Olfactory Identification is Associated with Neuroimaging Biomarkers

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Olfaction in AD

- Multiple studies have shown that patients with MCI and AD show impaired olfactory identification (Doty 1987, Djordjevic 2008, Devanand 2010).

- Studies have also shown an association between olfactory identification impairment and medial temporal lobe neurodegeneration (Growdon 2015, Murphy 2003).

- However, studies have suggested a minimal association with amyloid deposition, which was mostly driven by differences in diagnostic group (Growdon 2015, Bahar-Fuchs 2010).

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Goal

With the advent of PET imaging techniques to measure tau deposition *in vivo*, we sought to evaluate the relationship between olfactory identification and cerebral tau deposition on [^{18}F]Flortaucipir PET, as well as medial temporal (MTL) neurodegeneration, in participants at-risk for Alzheimer's disease

*i*ADC

Methods

- 33 individuals were included in the analysis, including 19 cognitively normal older adults (CN), 7 with subjective cognitive decline (SCD), and 5 with MCI

	CN (n=19)	SCD (n=10)	MCI (n=5)	p-value
Age (years)	68.5 (6.9)	72.2 (6.4)	75.7 (10.6)	ns
Education (years)	17.6 (2.0)	17.5 (2.0)	16.0 (4.0)	ns
Sex (M, F)	4, 15	4, 6	4, 1	0.046
CDR – Sum of Boxes[‡]	0.2 (0.3)	0.1 (0.2)	1.2 (1.6)	0.003
MoCA Total Score[‡]	26.8 (2.5)	26.1 (2.3)	22.5 (3.8)	0.024
Craft Story Immediate Recall[‡,§]	16.4 (3.5)	16.7 (2.1)	12.0 (2.7)	0.016
Craft Story Delayed Recall[‡,§]	15.8 (3.5)	17.5 (2.7)	10.1 (4.9)	0.001
CCI – Self (12 items)[‡,¶]	16.2 (4.1)	24.0 (4.4)	33.5 (12.7)	<0.001
CCI – Informant (12 items)[‡,#]	17.4 (6.6)	15.2 (3.8)	26.1 (2.8)	ns
UPSIT Total Score**	34.5 (2.3)	35.7 (3.3)	28.7 (7.0)	0.006

