APPLIED COGNITIVE SCIENCE
CLASS WEEK 2: BODY OVER MIND: CIRCADIAN AND HOMEOSTATIC RHYTHMS PART 2

DATA ANALYSIS
Learning objectives: 1) To consider experimental design and data of a complex experiment. 2) To experience how getting the data ready (preprocessing) is the biggest step of data analysis; 3) To exercise plotting data in R; to (re)introduce mixed-effects models in R; to increase awareness of experimental methods by discussing experimental strengths and weaknesses.

Teaser: Next week, we'll look into cycles/rhythms in the data…

Data
Data has been uploaded to Brightspace as a zip-file (FaceStroopExp_data.zip)

Data analysis
A script to aid data cleaning and analyses has been uploaded (FaceStroopExp_analysis.Rmd).

Assignments to be answered in study groups

1. *Introduction1.* Please write a few sentences summarizing the putative links between satiation, sleep and cognition.
2. *Introduction2.* In the study, participants were asked to report on their age, gender, current level of satiation/hunger, freshness/tiredness, positive/negative mood, hours since eating, hours since sleeping, and the hour of day was recorded. This was combined with a short experiment measuring RT and accuracy on a Stroop task. Please write out some of the most interesting hypotheses that could be answered with this dataset.
3. *Data loading and overview.* Load the data in R either by making your own code or adapting the supplied code. Report how many independent datasets were in the raw datasets. How many Stroop trials were in the raw data?
4. *Data cleaning1.* The data contains a lot of variables. Go through them and try to figure out what they are measuring. Check if they are in the right format (character/factorial/numeric) for what you want to use them for.
5. *Data cleaning2.* In the supplied script a number of cleaning steps are done. Try to go through each of them and make a list of what they do. Some of the choices are subjective. Try changing them and see what happens (eyeballing dataframe and using plots). Make a list of the steps with a short explanation. Is anything missing? How many unique participants were in the experiment (recall that each participant participated more than once)?
6. *Data plotting.* Look at the plots produced by the supplied code. Do any patterns emerge? Produce at least one informative plot which is not in the supplied code.
7. *Data analysis.* Analyze the data using R to test the hypotheses stated under 2, either by making your own code or adapting the supplied code.
8. *Reporting.* Make a brief summary of the results. Where the hypotheses supported?
9. *Discussion1.* Experiments require participants to be cooperating (i.e. wanting to participate and to do well). Online experiments have less control of who participates and what their intentions are. Briefly discuss the possibilities of discovering

participants who either are not motivated or have malicious intentions. What would be the potential "tells" in the data?

10. *Discussion2.* Asking the participants about their inner states might bias them towards answering in particular ways to support their own views of how their body/mind is connected or to try to please the experimenter (also called "demand characteristics"). The solution to this is blinding the participants/experimenters to the purpose of the experiment. Briefly discuss what the potential biasing problems are with this experiment and if they could be handled through blinding and what the challenges with blinding would be.
11. *Perpectives.* Name at least one applied scenario where these findings might be relevant.
12. Send one report with filename: "02Class_GroupX_assignment.pdf", where X is your group number to a member of the paired group (cc. MW): 1-6, 2-7, 3-8, 4-9, 5-10. Deadline Friday, this week.
13. Provide short written feedback (max 10 lines) on paired group's assignment: What was good? What was missing? Deadline Tuesday next week.