

The Interaction between Chronotype and Napping on Inhibition in College Students

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Introduction

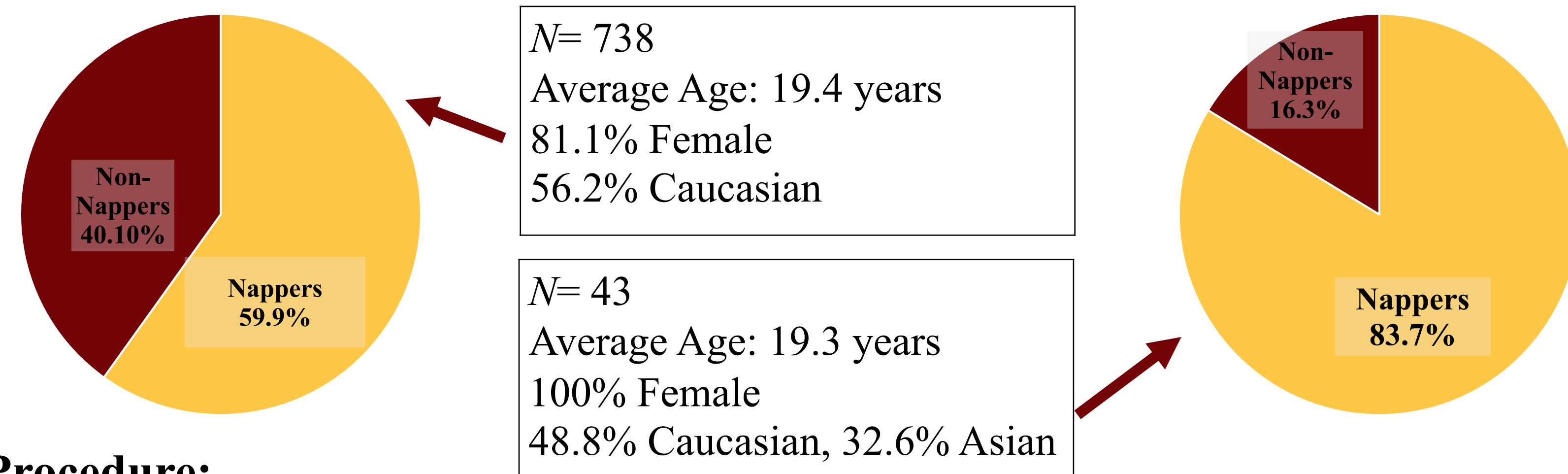
- College is a critical **transition period** in the lives of young adults, with more independence and choices to make in their **schedules** – including sleep
- Sleep** is critical for proper physiological and mental functioning in humans¹⁴
- Circadian rhythms**, cyclic fluctuations in physiological and cognitive functions impact sleep and are referenced as morning or evening preferences⁵
- Chronotype**, the propensity of an individual to engage in sleep and activity at specific times during a 24-hour period, varies by person and is split into early-morning types (e.g., larks) and late-night types (e.g., owls)²
- College students usually exhibit **evening preferences**
- Inhibitory control (IC)** is an executive function, defined as the ability to focus on relevant stimuli which influences academic achievement among college students¹¹
- Relation** between chronotype predispositions, napping, & inhibition is poorly understood

Primary Aims

- Aim 1:** Determine if there is a relation between morning or evening preferences and 1) napping frequency and 2) average napping time across the week
- Aim 2:** Explore whether those who have a greater nighttime preference are more likely to nap and exhibit poorer inhibitory control
- Aim 3:** Examine whether the relation between nighttime preference and inhibitory control differs based on napping frequency

Method

Participants:



Procedure:

- Participants filled out a Daily Diary for 7 days, answering questions about their daily sleep behaviors, such as napping
- Participants answered basic demographic questions, information about naps, and three items from the Morningness-Eveningness Questionnaire (MEQ) pertaining specifically to chronotype
- A subset of participants completed the lab-based D-KEFS test to measure inhibitory control

Measures

- Napping:** average napping time across the week was calculated based on self-reported napping times
- Napping frequency:** calculated based on the Daily Diary responses, ranging 0-7 days
- Napping group:** participants grouped into nappers versus non-nappers
- Napping duration:** napping time across the week was averaged
- Morningness-Eveningness Questionnaire (MEQ)** is used to assess individual differences in morningness and eveningness differences
- Higher MEQ** = preferences for evening (i.e., owl)
- Lower MEQ** = preferences for morning (i.e., lark)
- Delis-Kaplan Executive Function System (D-KEFS)** is a test which measures a variety of verbal and nonverbal executive function, more specifically to measure inhibitory control
- Averaged across timepoints 1 & 2 for *errors made* and *response time*
- Looked at inhibitory control subscale

Results

Aim 1 (N= 738):

- More than half of students **napped** throughout an average week (59.9%)
- Students less likely to nap preferred earlier wake times than frequent nappers
- Correlational analyses indicated significant small **positive relations**
 - MEQ and napping frequency** ($r = 0.117, p = .016$)
 - MEQ and average napping duration across the week** ($r = 0.12, p = .012$)

Aim 2 (N= 43):

