CG 504 Research Methods in Cognitive Science

Term Project

This Term Project requires you to conduct a scientific experiment including data collection, statistical analysis and scientific reporting.

A. General Instructions:

1. The project is to be executed in groups. Each group should have 5 members. You are free to form your own groups.
2. Every team shall collect data on at least **15** unique participants.
3. Each group shall choose 2 items from the listed *Exploratory Analysis*, and 1 from *Easy Analysis*. Every group must address all of the items in *Mandatory Analysis*.
4. Use checks for normality and use appropriate correction techniques if required
5. Use apriori estimates for power wherever necessary
6. Post-hoc power analysis and reporting of analysis as per standards discussed in class.
7. Report each group member's contribution in the execution of the project.

B. The experimental paradigm is available online at:
https://www.expfactory.org/experiments/dietary_decision/ (Dietary Choice Task)

C. Details are available in the following research article**:** *Self-Control in Decision-Making Involves Modulation of the vmPFC Valuation System by Hare et al. (2009)*

PDF can be downloaded at: *http://www.rnl.caltech.edu/publications/pdf/hare2009.pdf*

D. Additional data you need to collect from the participants:

1. Hours from last meal/food
2. Hunger index (1-10 scale)
3. Time of the day the test is conducted
4. Age

ANALYSIS:

A. Exploratory Track

1. Tastiest and untastiest items
2. Healthiest and unhealthiest items
3. The most confusing item: long time to decide
4. Most unavoidable items: just couldn't control myself!

Analysis Track

Easy

1. Is there a difference in the time taken for decision-making on healthy and unhealthy?
2. Is there a difference in the time taken for decision-making on tasty and not-tasty?

Mandatory

1. Classifying a subject as self-controlled vs not (follow instructions in the Subject classification. Section of the paper) and replicate Fig 1B
2. Use ANOVA to analyse the difference in the response time for decision making in self-controlled vs non self controlled individuals for :
    a. Disliked unhealthy
    b. Disliked healthy
    c. Liked unhealthy
    d. Liked healthy
3. Understanding self-control and hunger (correlation/regression to understand if not having food before the experiment negatively affects self-control). Justify with relevant visualizations and statistical tests

Report Track

Research Paper

Include the following sections as per standard academic practices:

- Introduction: Motivation of the study
- Relevant literature: brief description of similar works or previous insights
- Methodology: Detailed description of experimental paradigm, protocol and dataset details. Statistical analysis used and their justification.
- Results: Details on the listed outcomes, observations presented graphically/in tabular form.
- Discussion: interpretation of the results, their significance and implications
- Conclusion: brief conclusive comments and future directions.