



# Amount of Daily Sleep moderates the relationship between Family SES and children's Inhibitory Control



Srishti Nayak, PhD <sup>a, b</sup> & Amanda R. Tarullo, PhD <sup>b</sup>  
<sup>a</sup> Princeton University, <sup>b</sup> Boston University

## Background: SES, Sleep, Executive Function

- Family socioeconomic status (SES) has been robustly associated with EF, but a complex interplay of factors underlie this association.
- Sleep habits and health are important factors in understanding EF, in both normal and clinical populations, and sleep disruptions even over a short period can impair cognitive performance and daytime functioning in children (Vriend et al., 2013).
- Sleep duration and quality have been linked to EF and school performance in children (e.g. Dewald et al., 2010; Astill et al., 2012), and adolescents (Kuula et al., 2015).

## Aim: Examine Role of Sleep Habits in SES-EF association

To examine whether child sleep habits are a mechanism underlying the link between SES and EF in children

## Methods: Visual Stroop Task and Parent Reported Sleep

### Participants

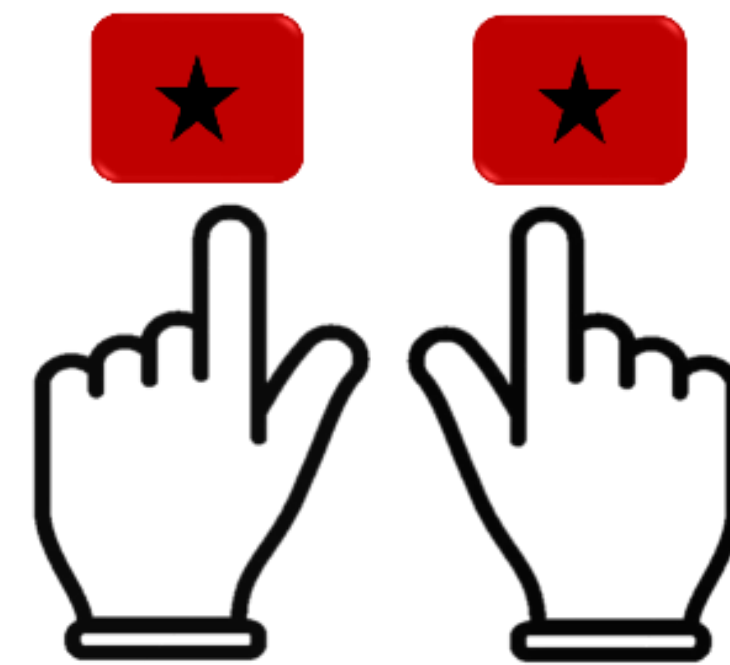
109 children, 6-8 years old

### Behavioral Task

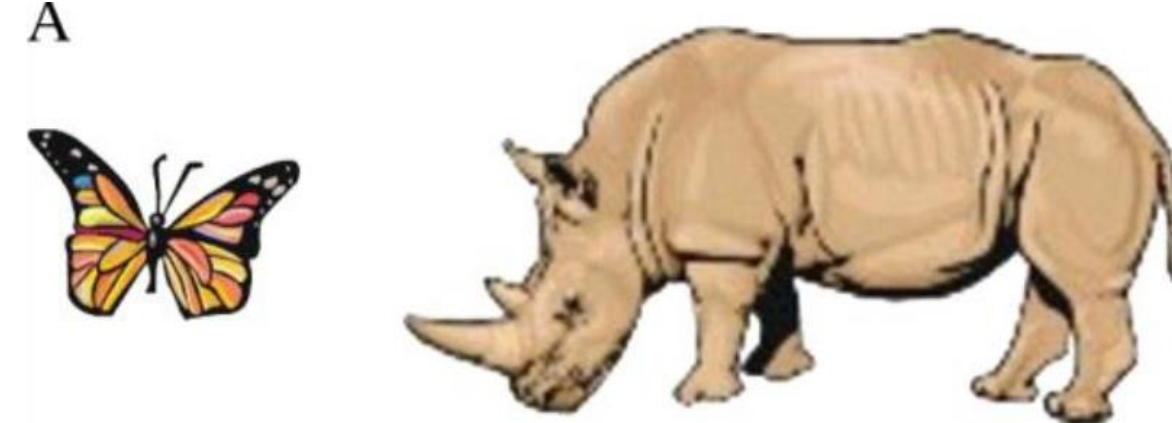
Animal-Size Stroop Task (Nayak et al., 2020; Bryce et al., 2011)

Stroop interference effects were computed:

- Stroop Effects = RTs (incongruent) – RTs (congruent)**



**CONGRUENT (64 trials)**



**INCONGRUENT (64 trials)**



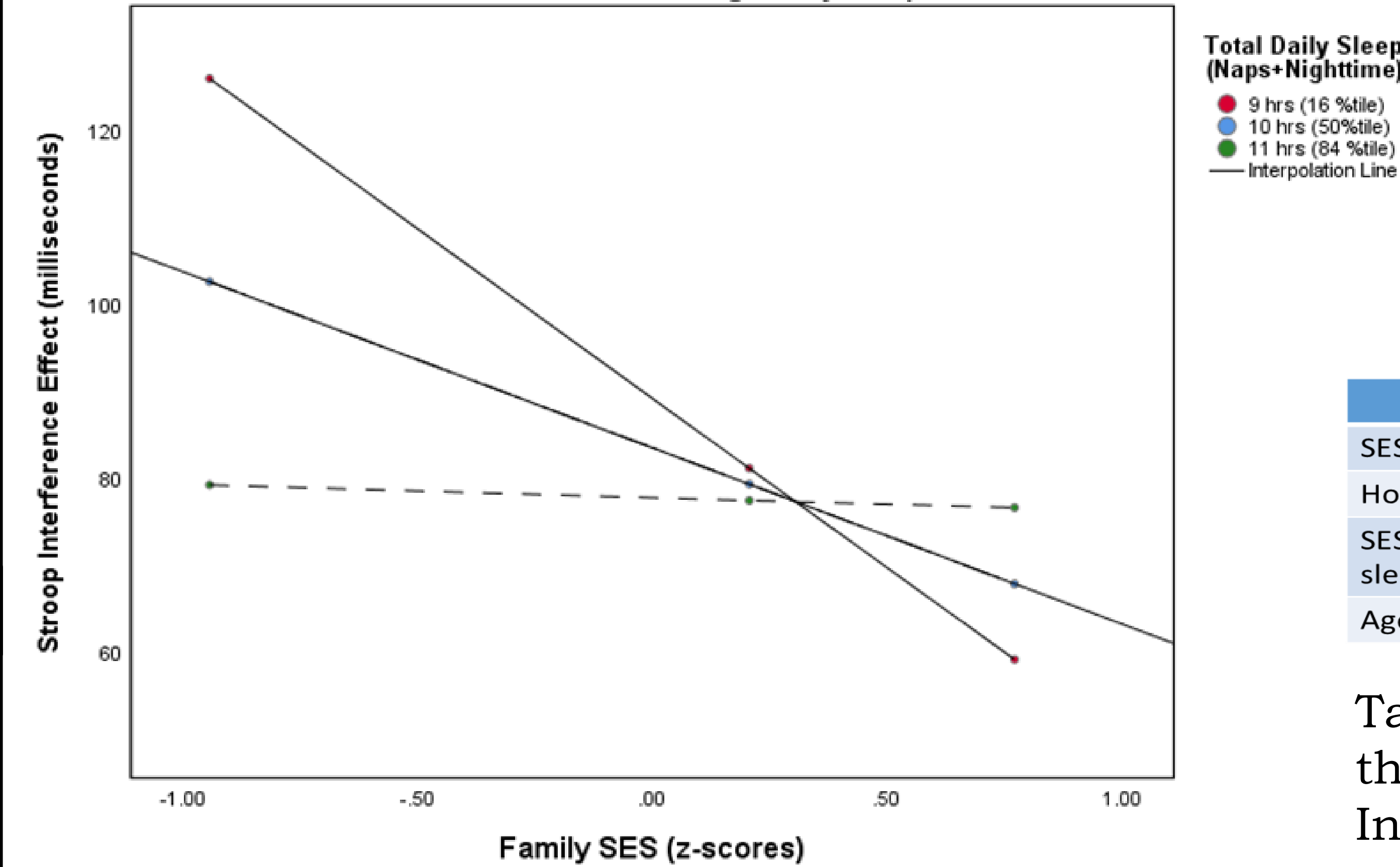
### Parent Reports

Child Sleep Habits Questionnaire

Family SES: composite of income-to-needs ratios, parental occupational prestige, and family income

## Results: Daily sleep moderates the relationship between SES and inhibitory control

Relationship between Stroop Interference Effect experienced and child's family SES, at different levels of Average Daily Sleep



	b	t	p
SES	-.2078	-3.029	.0031*
Hours of daily sleep	-.0001	-.7082	.4804
SES X Hours of daily sleep	.0003	2.7024	.0080*
Age	-.0016	-1.5485	.1245

Table 2. Model testing Daily Sleep as a moderator of the relationship between SES and Stroop Interference Effects; Age as a covariate

Daily Sleep	effect	t	p
9 hours (16% tile)	-.0390	-3.7775	.0003*
10 hours (50% tile)	-.0203	-2.3070	.0230*
11 hours (86% tile)	-.0015	-.1260	.9000

Table 3. SES predicted inhibitory control at the lower (16% tile) and middle levels (50% tile) of daily sleep; not at the highest levels

## Conclusion & Discussion

- Children from lower SES families experienced higher Stroop interference; shorter total daily sleep duration
- Daily sleep was a moderator of the relationship between family SES and children's inhibitory control skills:
  - SES predicted inhibitory control at the lowest (9 hrs) and middle (10 hrs) of parent-reported daily sleep
  - SES did not predict inhibitory control at the highest levels of parent-reported daily sleep (11 hrs)
- The SES and Daily Sleep scores were relatively high in our sample, which makes this result of the "buffering" effect of sleep surprising – perhaps sleep plays a particularly robust moderating role?
- Future studies should examine this relationship in samples with more variability, e.g. lower SES families; high EF disruption contexts

## Funding

Clara Mayo Memorial Fellowship (BU); Learned Society Travel Fund (Princeton University)