Students' sleep and academic performance

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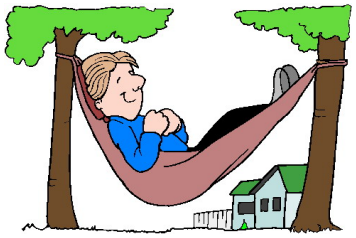
Data Science Incubator, Fall 2014

Hypothesis: Poor academic performance in college students correlates with poor sleep behaviors

Course: Biological Clocks and Rhythms, Spring 2014
72 students, seniors
Data recorded over: 6 days, including 1 weekend.



- **Sleep parameters:**
  - chronotype
  - social jetlag
  - variability of sleep onset, duration, offset etc

- **Performance:** grades (midterms, quizzes etc)

-**Purposes:** Research, teaching and public health goals.

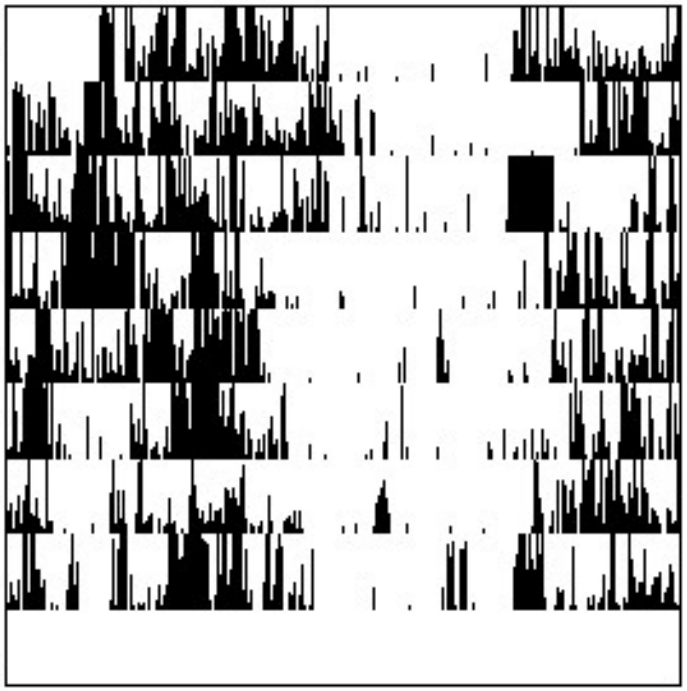
Datasets and Scientific Questions

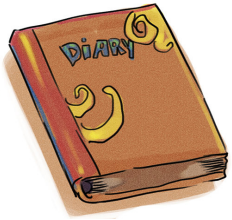
Data from:

1) 

Actiwatch

Example: →



2) 

Sleep Diary

3) 

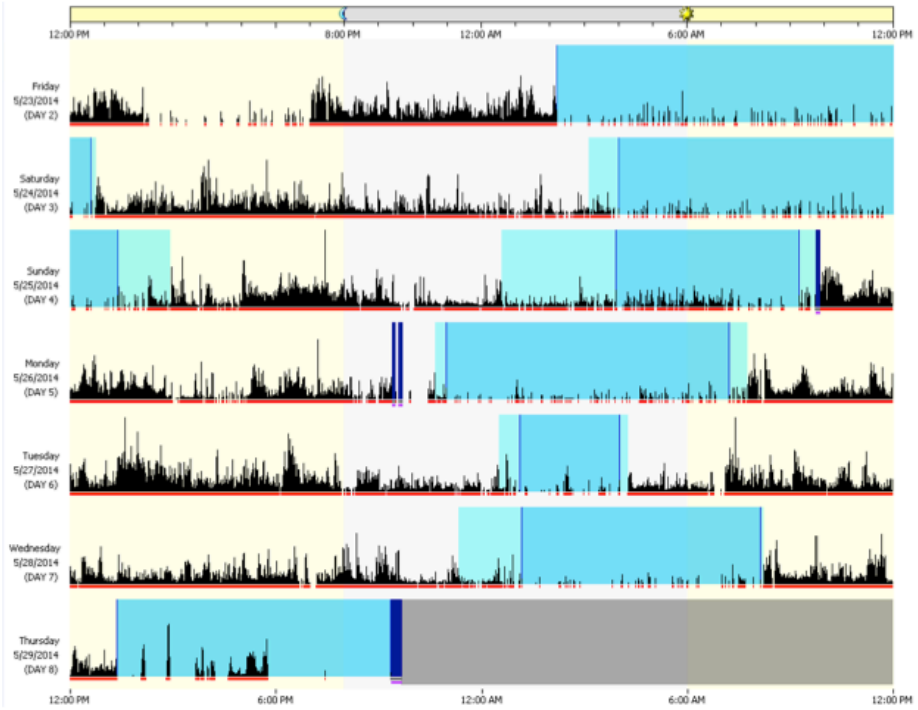
Chronotype questionnaires

Correlated to:

