

Introduction

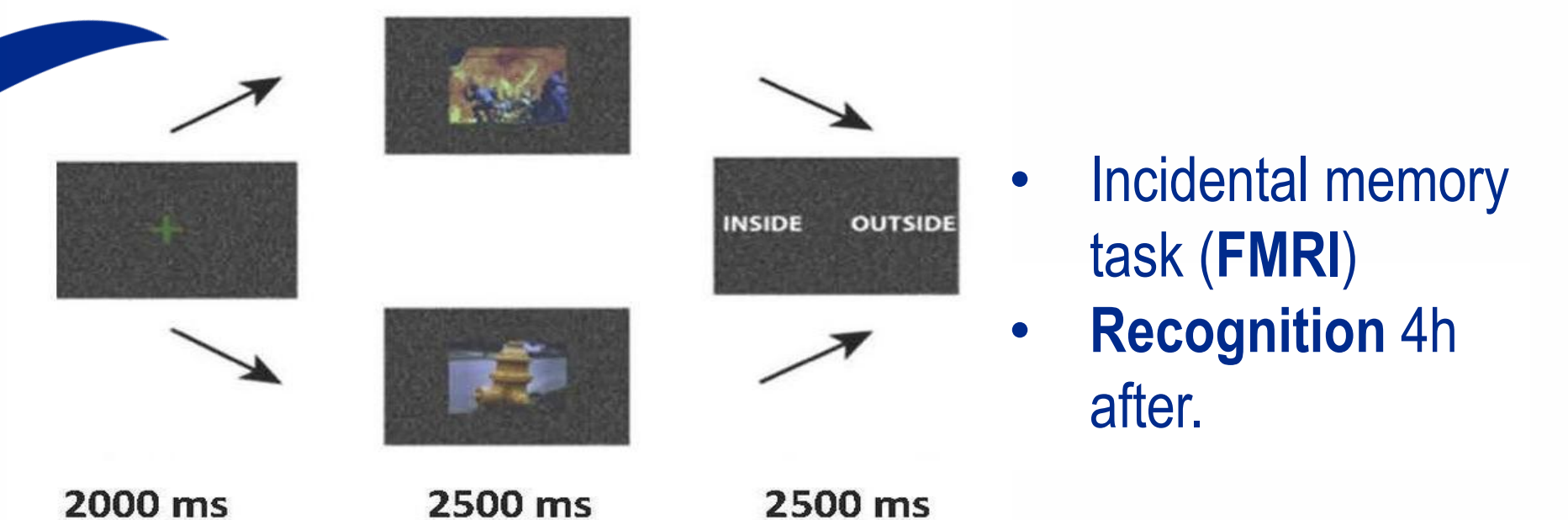
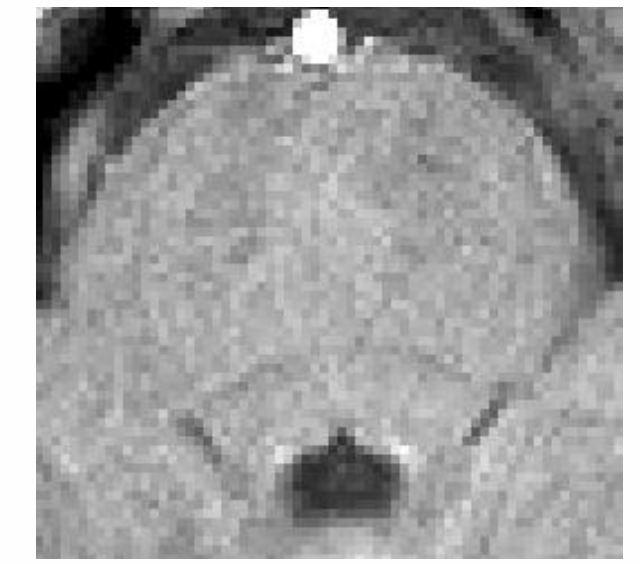
- **Episodic memory** is impaired in Alzheimer's Disease (AD), sometimes preceded by emotional dysregulation¹.
- The Locus Coeruleus (LC) is the first site in the brain affected by **TAU** pathology^{2,3}, posing a risk to noradrenergic system health in **aging and AD**.
- We examined whether the **LC contrast** is related to **episodic memory** and its association with **encoding** related **brain activity** controlling for emotional salience.