Methods
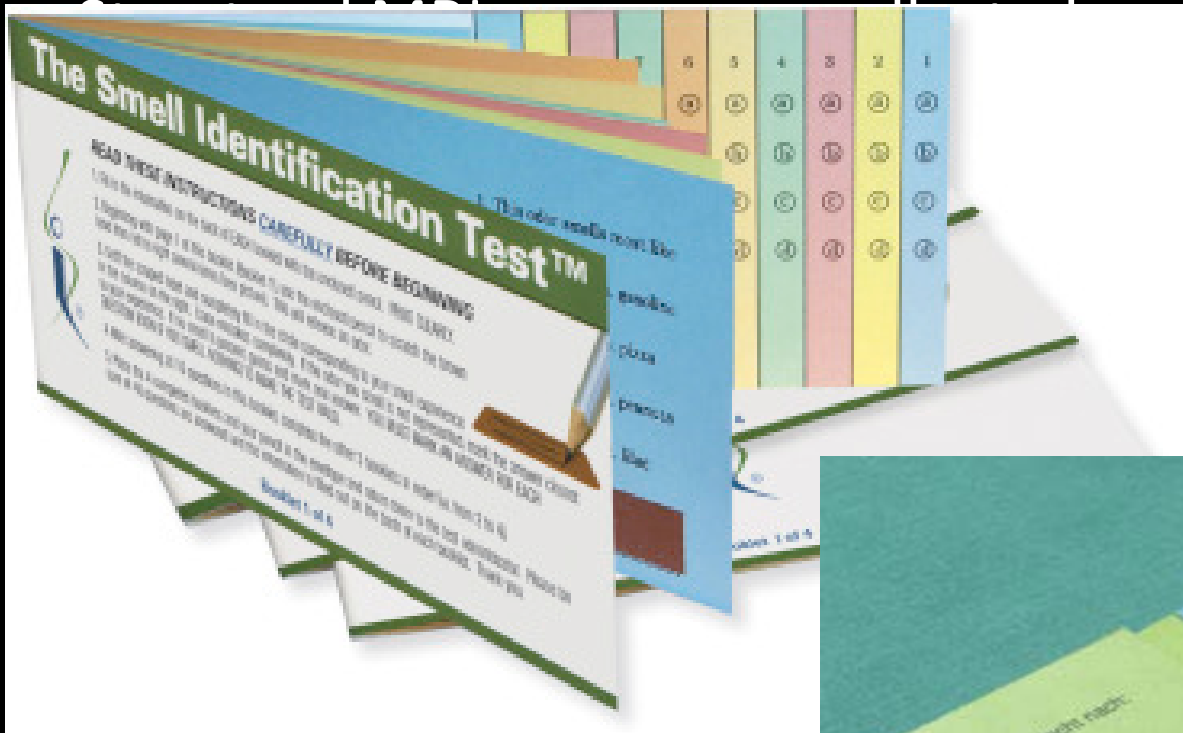
Structural MRI ... analyzed using ... temporal lobe ... which was ... ard techniques to ... rebellar crus)
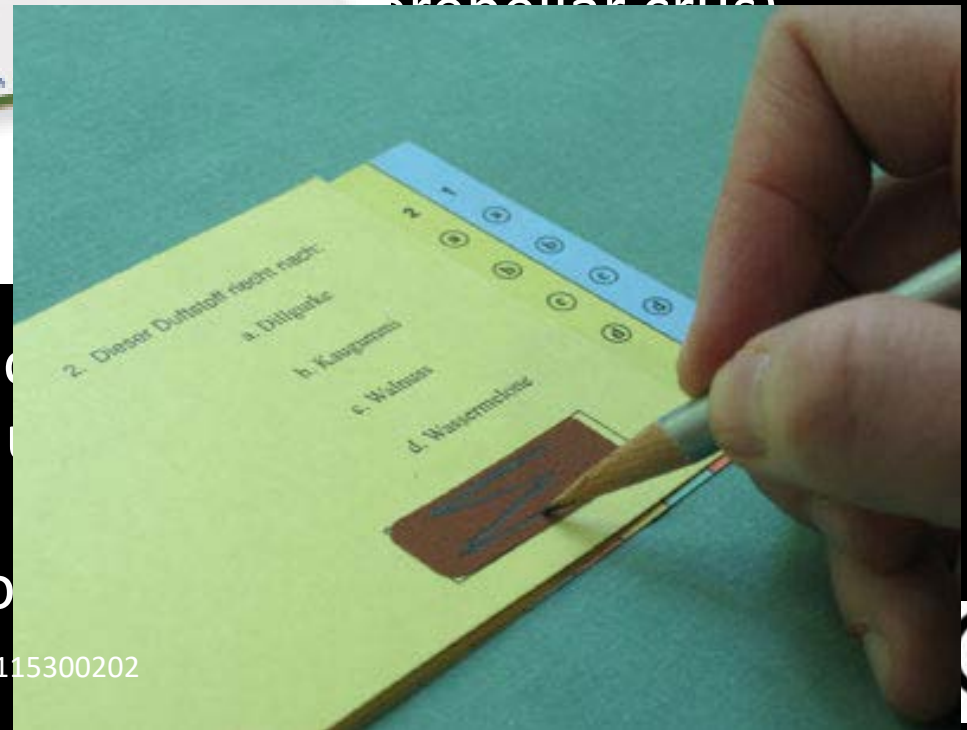
- The relationship between ... neurodegeneration and tau... a linear regression model, ... intracranial volume (MRI o...