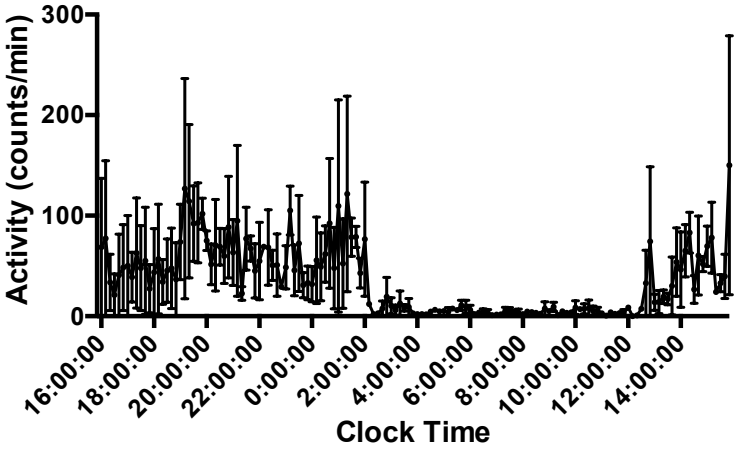
Grades? 

Gender?

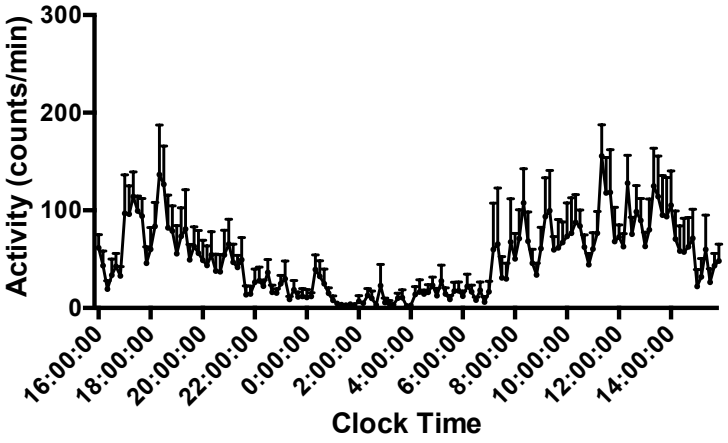
Example of individual student's actograms



