Hippocampal subfield volumes in preschool-aged habitual nappers and non-nappers

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Introduction

- Early childhood is a developmental period marked by important changes in sleep habits (e.g., the cessation of napping; Galland et al., 2012) and hippocampal subfield development (e.g., Canada et al., 2020)
- Moreover, hippocampal subfield volumes have been shown to vary as a function of nap status in 4-6-year-old children, with habitual nappers having larger CA1 volume in the body than non-nappers (Riggins & Spencer, 2020).
- Our study aims to expand on these findings by investigating potential differences in hippocampal subfield volumes in a younger sample of 3- to 5-year-old children.

Methods

Participants

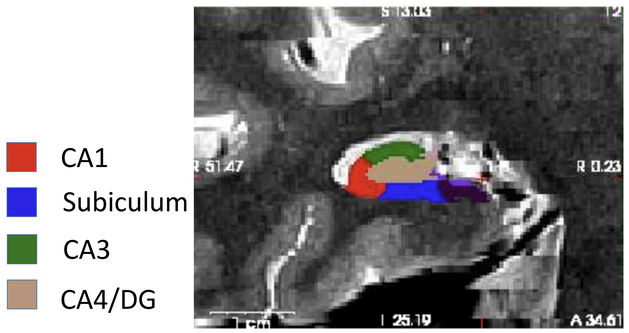
- Participants are a cross-sectional sample of 26 3-to-5-year-old children (M_{age}= 4.3, 17 F).
  - 14 Habitual Nappers
  - 12 Habitual Non-Nappers

Actigraphy

- Average Naps/Week = (Nap days/Total days)*7
- Nap status was calculated as follows: ≥5 naps/week = Napper, ≤2 naps/week = Non-napper

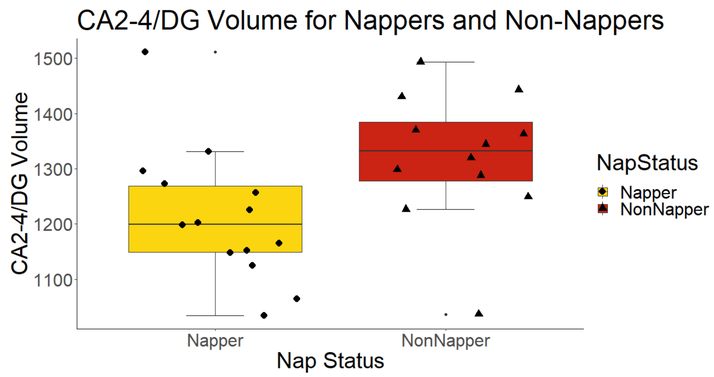
MRI Data

- A T1-weighted structural MRI scan (.9 mm^3) and was obtained using a Siemens 3T scanner with a 32-channel head coil.
- Hippocampal volumes were extracted via Freesurfer v6.0 (Fischl, 2012)



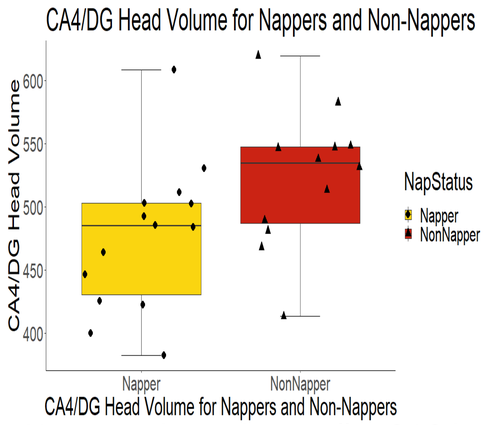
Results

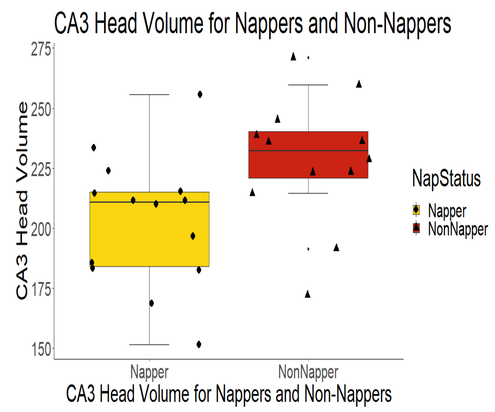
Analyses of covariance (ANCOVAs), controlling for age and sex, were run to assess differences in hippocampal subfield volume between nappers and non-nappers



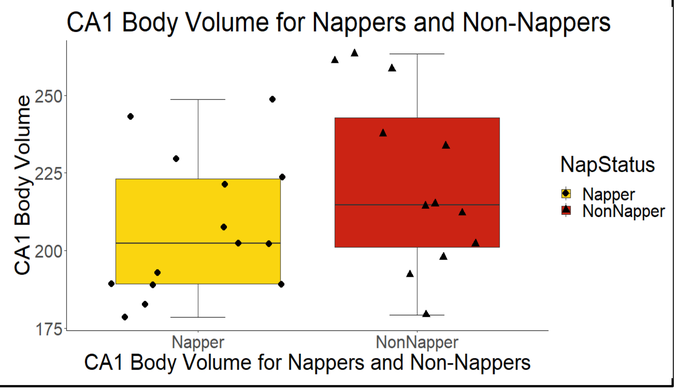
- Habitual nappers showed smaller CA2-4/DG volume than non-nappers (F(1,22) = 6.217, *p* = .0207).

CA2-4/DG was then split into CA3 (which includes CA2) and CA4/DG head and body to further probe these group differences





- Nappers showed a smaller CA3 head volume (F(1,22) = 4.92, *p* = .0373) and CA4/DG head volume (F(1,22) = 5.584, *p* = .02738) than non-nappers
- These findings became marginal when controlling for ICV (*ps* = .0670 - .0955).
- Inconsistent with previous literature, there were no significant differences between nappers and non-nappers in CA1 body



Take-Home Message

Young children who are habitual nappers have smaller hippocampi volume than their non-napping counterparts

Future Directions

Future work in the lab aims to:

- Use the Automatic Segmentation of Hippocampal Subfields (ASHS, Yushkevich et al., 2015) tool and compare these results to those found here using Fresurfer
- Increase our sample size within this young age range
- Consider how hippocampal volume in intermediate nappers (those that nap 3-4 times per week) compare to the other groups

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