Assignment 3: Learning and Memory PSY 306 (Winter 2024)

Name:

Roll Number:

Instructions: Please write your own responses and do not copy or lift text/code from any source. 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:. before submitting. Please note that answers in this template only will be evaluated and hand-written or scanned answer sheets will not be evaluated. Please submit ONLY ONE PDF and no extra files as it increases the time to evaluate them. DO NOT change the basic structure of the template. DO NOT remove the marks assigned for each question.

[Strict deadline for submission: 22 April, 11 PM]

PART A:

(Fill out the Google Form)

PART B

1.

5 participants performed a task where they were presented with a list of words on a computer screen. The words were presented one at a time. There were a total of 16 words in each list. After the presentation of each word in one list, the participants were asked to recall that list. The given Excel file contains the data of the words recalled from each list, and each sheet contains data for a total of 198 trials per participant.

Each row in the 'LM_A3_Data1.xlsx' file represents one trial.

Each column represents the serial position of the recalled item/word. The data file contains a numerical identifier for each response made by the participant during the free recall period.

The integers in the data file correspond to the serial position of the recalled item. For example, integer 15 will correspond to the word which was presented at the 15th position in the list of 16 words.

-1 represents intrusions (word repeated from the previous list)

0 represents no item recalled at that position

Now do the following

A) Count the frequency of each item/word recalled by each participant. Plot a simple line and marker plot for each participant. Create a larger plot with 5 subplots, each containing the data for one participant. Identify and explain the effect associated with memory recall that can be observed from the data.

[3+1 Points]

Hint: Create a larger figure with five subplots (positioned as 5 rows x 1 columns); Indicate the participant number on top of each subplot as the title.

[Answer]

B) For each participant, compute the distance from the last item recalled within each trial, excluding zeros and -1, by subtracting the item at the current index (ith) from the subsequent item at the adjacent index (ith+1). Count the frequency of each value and create a larger plot with five histograms (as subplots), each displaying the data for one participant.
What information can be drawn from the distribution (of the plot) with respect to the distance from the last recalled item?

[4+2 Points]

Hint: Create a larger figure with five subplots (positioned as 5 rows x 1 columns); Indicate the participant number on top of each subplot as the title.

[Answer]

2.

Use the data given in LM_A3_Data2.xls | An experimenter recorded and pre-processed EEG data from 20 participants on an auditory oddball task playing them standard and deviant tones. The interstimulus intervals between the two tones were manipulated at levels – 0.75 s, 1.5s, 3s, 8s, and 9s as the EEG traces evoked by both standard and deviant tones were measured (1000 Hz sampling rate) from the participants' brains. Each Excel file sheet has data for both standard tone (beginning from cell 'B3') and deviant tone (beginning from cell 'B25'). For each of the above tones there is a 20 (participants) x 100 (time point) matrix in each sheet. Do the following…

[All figures/schematics should be properly labelled and should have accompanying captions/legends to provide all information necessary to interpret the same…]

A) Make a figure with five subplots – one for each interstimulus interval. In each subplot, graph the average EEG response (across 20 participants) from standard and deviant tones in blue and red, respectively.

[4 points]

[Answer]

B) Analyze the data from each interstimulus interval statistically and report the time scale of echoic memory. Explain the cognitive science consistent rationale behind the calculation and reported time scale.

[4 + 2 points]

Hint: Carefully inspect the correctly created figure above for clues.

[Answer]