Methods

Group	Young	Older	aMCI
n (m)	27 (17)	26 (19)	24 (10)
Age	23.1 (2.7)	70.6 (6.39)	72.6 (7.05)
MMSE	29.52 (1.09)	29.48 (0.69)	25.49 (2.68)

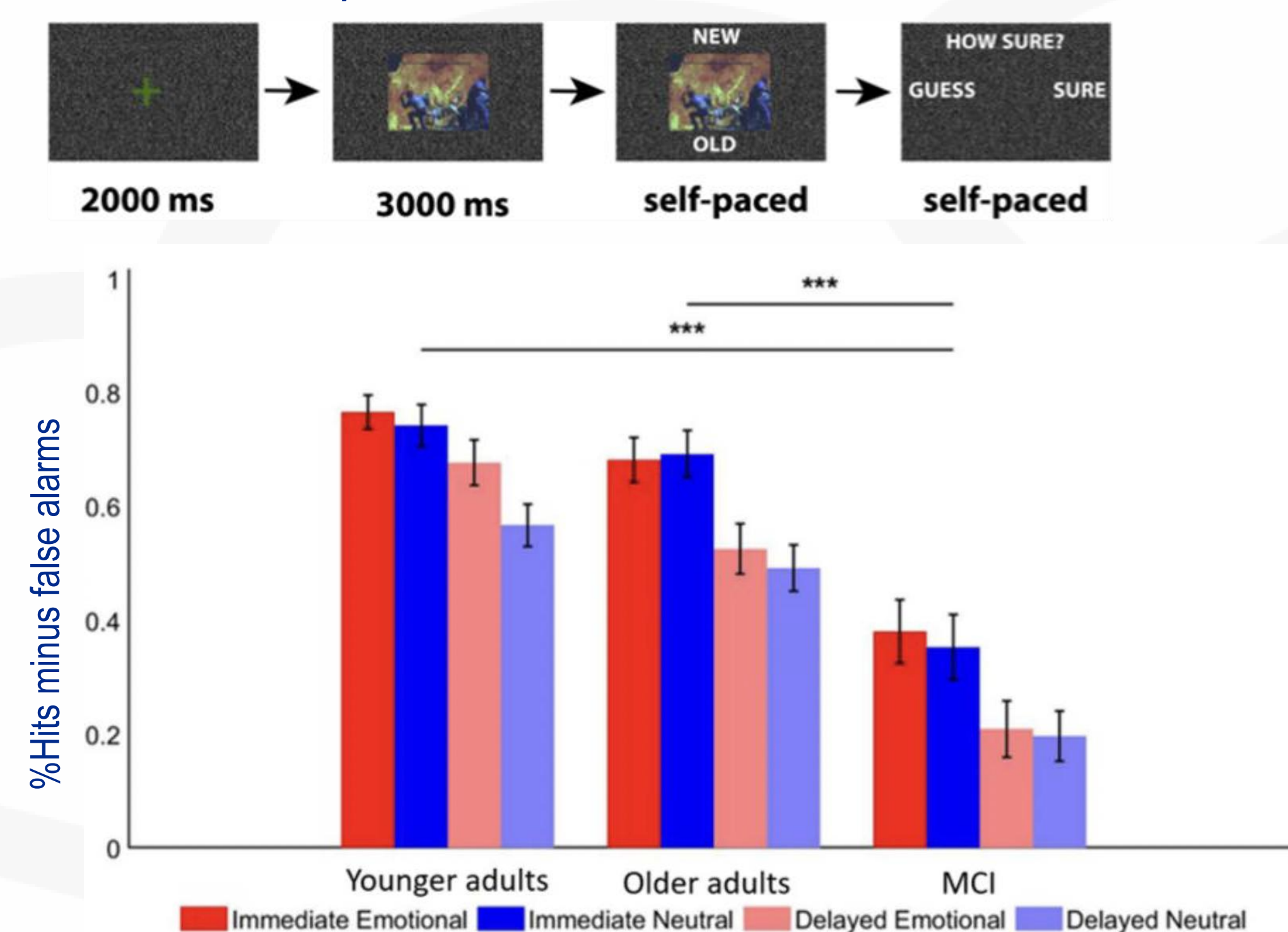
- Stats: Between and within group analysis, ANOVAs ($p < .05$ Bonferroni correction) and GLM – 1. **memory performance** ; 2. **LC intensity** ratio; 3. **memory – LC intensity** ratio and 4. GLM **BOLD activations** remembered > not remembered.

