Judgment of Recency

Mini-Project 5
Michael Jacob Kahana

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Recency Judgment Experiment

In this project we will collect, analyze and interpret data on memory for temporal information. Our online experiment is a replication of a classic study by Yntema and Trask (1963). In their experiment, subjects made recency judgments on pairs of studied items, indicating which occurred later (or more recently) in the series. None of you will be surprised that people can do this task at levels significantly better than chance. But to understand how people do the task, we need to delve deeper and ask how performance in judging the relative recency of two events depends on the recency of each event, and the temporal separation between the events. The quantitative features of this relation will likely favor some interpretations over others.

To run in the experiment, please link to this URL: recency judgment experiment - Yntema & Trask, 1963. At the end of the experiment you will receive a random number certifying your participation. You will enter that number in Canvas along with your report.

For the purpose of this assignment, you may treat all the data as if they came from a single participant. If you can efficiently analyze the data from each of the participants individually, it is more accurate to analyze each person's data, and then average across people to create your final results.

Description of the data

In the data file, each row indicates a test list, and the columns are as follows:

1. "Subject" - the subject index;
2. "Left Comparison Type": the number of words that appeared since the word on the left side of the test trial screen (or "card" as in Yntema & Trask) was last seen. This number of intervening words includes words that appeared on study and test trials.
3. "Right Comparison Type": the number of words that appeared since the word on the right side of the test trial screen was last seen. This number of intervening words includes words that appeared on study and test trials.

4. “Correct Side”: which side the correct answer was on (0 represents left and 1 represents right)

5. ”Chosen Side”: which side the participant actually indicated to be more recent on this trial (0 represents left and 1 represents right)

Interpretation and Data Analysis Problems

1. For the case of 2 items since B, 16 items since item B, and 68 items since B, compute the probability of judging item A as more recent as a function of the number of items since A (0, 2, 4, 16, 68 and many) (“many” indicates that a word has NOT been studied prior to this test card and should be treated as if it was seen a long time ago, prior to whatever other word is on the test card). Plot one curve for each of the numbers of items since B with each curve showing the probability of selecting A ranging over the number of items since A. See Fig. 2 in Yntema & Trask (1963) (on Canvas under Files/Readings/YnetmaTrask1963.pdf) for a depiction of these curves (you do not need to label the curves as Yntema & Trask did and may use a legend instead).

   As stated in the original paper, the choice of which item is labeled A or B is arbitrary. We care about which item the subjects judge to be more recent regardless of whether it was tested on the right or left side and so reversing the definitions of A and B should not meaningfully affect the probabilities we compute. To this end, for a comparison of K items since item A and J items since item B (denoted by ”(K, J)”), you should pool all items together where either the left item or the right item occurred K items ago and with the other respective item occurring J items ago (so that one of the items in the pair, left or right, occurred K items ago and the other occurred J items ago). This will provide you with equal probabilities for the recency comparisons (K, J) and (J, K). Then to obtain the JOR curves from Yntema Trask (1963), you should complement these computed probabilities (replacing a probability of p with $1 - p$) for comparisons for which the number of items since item A (K) is less than the number of items since item B (J). This will provide you with probabilities such that the probability for (K, J) is equal to one minus the probability for (J, K). This flipping of the probabilities makes the plots more interpretable (without it, the curves do not appear as sigmoidal ’S’ shapes as in Yntema & Trask, but instead as ’V’ shapes). [4 points]

2. Consider the predictions of a time tagging, or retrieved temporal context model. In such a model, subjects can retrieve a time tag for each item and compare the time tags to make their judgments. Draw graphs to depict the predictions of this theory as a joint function of the items since A and the items since B. To do this, for each of several values of items since B, plot the probability of judging A as more recent as a function of the number of items since A, as you did in the first question. [2 points]

3. Consider yet another model, one in which people scan either backwards (from the end of the list) or forwards (from the beginning of the list) to "find" the most recent item. Assume that they can scan in either direction, and even move forward and backward until they get to one of the two items. Assume that they automatically keep track of the position of their scan. What predictions would derive from such a scanning model? Would the predictions be similar or different from the other model noted above? Draw another set of curves to show the predictions of this model in comparison to the previous model. The exact values in this plot are not as important as the qualitative distinctions, which should be clear in the plot and in your description of your prediction. You may create these curves in Excel or by hand, but make them clearly readable. [2 points]

Software for analysis

Although you are encouraged to use Microsoft Excel for this assignment, you may use one of the following software packages: MATLAB, Python, R, Java, C. If you want to use a different software, please email the TAs for approval.

Submission

You should save your report as a PDF and submit it electronically through the Canvas site. **Word documents are not accepted.** You also need to submit the code or the Excel spreadsheet you used to do your analyses.