

ECE511/PSY511 PSYCHOPHYSICS
A Joint Offering by the School of Electrical and Computer Engineering
And the Department of Psychological Sciences
Purdue University
Fall 2018

HW #1 (Assigned: 08/23/2018; Due: *before lecture on 08/30/2018*)

Topic: Method of Constant Stimuli and Probit Analysis

- (1) Run yourself on *curvature detection* using the Method of Constant Stimuli, from the course website. Choose the “long” session and “yes” for feedback. Run Probit Analysis using SAS on your results. Discuss the results from probit analysis. Compute the 95% confidence interval for AL.
- (2) Run yourself on *line-length discrimination* using the Method of Constant Stimuli, from the course website. Choose the “long” session and “long” exposure time. Run Probit Analysis using SAS on your results. Discuss the results from Probit Analysis. Compute the 95% confidence interval for PSE.
- (3) Plot the data and the estimated psychometric function for both (1) and (2). Attach a copy of your data file and Probit Analysis results.

[*Hint 1*: Be brief and to the point in your discussion. Think about the points that you want to make before putting words on the paper. One to two paragraphs of discussion (double spacing, preferably typed) is sufficient.]

[*Hint 2*: See the attached Appendix for instructions on running Probit Analysis on SAS.]

[*Hint 3*: Recall that 95% confidence interval = $\text{mean} \pm (1.96 * \text{SE})$, where SE stands for standard error. Also recall that $\text{SE} = \text{SD} / \sqrt{n}$, where SD stands for standard deviation and n denotes the number of data points. Finally, the SAS output gives variance, which is equivalent to SD^2 .]

Appendix

How to Run SAS for Homework Assignment #1

URL FOR SAS SOFTWARE

Purdue ITaP has a Software Remote site at:

<https://engineering.purdue.edu/ECN/Support/KB/Docs/UsingITaPGoRemotesof>

You need to log in using your Purdue career account. From the Main page, choose the “Standard Software” folder, then the “Statistical Packages” folder, to access “SAS 94” application. Note that you may need to download a client software if you have never used the site before.

CREATE A DATA FILE

Run the experiment from the course website. At the end of the experiment, a data file window will pop up. Cut and paste the contents of this window to a text file in your home directory. **Save your data file.** *Caution: you may want to jot down your results if you are not sure that the data have been saved properly. Once you close the data window, the results are gone! You will then have to run the experiment again – Ouch!!*

Here is a sample data file for subject XYZ:

```
Data XYZ;
input strength NUM RESP;
cards;
90.00 100 2
97.00 100 8
105.00 100 35
113.00 100 81
121.00 100 91
128.00 100 100
136.00 100 100
144.00 100 100
152.00 100 99
160.00 100 100
;
proc print;
title ' Method of Constant Stimuli';
proc probit lackfit;
model RESP/NUM=strength;
run;
quit;
```

If you see extra “.” (period) or “,” (comma) in your data file, delete them.

Note that your data file should look the same as the above example except that (1) your initial, instead of “XYZ”, should appear in the first line, and (2) the actual numbers in the data columns would be different.

HOW TO RUN SAS

Four windows will appear with the following titles:

Explorer

Log

Output

Editor

Click on the “Editor” window to activate it. You can cut and paste your data file into the “Editor” window. Then right-click anywhere in that window and a menu will pop up. Scroll down and select “Submit All”. After a short pause, the results will appear in the Output window. Note that “MU” and “SIGMA” stand for the mean and the standard deviation of the cumulative Gaussian function, respectively. The variances for MU and SIGMA appear at the end of the output file in a 2x2 covariance matrix, along the main diagonal. You need to convert variance to SD, and then to SE, before computing the 95% confidence interval.