- **LC scans** (MTFLASH) $0.6 \times 0.6 \times 3.0$ mm.



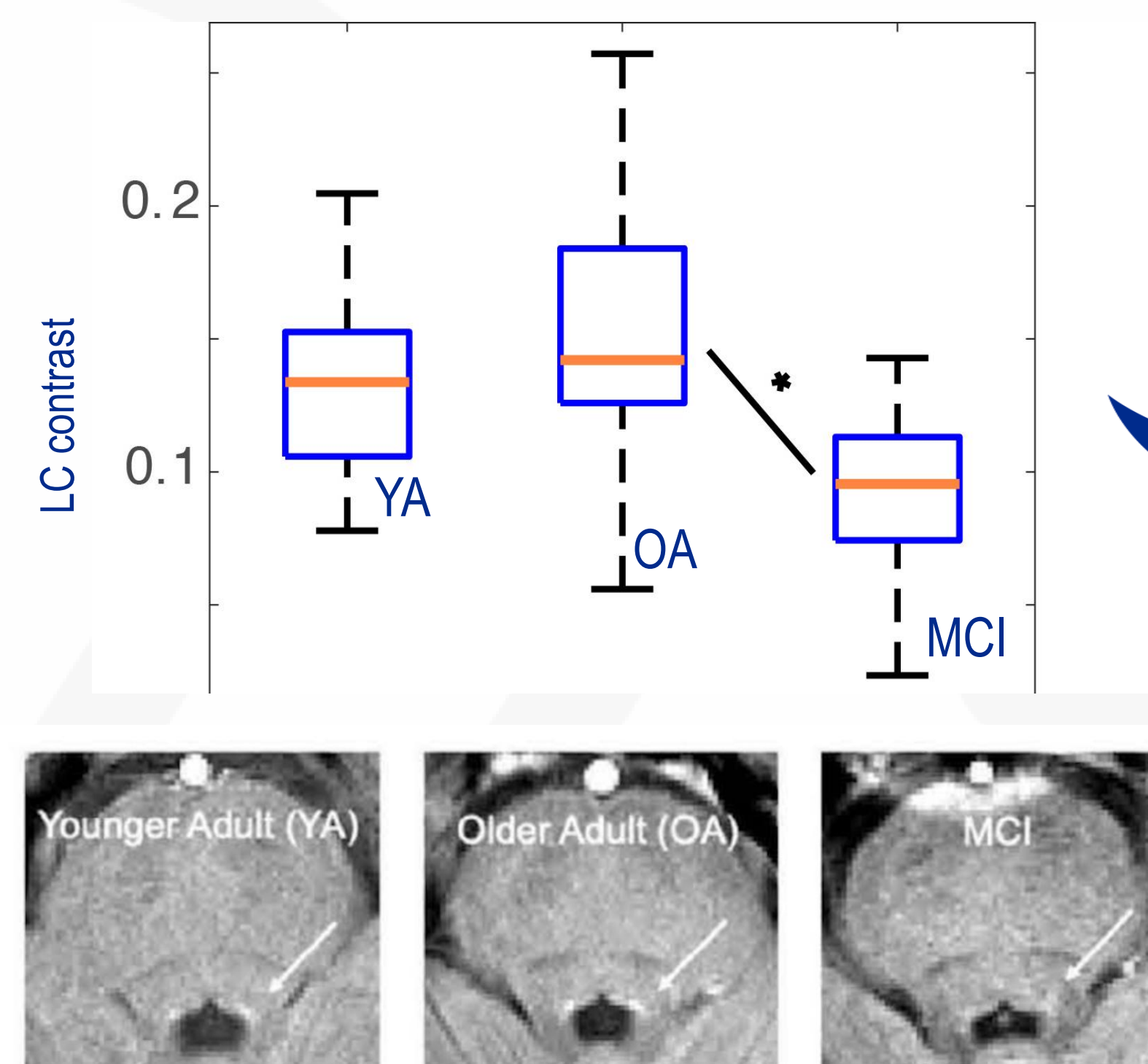
Results

➔ **Results 1. Does episodic memory (recognition) differ across groups and type of scene (emotional vs neutral)?**



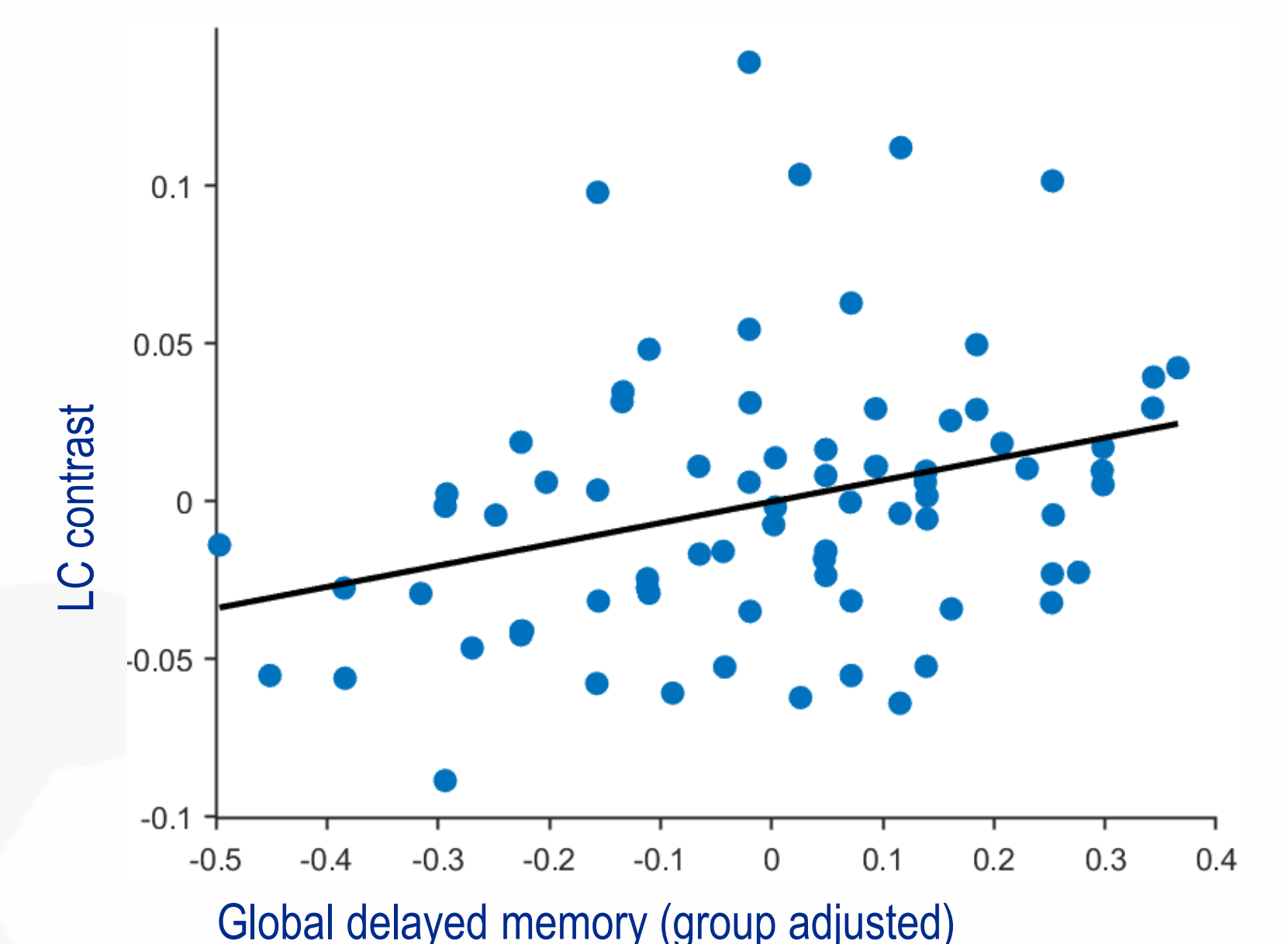
- The benefit from emotional salience is preserved in all the groups.

