Sleep Restriction and Altered Sleep Timing on Energy Expenditure

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Introduction

- Chronic sleep restriction can negatively affect inflammatory status, blood glucose control, and insulin sensitivity.
- Sleep restriction is also linked to obesity and weight gain in young adults.
- It is unclear if sleep restriction impacts lifestyle behaviors like physical activity throughout the day.
- Few studies have examined if the time of sleep restriction will modify these lifestyle behaviors differently.

Purpose

To examine the effect of the timing of sleep loss on physical activity.

Hypothesis

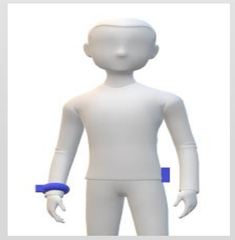
Physical activity behaviors will vary whether bedtime was delayed, or wake time was advanced.

Methods

Subject Inclusion Criteria

- Must sleep 7-9 hrs a night regularly
- 21-45 years of age
- Normally active (>5000 steps per day)
- Have a BMI of <40 kg/m2
- Subjects included will fill out questionnaires addressing health history, sleep patterns, physical activity, food intake, etc.

- For 6 days subjects will wear an activity monitor (actigraph) and sleep monitor (actiwatch



- For the first experimental condition, the subject will wear the actiwatch and actigraph for six day of normal sleep (7-9 hours).
- For the second and third experimental condition, subjects will the follow the first condition but will reduce the number of hours they sleep by two hours for four days. Either by going to bed later in the night or waking up earlier.

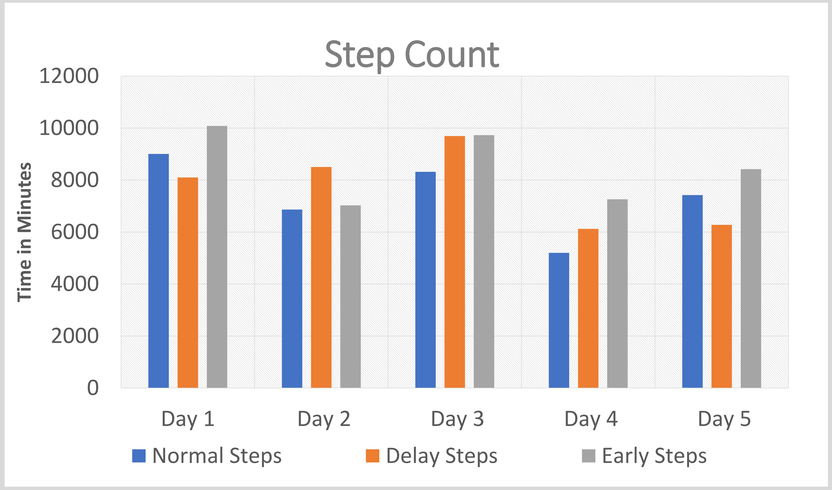


Figure 1: Total number of steps taken while awake was not different by condition (P>0.05). There was a trend (P<0.059) in total steps taken across days, with the lowest number of steps taken following the 4th night of sleep restriction.

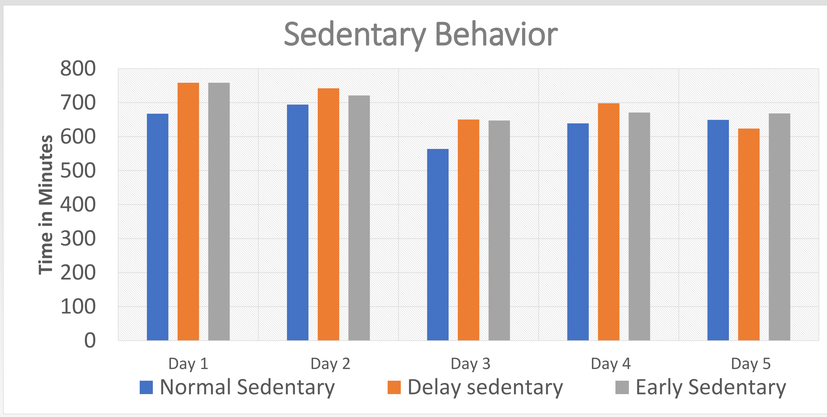


Figure 2: There is no change in sedentary behavior across all 5 days and between conditions.

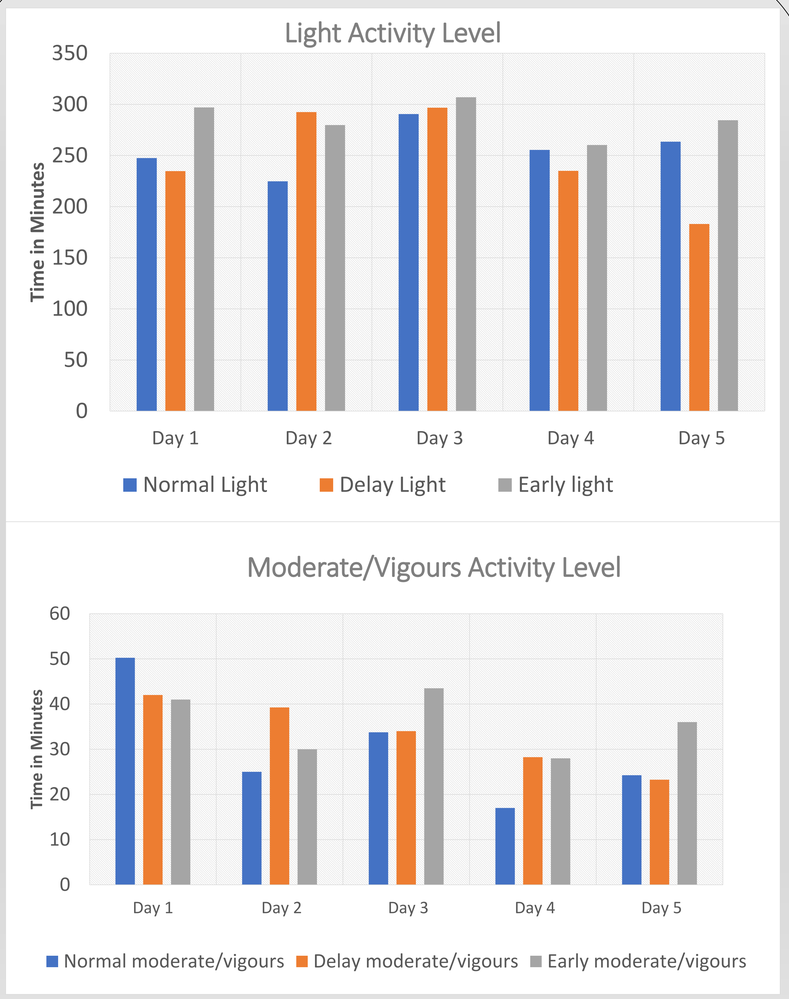


Figure 3 and 4: Light and moderate/vigours behavior across the 5 days doesn't change and between each condition has no change.

For all three levels of activity, data collected for the extra 2 hours awake in each condition need to be further analyzed to see if any additional difference occurred while awake.

Future Directions

- If the timing of the sleep loss affects the behaviors, this would then be a known therapeutic target.
- The next step after this would be separating subjects by age groups and establishing if age alters the lifestyle behaviors changes observed with sleep restriction.