Weekend

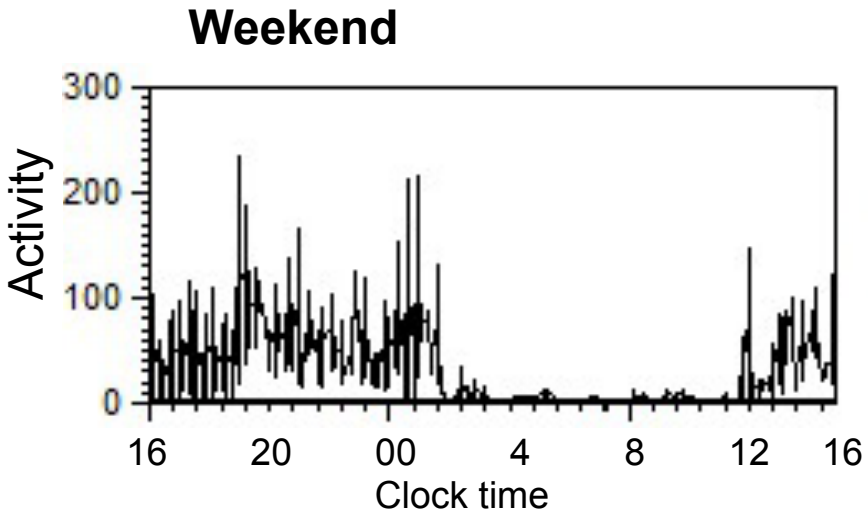


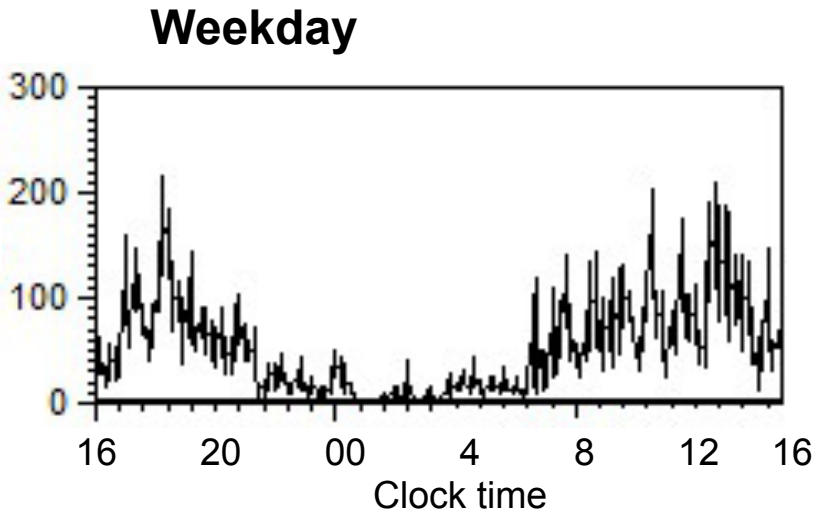
Weekday



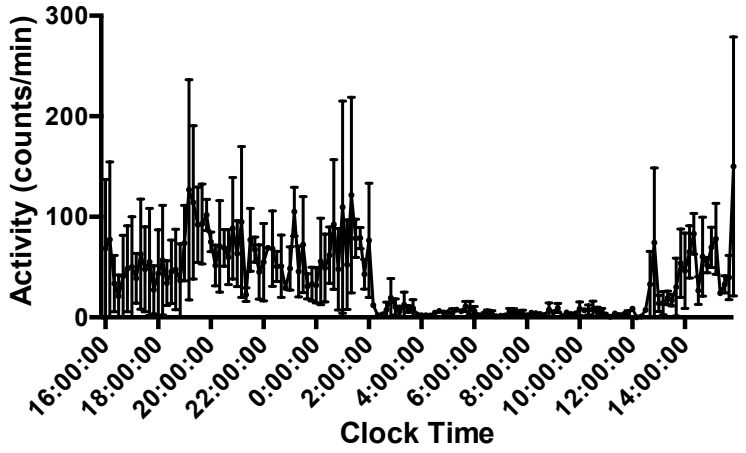
Individual student's actograms: Incubator results match with manually-processed data

