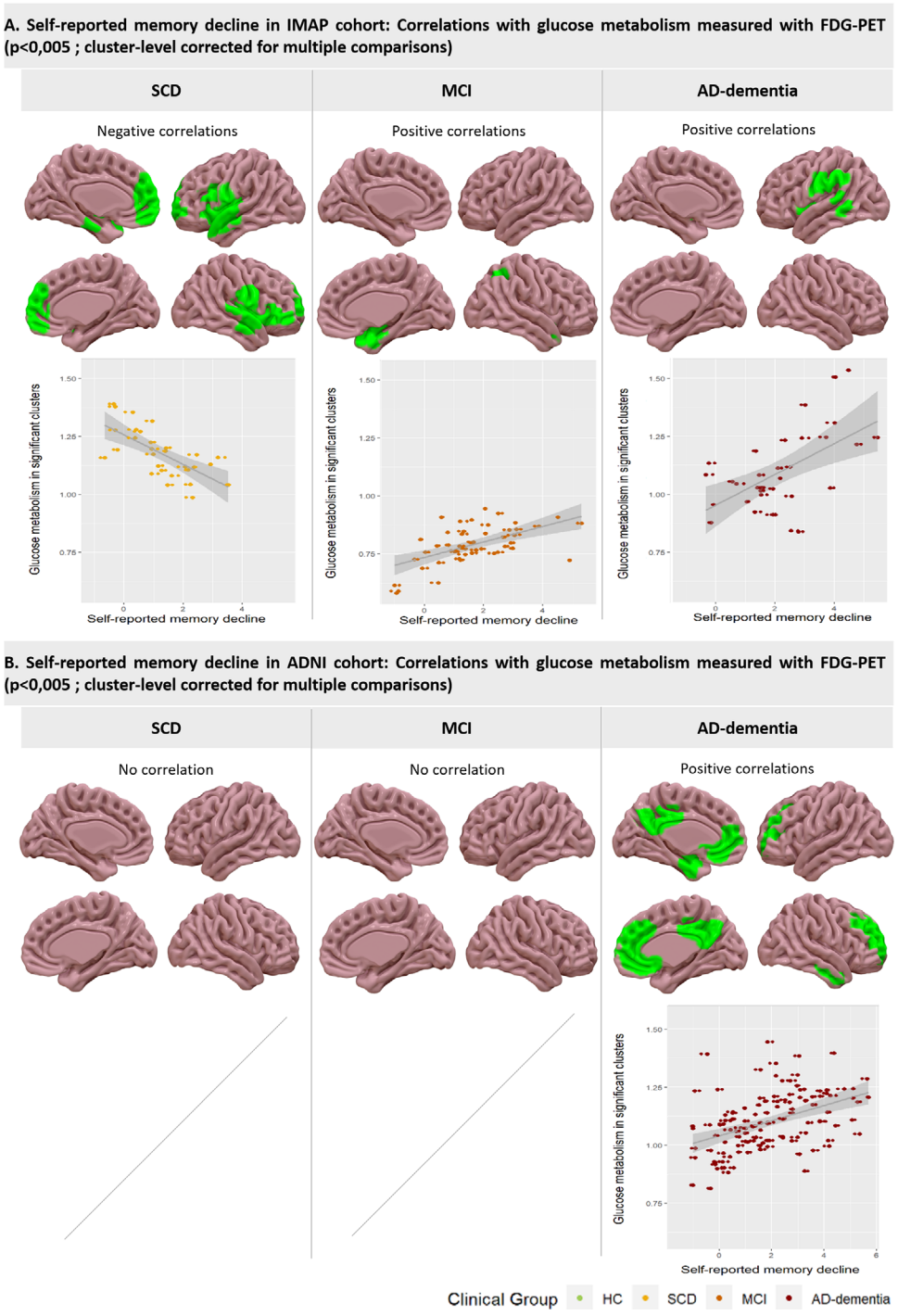

FIGURE 2