Assignment 3: Neuroscience of Decision Making PSY 307 (Monsoon 2024)

Name:

Roll Number:

Instructions: Please write your own responses and do not copy or lift text/code from any source (including the paper). If you are referring to credible external sources other than the attached paper for your answers, please cite those sources (within the body of text and the provide a reference list at the end) in the APA citation format (https://www.mendeley.com/guides/apa-citation-guide). Word limits given are indicative and less than the indicated numbers may also be used.

Please download this MS word question-cum-response template to TYPE your answers and feel free to add sheets as required. Convert this document to a PDF and rename the file: name_RollNo. before submitting. Please note that answers in this template only will be evaluated and hand-written or scanned answer sheets will not be evaluated.

[Strict deadline for submission: 23 November, Saturday, 11:00 AM]

Please paste the relevant code and graphs in this document

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1. Fill out the google form: https://forms.gle/AFfSvHugnMg3JMCQ6

2. Two independent groups of participants (63 each) performed an Iowa gambling task. There are a total of 4 decks and 100 trials. Decks 1 and 2 yield immediate and steady rewards, but they are also characterised by unpredictable occasional losses that can result in negative long-term outcomes. Decks 3 and 4 offer relatively lower and steady immediate rewards, accompanied by even lower and less unpredictable occasional losses, leading to favourable long-term outcomes. The file 'choice.xlsx' contains the deck chosen by the participant from four available options - deck 1, 2, 3, 4, 'win.xlsx' contains the gain associated with the deck chosen and 'loss.xlsx' contains the loss associated with the deck chosen. Each excel file contains two sheets representing the two groups. Each sheet contains 63 rows and 100 columns, each row representing one participant's data and each column represents one trial.

Now solve the following. Insert a figure (wherever required) and paste the MATLAB/Python/R code for the same. Any figure must provide all information necessary to interpret it including axes labels, captions/legends (simple figure titles as captions are not enough).

A) Calculate the proportion of switches made after a loss and a gain trial for each participant. Switch refers to a change in the choice of the deck in the subsequent trial. A loss trial is where the money received is less than the amount lost, and a gain trial is where the money received is greater than the amount lost. Create a larger plot with two subplots—one subplot representing each group. Plot bar diagrams representing the mean proportion of switched responses for the gain and loss trial and the standard error of the mean for each group. [6+4 marks]
Conduct appropriate statistical tests to compare the

i) proportion of switched responses of gain/ loss trials between groups. Briefly explain the findings of the statistical analysis carried out.

ii) proportion of switched responses of gain trial and loss trials within each group. Briefly explain the findings of the statistical analysis carried out.

(Hint: If the data in each of the two groups follow a more or less normal distribution, use a parametric test for testing the difference between two independent group means. Otherwise, use a suitable non-parametric counterpart of the parametric test.)
[Answer]

B) For each group, determine the deck chosen by each participant immediately before switching decks after encountering a loss trial. Subsequently, calculate the proportion of each deck chosen relative to the total number of loss trials for each participant. Create a larger plot with two subplots—one subplot representing each group. Plot the mean proportion as a bar diagram and the standard error of the mean for each of the four deck choices during loss trials. Rank the decks in decreasing order based on their mean proportions for each group. [4+ 1 marks]
[Answer]

C) For each group, determine the deck switched to by each participant immediately after encountering a loss trial. Subsequently, calculate the proportion of each deck chosen relative to the total number of loss trials for each participant. Create a larger plot with two subplots—one subplot representing each group. Plot the mean proportion as a bar diagram and the standard error of the mean for each of the four deck choices during loss trials. Rank the decks in decreasing order based on their mean proportions for each group. [4+1 marks]
[Answer]