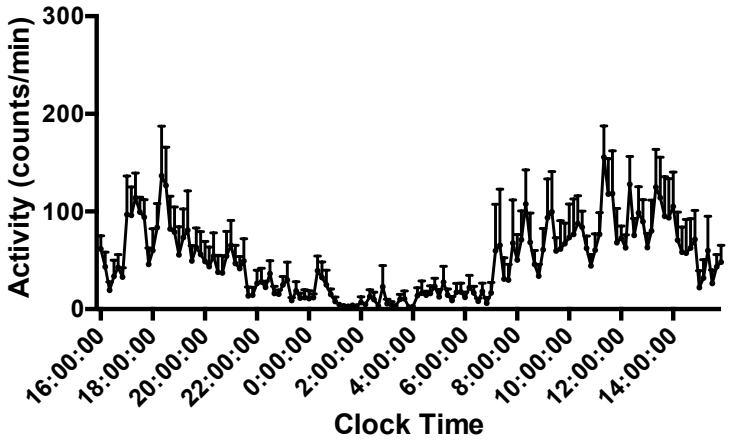
Manual



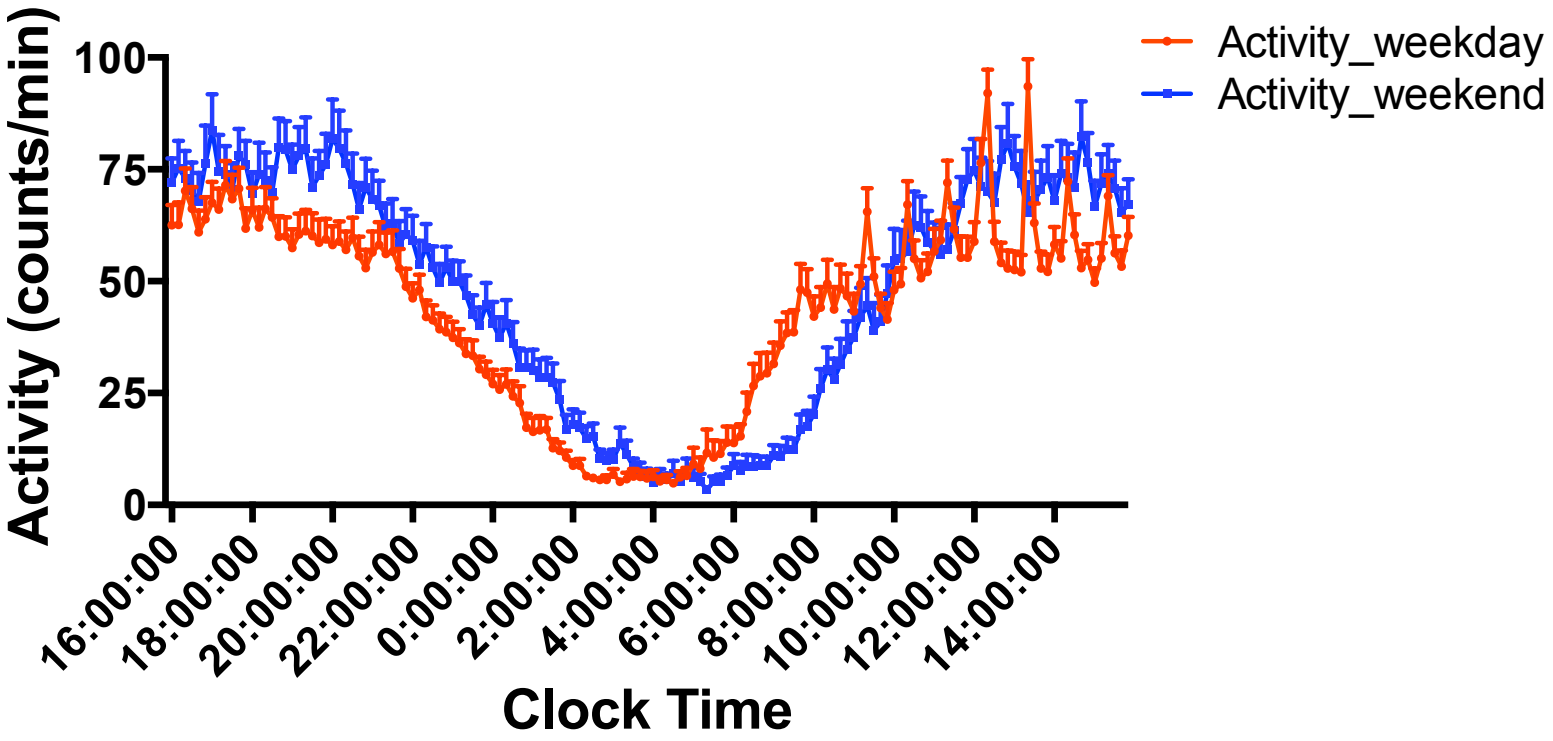


Incubator



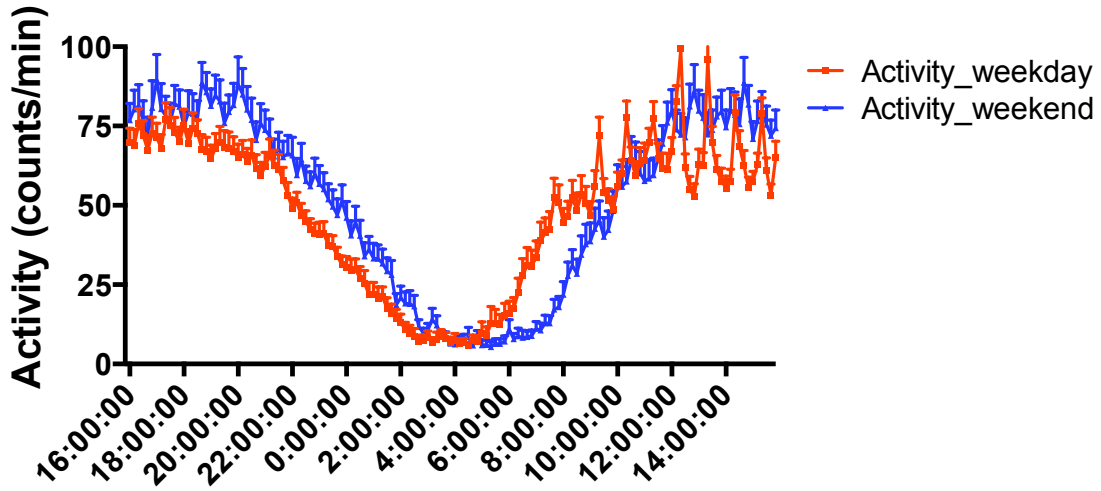


During weekend, students go to bed later, wake up later and sleep more than during weekdays

