Picture Perfect: Investigating relations between hippocampal subfield volumes and episodic memory in preschoolers using a visuospatial paradigm

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Introduction

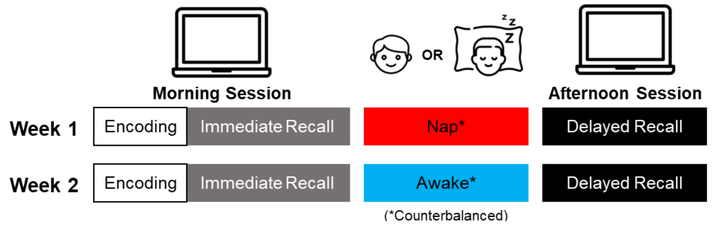
- Early childhood is a developmental period marked by rapid development of episodic memory (e.g., Riggins et al., 2020)
- During this period, hippocampal subfields also undergo protracted development and have been shown to underly improvements in episodic memory (e.g., Canada et al., 2020)
- Much of this work has been done in school-aged children using mnemonic discrimination (e.g., Canada et al., 2019) and source memory (e.g., Riggins et al., 2018) paradigms
- Our study aims to expand on these findings by investigating relations between hippocampal subfield volumes and visuospatial memory in a younger sample of 3- to 5-year-old children.

Methods

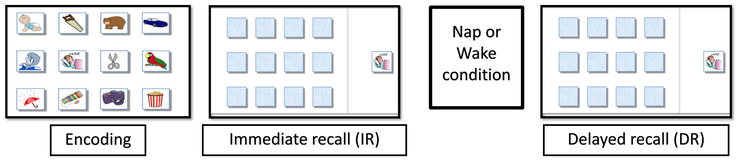
Participants

- A cross-sectional sample of 26 participants from a larger longitudinal study (M_{age} = 3.99 ± 0.49 years, 16 F)

Study Design

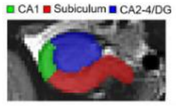


Behavioral Memory Task



Structural MRI Data

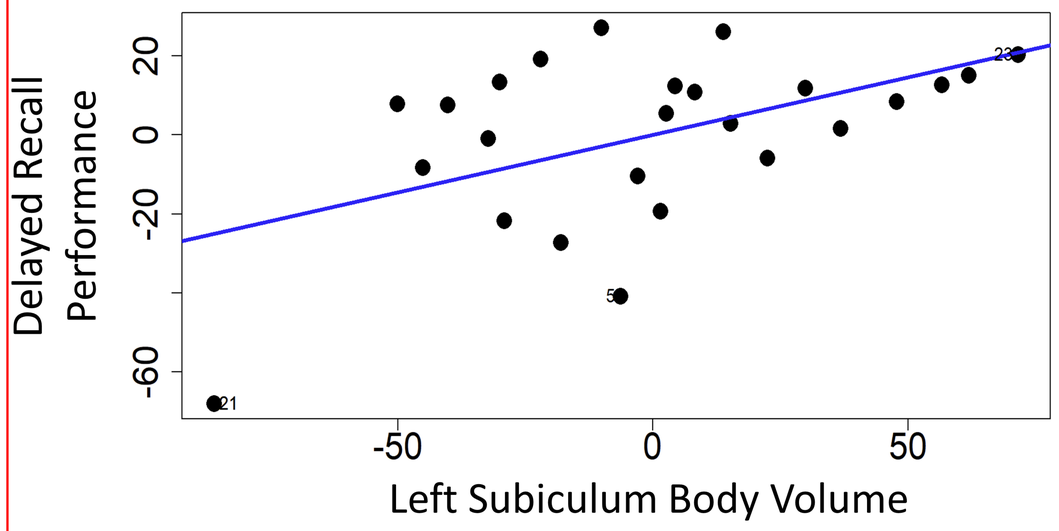
- Participants completed a high-resolution T2 scan (.4mm x .4mm x 2mm) of the medial temporal lobe, which was then processed in Automatic Segmentation of Hippocampal Subfields (ASHS; Yushkevich et al., 2014) to derive the hippocampal subfields.



Statistical Analyses

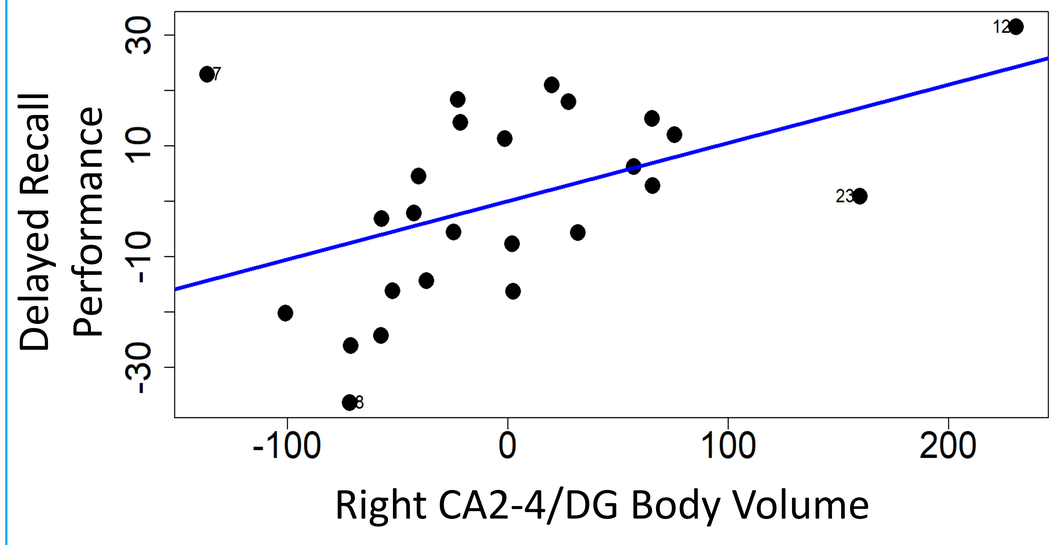
- Multiple Regressions controlling for intracranial volume (ICV) and delay between immediate and delayed recall

Results: Nap Visit



- Left subiculum body volume significantly predicted delayed recall at the sleep visit (b = .029, t = 2.7, p = .0134)

Results: Wake Visit



- Right CA2-4/DG body volume significantly predicted delayed recall performance at the wake visit (b = .011, t = 2.54, p = .0191)

Take-Home Message

Hippocampal subfields differentially support memory consolidation following bouts of sleep and wake in preschoolers

Future Directions

- Investigate relations between nap status (habitual vs. non-habitual napper), hippocampal subfield volumes, and visuospatial memory.
- Investigate relations between sleep architecture (e.g., Slow Wave Activity), hippocampal subfield volumes, and visuospatial memory

References

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Acknowledgments

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