**CONFIRMATORY STRATEGIES – NOTES 2020\_11\_04**

**GRAPHS**

**2-D line [to show the relation between two continuous variables]**

EXAMPLE: Pr(accuse red) as a function of Pr(red)

DESCRIPTION: show the probability of accusing the red suspect as a function of the posterior (in the accusation action). Show the overall function (black) and also show separately the function for the trials in which the prior is <0.4 (blue) and >0.6 (red)

Input:

* GENERAL:
  + Title = Action probability
  + range x-axis = [0, 1]
  + range y-axis = [0, 1]
  + tick x-axis = [0:0.25:1]
  + tick y-axis = [0:0.25:1]
  + label x-axis = Updated Pr(Red)
  + label y-axis = Pr(Accuse Red)
* LINES:
  + x-values coordinates: 0:0.05:1 (vector of 21 numbers equally spaced)
    - NOTE: we will use this x-values coordinates for ALL the lines. We use these 21 bins to group continuous variables into easier-to-show values
  + values-matrix (each row in the matrix is a line to show)
    - From the SummaryStatistics script, create the matrix with 3 rows (lines to draw) and 21 columns (21 points for every line). Select only the accusation actions, and start by saving the action (accuse red or blue) and the posterior (that is a number between 0 and 1)
    - The posterior is from a continuous space, but we want to use only 21 bins (described above as x-values coordinates). In order to do so, group the continuous values based on the closest bin-center (so assign 0 to all the values below 0.025, assign 0.05 to all the values between 0.025 and 0.075, etc.)
    - In this way you generate the row for the line to be displayed in black
    - Repeat the procedure for the two subsets with low (blue) and high (red) initial probability of red being guilty
* line-colors (one color for every line): [black, red, blue]
* line- styles (one style for every line): [solid, solid, solid]
* line- width (one width for every line): [2, 1, 1]

**2-D lines with standard errors [to show the relation between two continuous variables]**

EXAMPLE/DESCRIPTION as above, add the standard errors

Inputs as above, but in addition to the “(mean) values matrix” there is also a “SE values matrix” that contain the standard errors (each mean is associated with a SE). The SE equation is SD/N (standard deviation / number of observations) and you can calculate the SE in the same

You can find examples of plots with SE here: <https://matplotlib.org/1.2.1/_images/errorbar_demo_001.png> or check the first graph here

<https://jakevdp.github.io/PythonDataScienceHandbook/04.03-errorbars.html>

**OTHER GRAPHS (NEW)**

HEATMAPS (see below some examples from the Matlab analysis, it is a different style of the heatmap but the idea is the same)

1. STOP PROBABILITY IN PERIOD 1

5x5 heatmap, that shows the probability of stopping at the very first round based on the prior condition (x-axis, 0.1 to 0.9) and cost condition (y-axis, 5 to 80)

1. SEARCH RED PROBABILITY IN PERIOD 1

5x5 heatmap, same as above, but show the pr(search red)/pr(search, either red or blue)

i.e. the probability of searching red, conditional on searching something

NOTE that this probability is based on only the search actions, remove the accuse actions

1. STOP PROBABILITY AS A FUNCTION OF CURRENT BELIEF

Now use all the rounds (not only the first period) but remove all the rounds with evidence\_found=1 (we do not care about what participants do after observing the evidence) and in the x-axis you use the posterior instead of the prior condition.

For this heatmap use the concept of binned data (as for the lineplot), start plotting with 9 bins (and the code should be flexible enough to allow for a different number of bins if needed). So bin the data based on the posterior, and use the bin midpoints as values for the x-axis

1. CONFIRMATORY PROBABILITY AS A FUNCTION OF CURRENT BELIEF

Combinatino of 2) and 3). Use all the rounds as described in 3), but calculate the probability of searching red conditional on searching something. Use 9 bins

EXAMPLES OF HEATMAPS FROM PILOT DATA