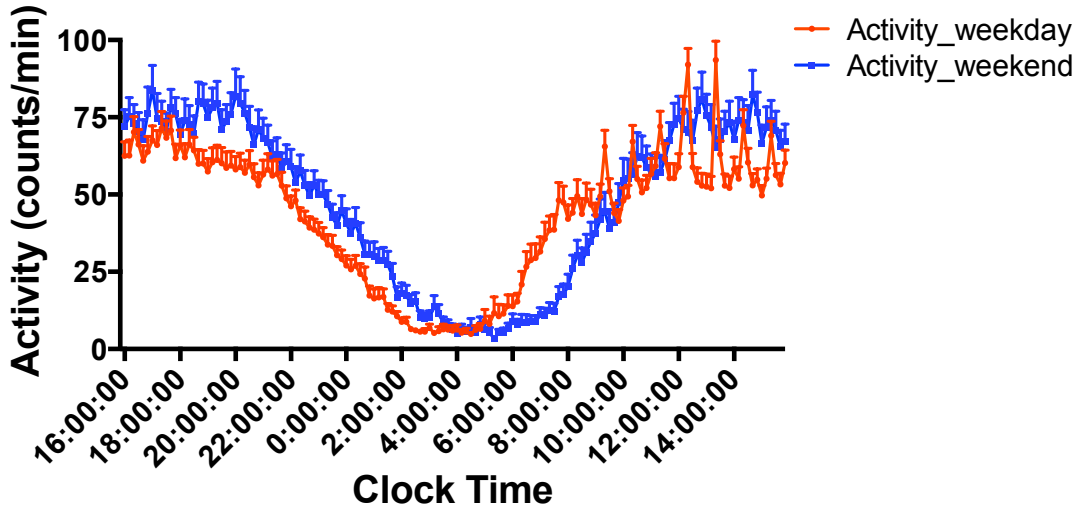


Entire class average waveforms: Incubator results match with manually-processed data

