

Introduction

- Sleep is important for brain plasticity in adults (e.g., Spencer, 2013).
 - Sleep promotes memory consolidation (the off-line processing of memories that makes them stronger and less vulnerable to interference).
 - Via hippocampal-neocortical transfer of memories.
- Less is known about the function of sleep in children, a period during which both memory and the hippocampal-cortical network supporting it undergo significant a developmental change.
- Previous research has documented relations between episodic memory (e.g., children's ability to recall contextual details surrounding an event, such as the source from whom they learned novel information, and hippocampal volume during early childhood (Riggins et al., 2015).
- However, the role of sleep remains unclear. The present study sought to fill this gap by exploring relations between parent-reported 24-hour duration sleep, memory ability, and hippocampal volume in 4- to 8-year-old children.

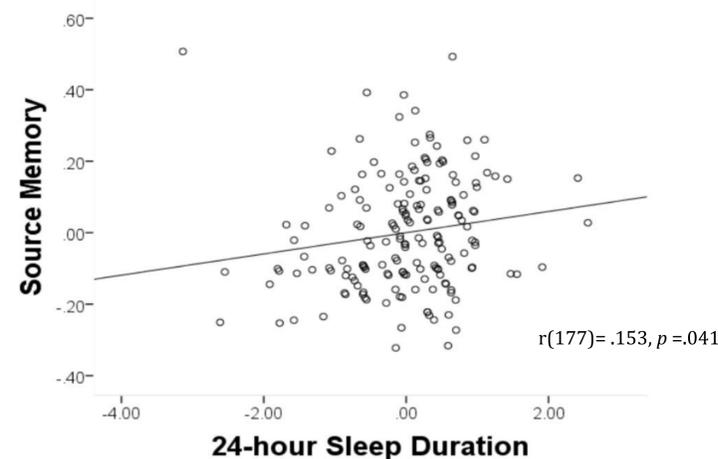
Methods

- **Participants**
 - 200 children between 4-8 years of age
- **Sleep**
 - Characterized via parent report on the Child Sleep Habits Questionnaire (Owens et al, 2000).
- **Memory**
 - Novel Fact Source Memory Paradigm (Drummeary & Newcombe, 2002; Riggins, 2014)
 - Children learned 12 novel facts via video (half from a puppet, half from a female experimenter)
 - After a 1-week delay, children were asked to recall the facts and from whom the fact was learned
- **Brain**
 - Bilateral hippocampal volumes were obtained from a T1-weighted MRI scan (.9mm³ voxel) using FreeSurfer (surfer.nmr.mgh.harvard.edu; Fischl, 2012) and Automatic Segmentation Adapter Tool (ASAT, nitrc.org/projects/segadapter; Wang et al., 2011).
 - Manual identification of uncus apex & fornix were used to calculate volumes of subregions (head, body, tail) bilaterally (Weiss et al., 2005).
 - Measurements adjusted for total brain size (ICV) using an analysis of covariance approach (Riggins et al., 2018).



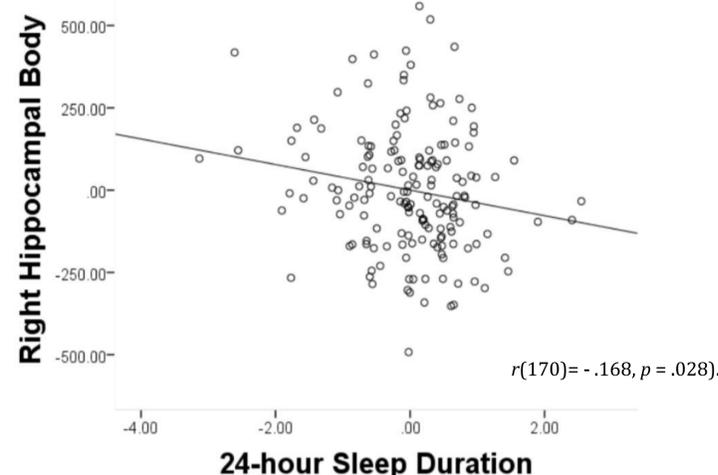
Results: Sleep and Memory

- **Question:** Is there a relation between 24-hour sleep duration and memory ability?
- **Answer:** YES. After controlling for effects of age, there is a positive correlation between parent-reported 24-hour sleep duration and source memory.



Results: Sleep and Brain

- **Question:** Is there a relation between 24-hour sleep duration and hippocampal volume?
- **Answer:** YES. After controlling for effects of age, there is a negative correlation between parent-reported 24-hour sleep duration and the volume of the right hippocampal body.



- Relations with other subregions were not significant.

Discussion

- Previous research has documented relations between source memory and hippocampal volume in early childhood (e.g., Riggins et al., 2015).
- Present findings suggest sleep may be also related to source memory and hippocampal volume as it relates to individual differences in both across this age range.
- These findings were isolated to the right hippocampal body.
- Interestingly, these findings may be specific to episodic memory, as 24-sleep duration was *not* related to individual differences in general intelligence.
 - No correlations were found between 24-hour sleep duration and block design or vocabulary, $r(180) = .103, p = .168$, $r(180) = .050, p = .502$, respectively.
- Future analyses will examine whether sleep mediates associations between memory and hippocampal volume and if these associations vary across this age range.

References

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