➔ **Results 2. Is LC intensity reduced in MCI? Is this associated to episodic memory performance?**



- LC contrast is reduced in MCI.

➔ **Results 3. Does LC intensity predict episodic memory performance?**



- LC contrast predicts memory consolidation (GLM), especially in MCI, all scenes ($\beta = 1.16$, $p = 0.045$; $R^2 = 0.475$).

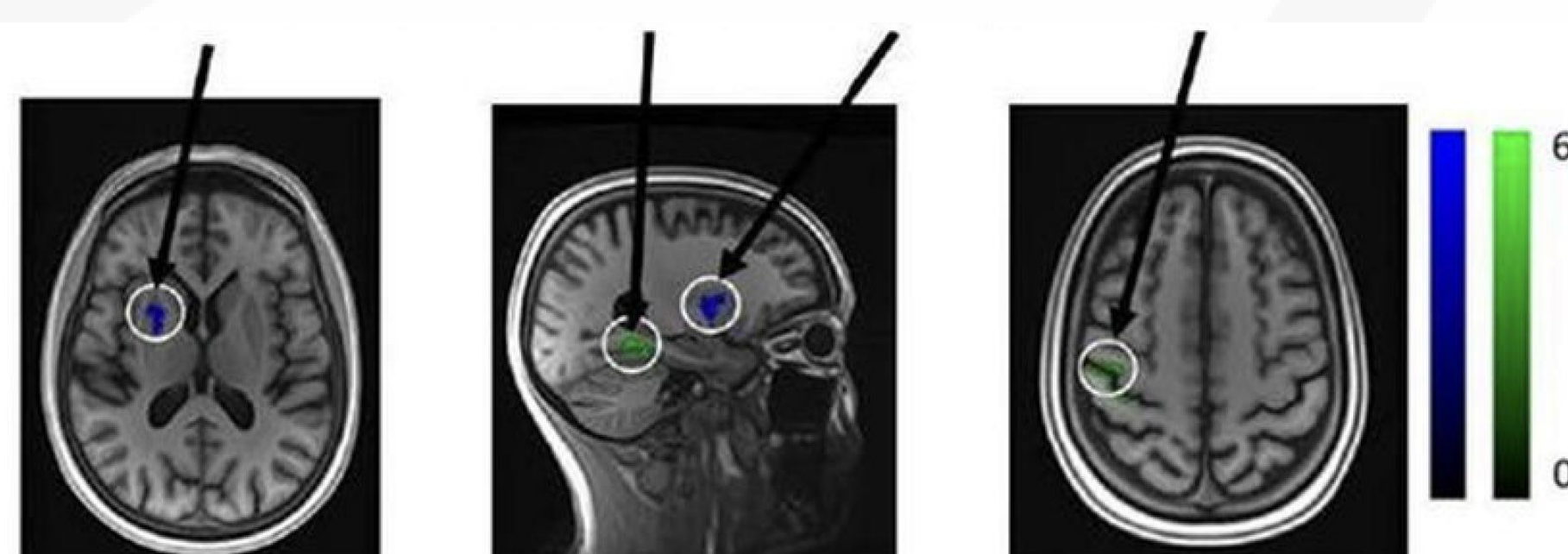
Conclusions

- **Emotional salience** benefit – **adaptive**?
- Functional activations shifts across aging.
- Successful encoding was not associated with increased activation in **MCI** despite **preserved behavioural benefits**- atrophy? Low SNR?
- **LC contrast predicted memory** - valence-independent, especially in MCI. Adaptive LC-MTL pathway despite LC structural loss?