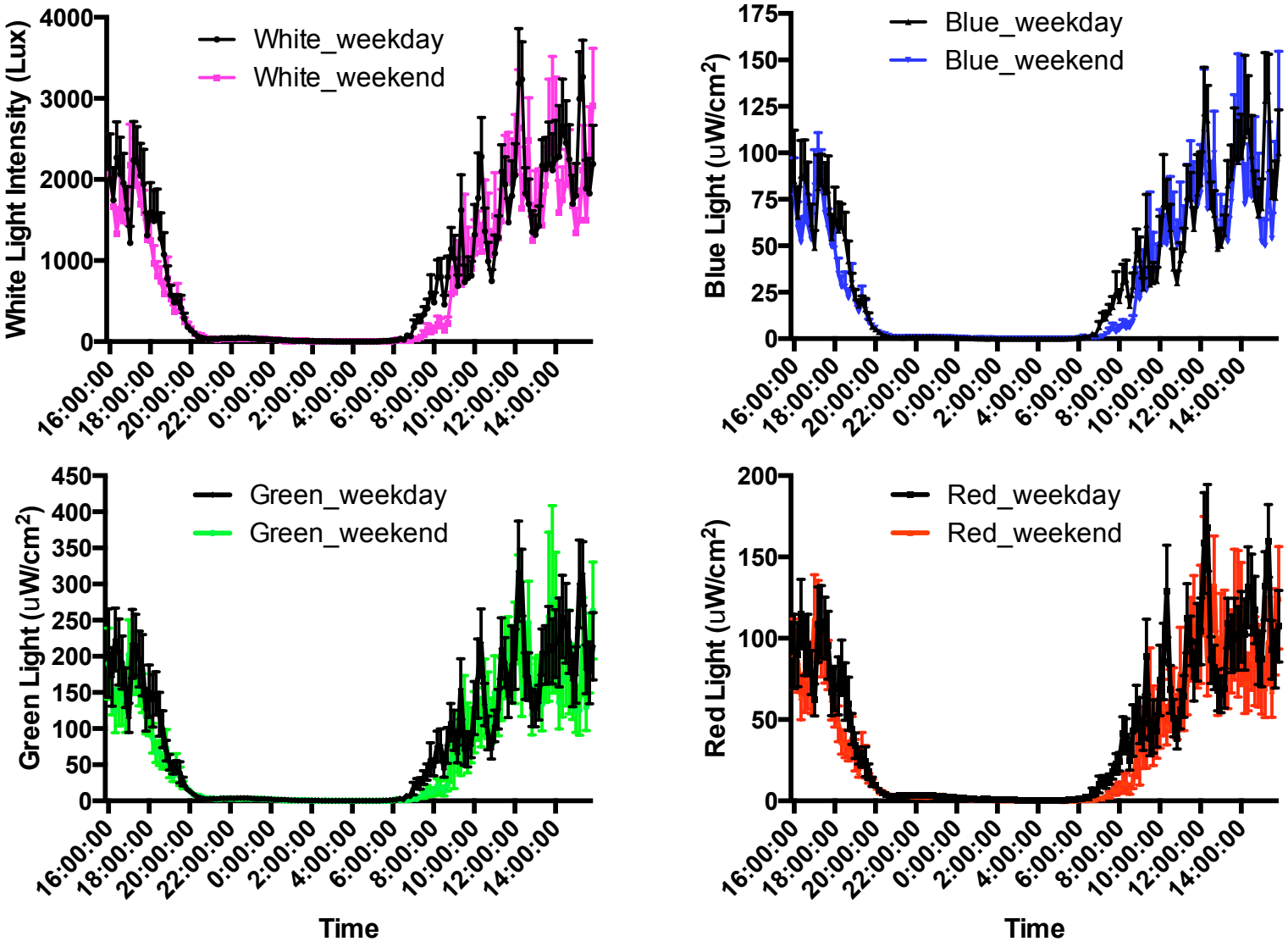
Manual



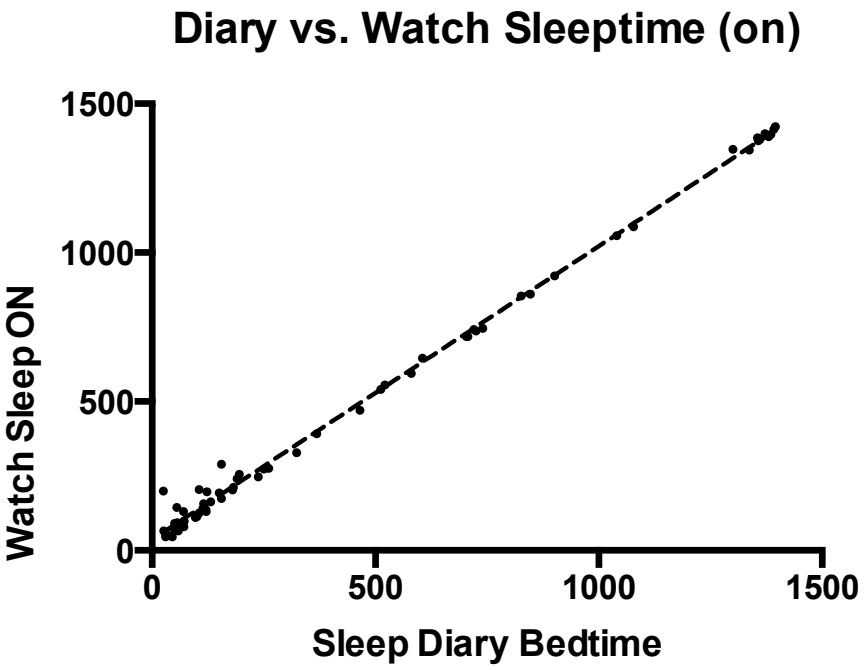
Incubator

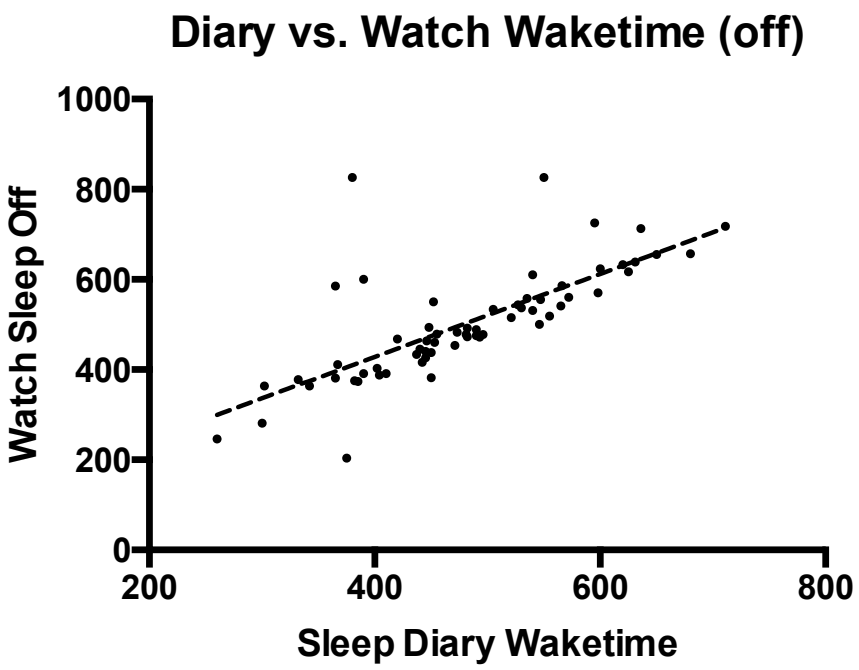


On weekend, students' exposure to light in the morning is delayed



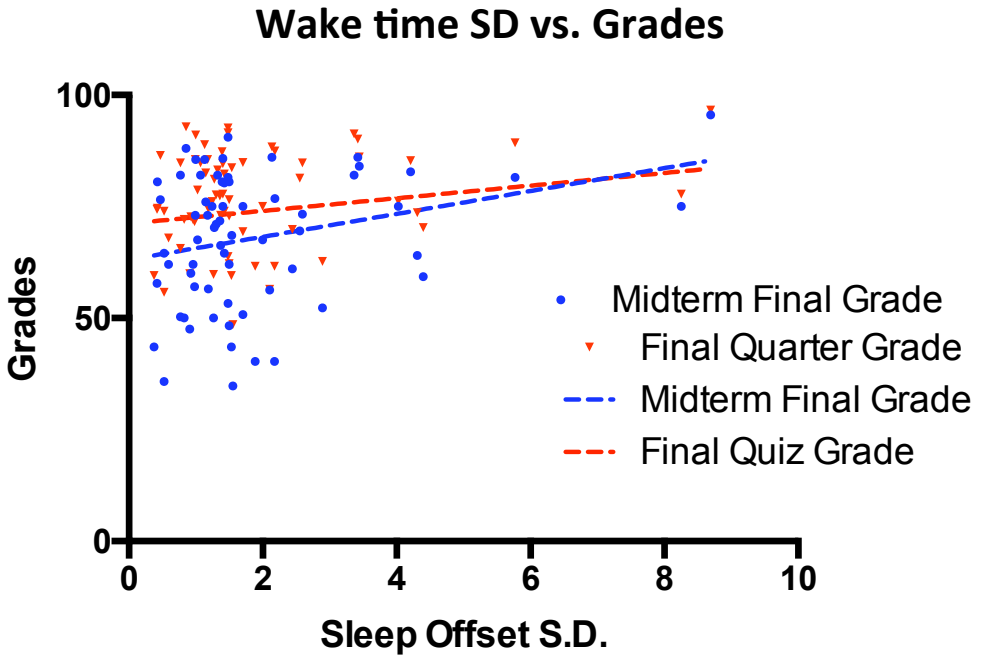