Results

Results

Results

Risacher et al. (2017) *Alz & Dementia: DACM*
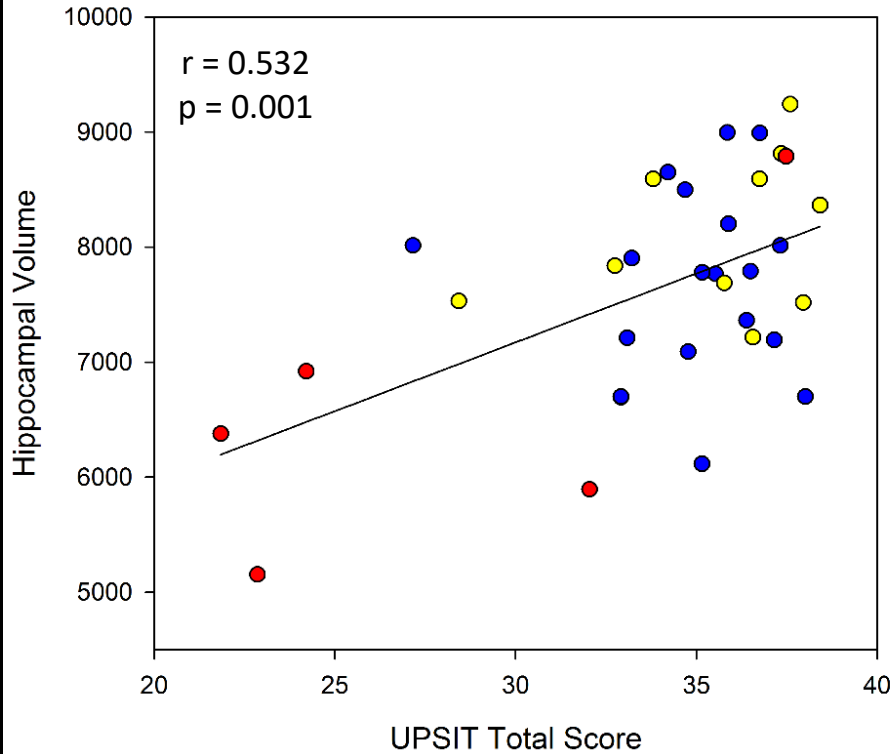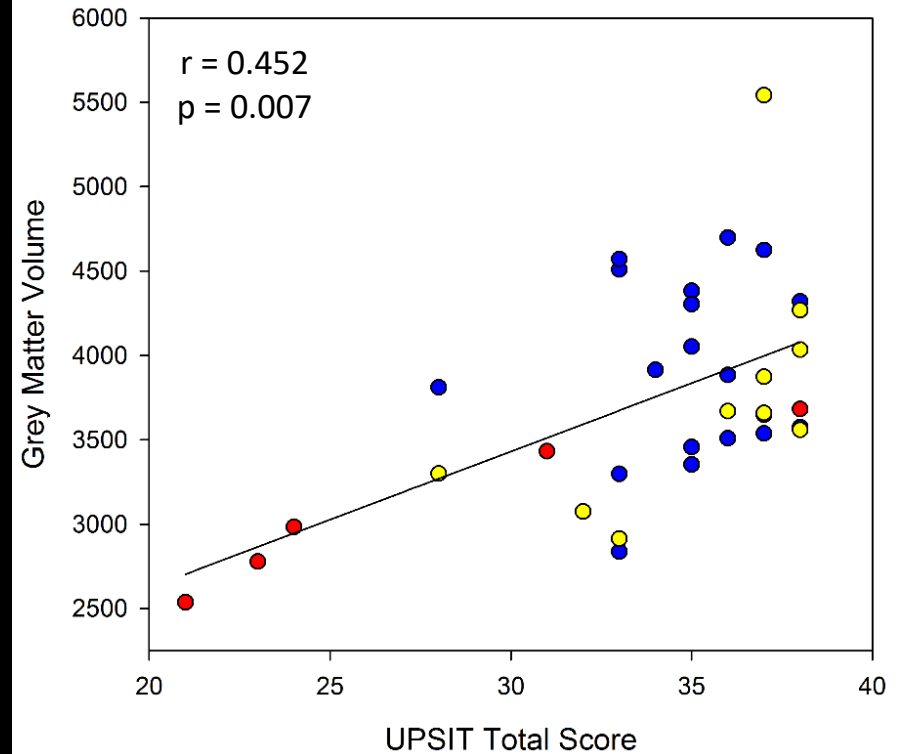