Lucia.PenalbaSanchez@dzne.de

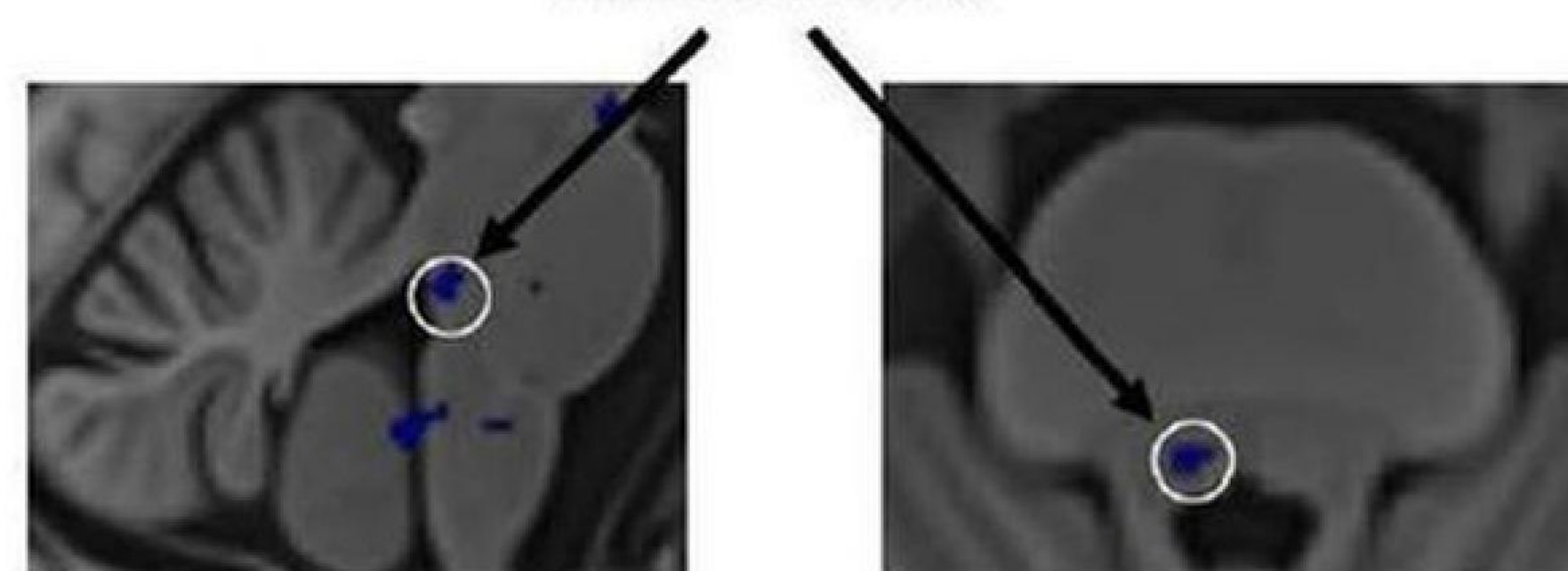
➔ **Results 4. Which brain activations are associated with successfully encoding of episodic memories?**

Putamen Parahippocampus Putamen Precentral



- Between and within group differences in BOLD activations (successful memory encoding: remembered > not remembered scenes); Green: increased in young; blue: increased in older. No significant activations in MCI.

Locus Coeruleus (trend)



- LC activated (trend) in older and older larger than MCI (successful memory encoding- remembered > not remembered scenes).