Although self-reported, diary information correlates for the most part with actiwatch data

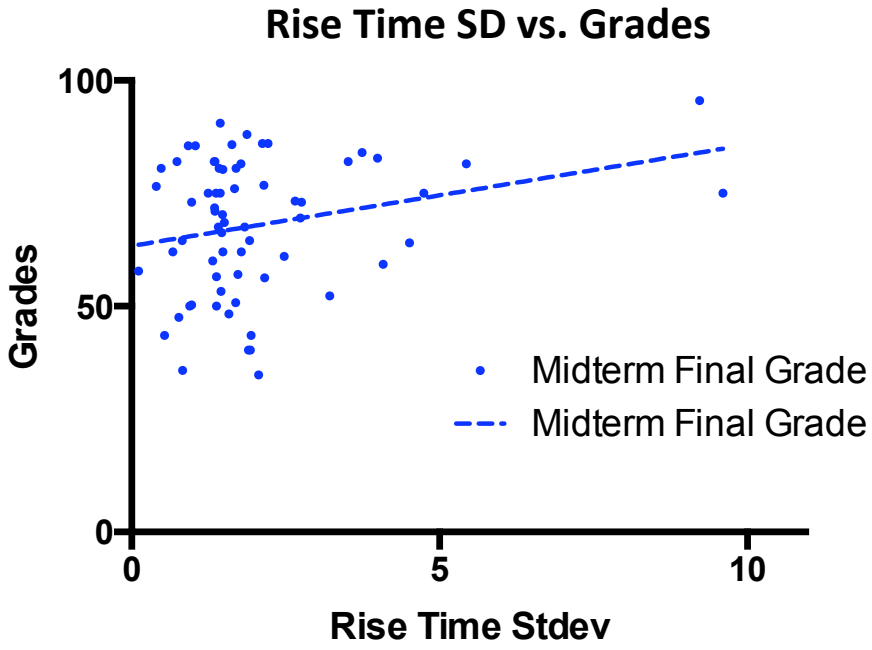




P < 0.0001

Wake time SD and Rise time SD (from Sleep Diary) correlate with grades: higher variations correlated high higher grades