- MEQ and IC** correlational analyses indicate non-significant relations
 - IC response rates:** ($r = -0.095, p = .599$)
 - Error rates:** ($r = -0.129, p = .475$)
- Napping and IC** correlational analyses indicate non-significant relations
 - IC response rates:** ($r = -0.017, p = .914$)
 - Error rates:** ($r = -0.302, p = .049$)

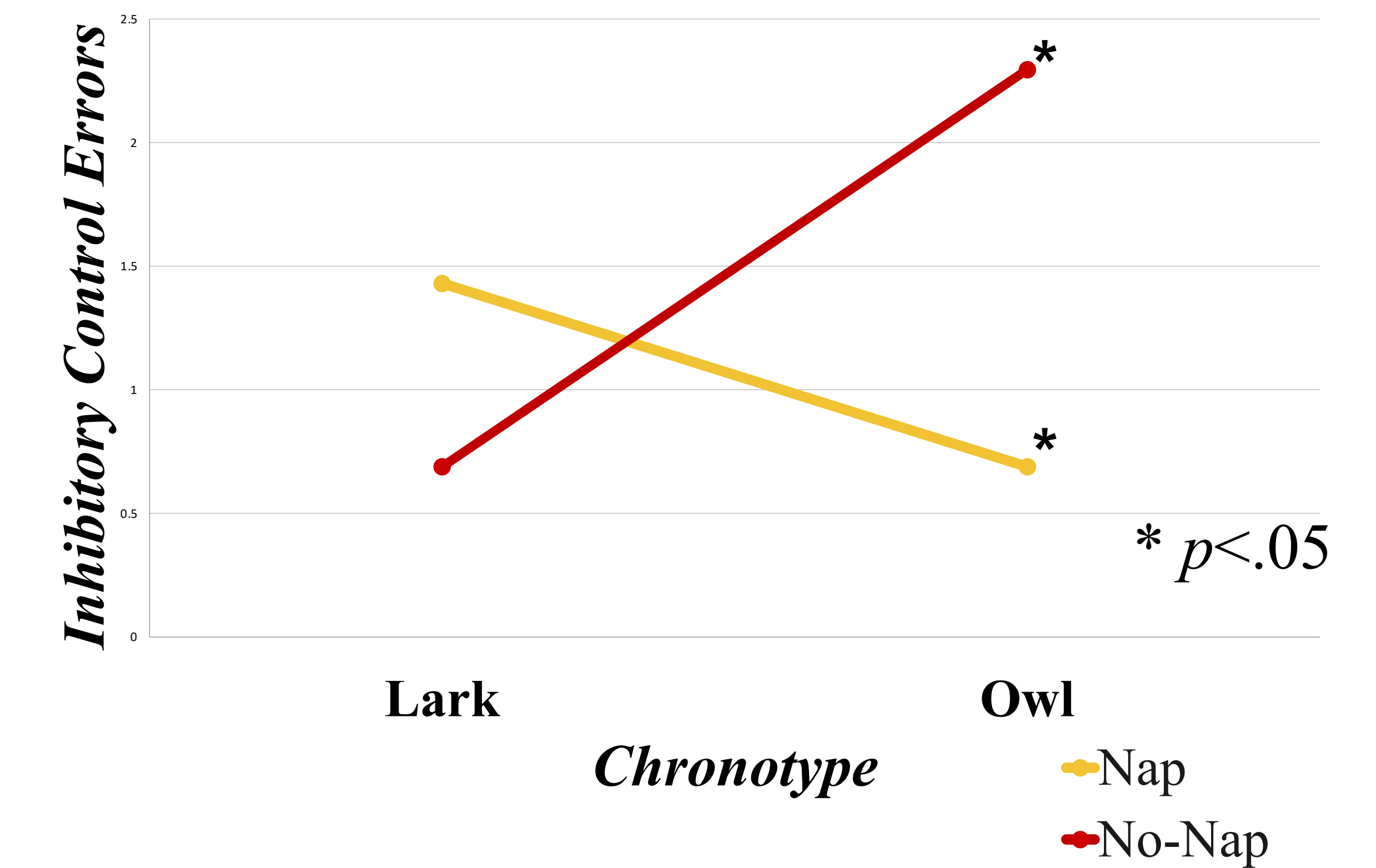
Aim 3 (N= 33):

- A hierarchical linear regression indicated a main effect such that stronger preferences for evenings were associated with **more errors** made during the inhibitory control task ($b = .773, t = 2.059, p = .049$).
- Main effect of napping frequency group (nappers vs. non-nappers) were non-significant ($b = -.151, t = -.912, p = .369$).
- However, the interaction effect of chronotype x napping group was significant ($b = -1.021, t = -2.732, p = .011$).

Results cont.

Aim 3 cont. (N= 33):

- Significant interaction effect is revealed in the relation between napping and morning or evening preferences (see graph):



Discussion & Conclusions

- Napping is an important construct for college students – they nap a lot
- Napping frequently impacts students with morning preferences differently than students with evening preferences

- Larks:**
 - No nap: do not make many inhibitory errors**
 - Nap: more inhibitory errors!**
- Owls:**
 - No nap: the most inhibitory errors!**
 - Nap: less inhibitory errors**

Future Directions:

- Recognize sleep patterns in college-aged students
- Implications on academic performance and ability to succeed

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