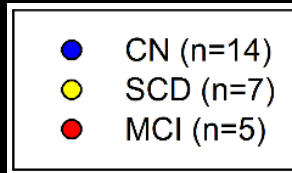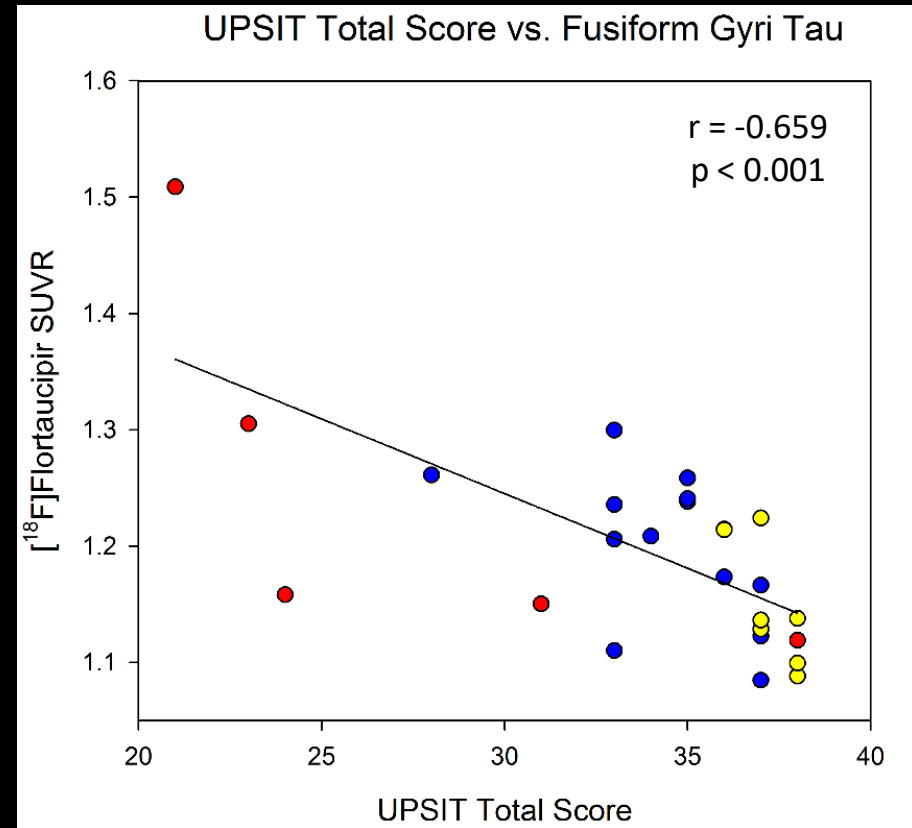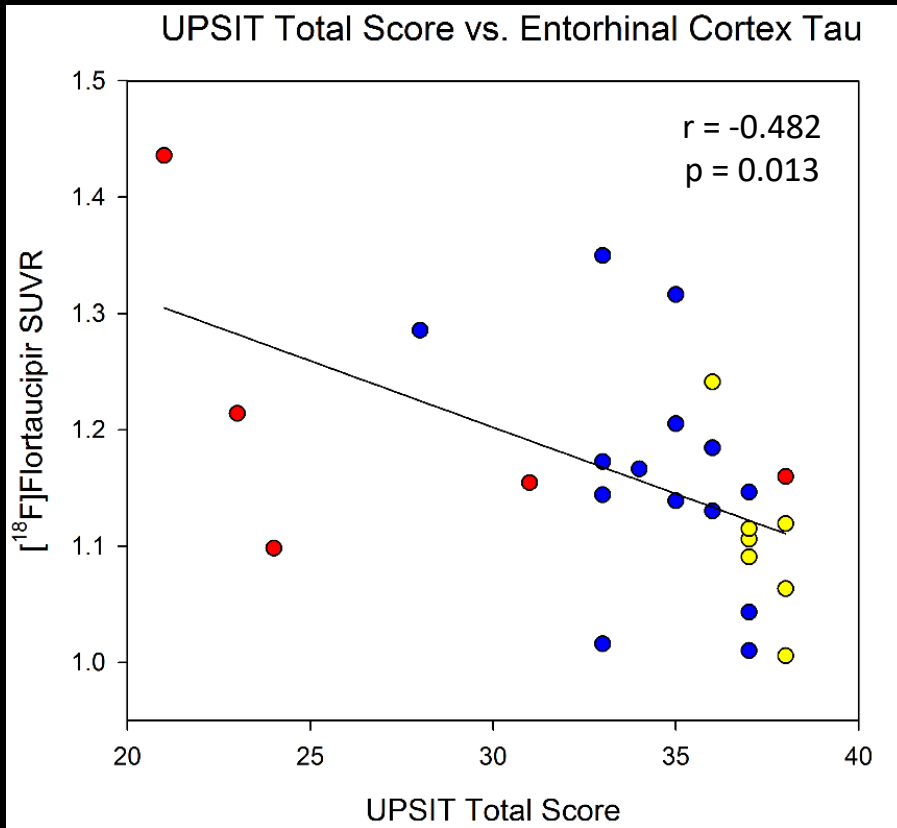