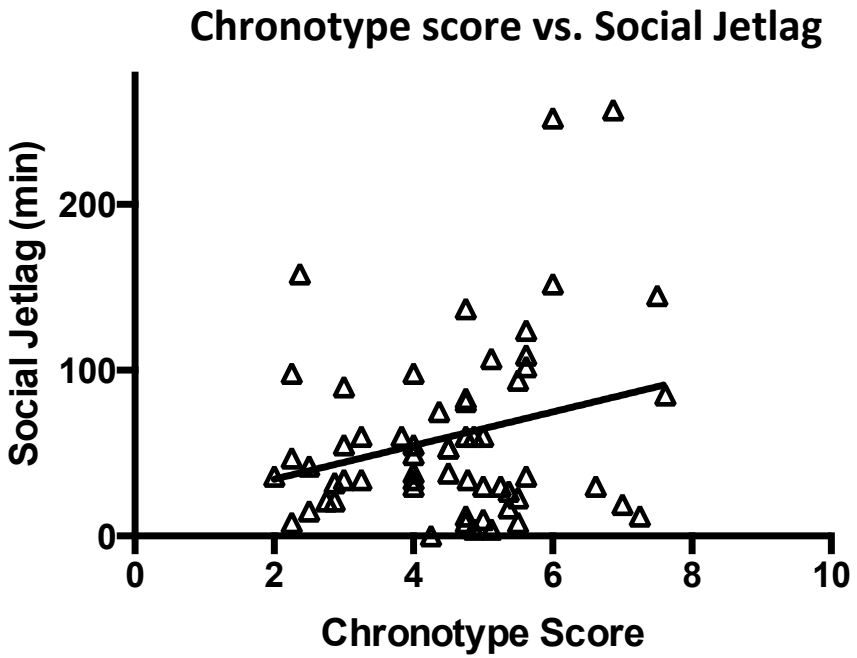
Midterm Final Grade: P = 0.0249
Final Quarter Grade: P = 0.0490

P = 0.0396

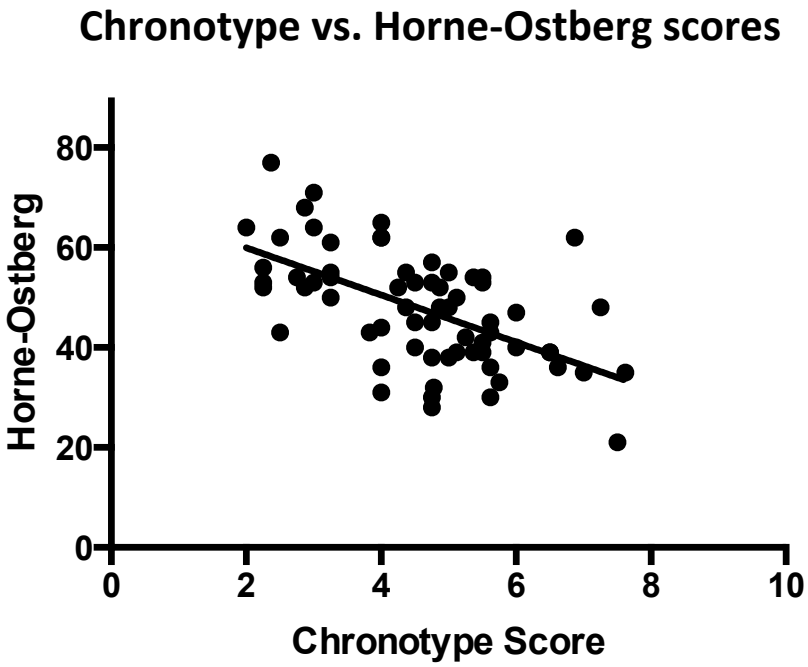
Collected data agrees with results from literature:

Late types tend to have bigger social jetlags

Chronotype questionnaires scores correlate with each other



P = 0.0449



P < 0.0001

Summary

Conclusions:

• Most sleep parameters did not correlated with performance. Bigger N needed for definite conclusions.

• Some correlations agree with literature data: later chronotypes have bigger social jetlags and females tend to be earlier types.

•Students go to bed later, wake-up later and sleep more on weekends.

•On Weekend, student's exposure to light is delayed in the morning.

Future directions:

- Obtain bigger N.
-Add demographic data (ethnic, socio-cultural, living on/off campus data etc) to correlate with sleep patterns and performance.

Acknowledgements

- Horacio de la Iglesia (PI)
- de la Iglesia lab
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- eScience team:

 - specially Bill Howe and Dan Halperin

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