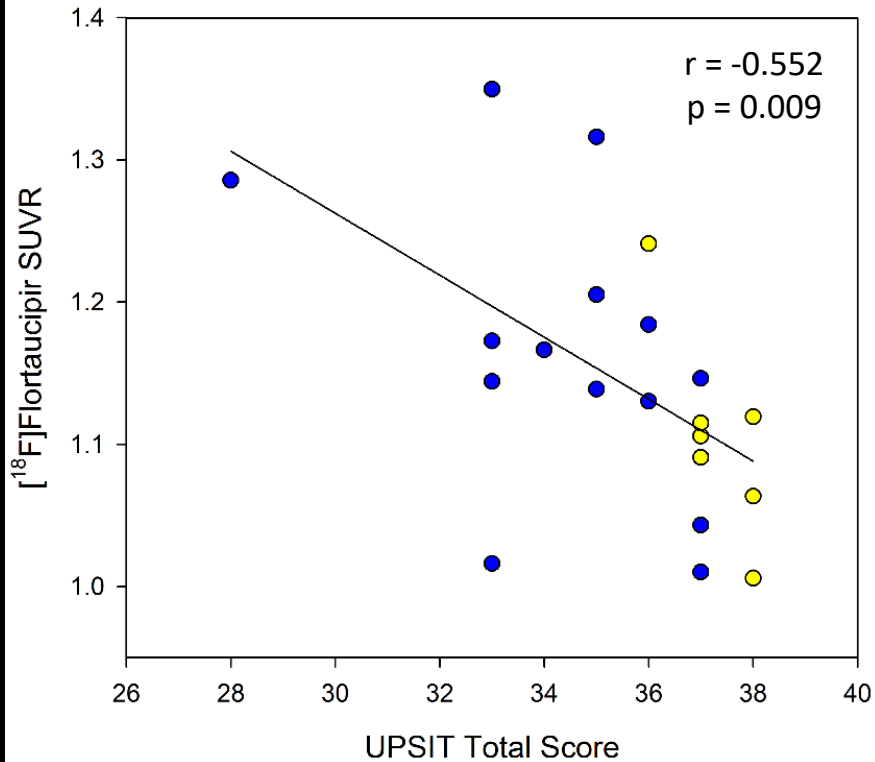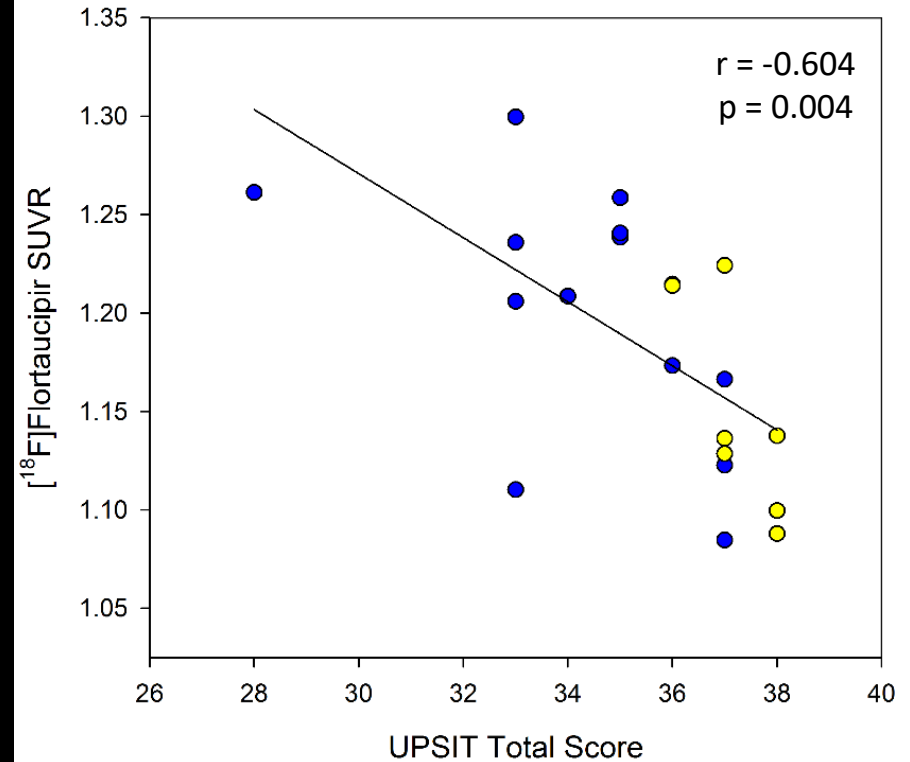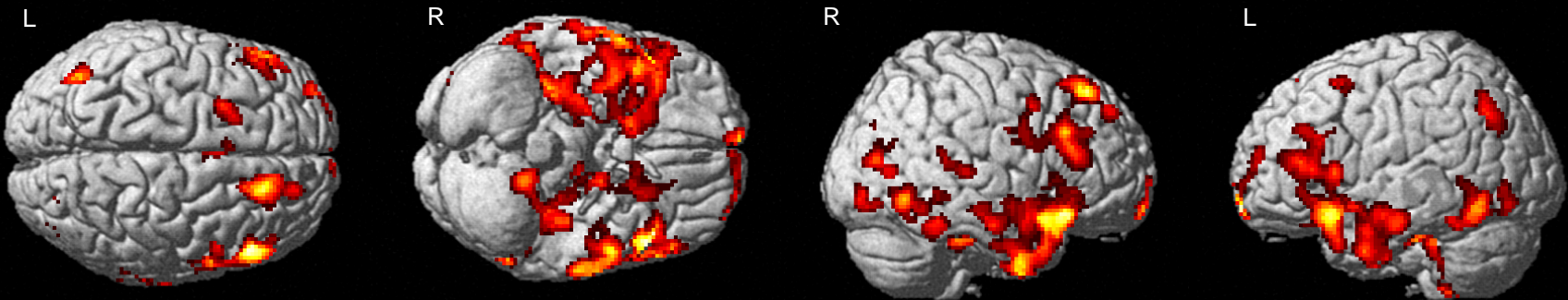
Results

A) Association between Tau Deposition and UPSIT Total Score in all participants
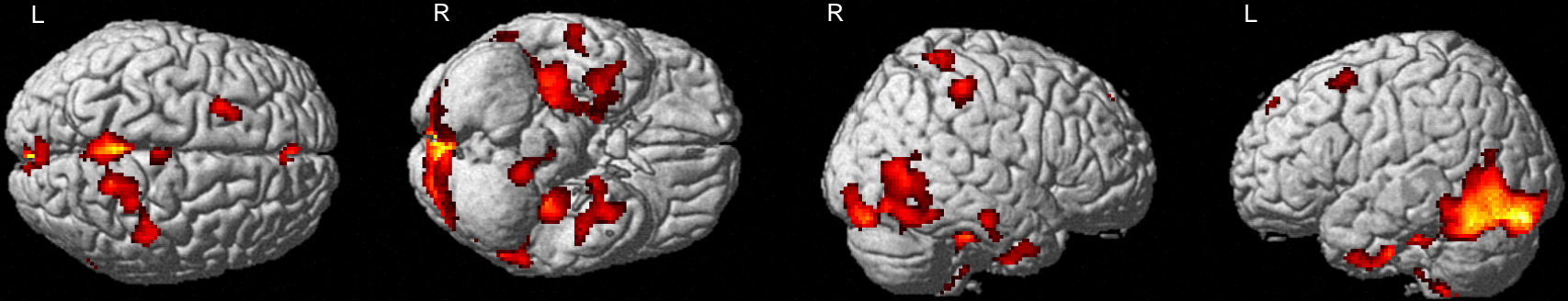
B) Association between Tau Deposition and UPSIT Total Score in CN and SCD only

Cluster p<0.05 (FWE)

Conclusions

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- Olfactory identification was not associated with amyloid (*data not shown*) but was associated with MTL neurodegeneration.

- Olfactory identification was associated with MTL tau deposition both on regional and voxel-wise analysis.

- Similar results were observed in cognitively normal individuals only (CN/SCD).

- This test may have utility to detect AD neuropathology in early disease stages.

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