

Muller-Lyer Data Analysis

Introduction

In class, we ran a quick magnitude estimation experiment, where each student reported the apparent length on 8 trials.

In this assignment, you will write a short program to analyze and plot these data, and then comment on them.

How to get the data into Matlab

The data are provided in two tab delimited text file `MullerRawData2013.txt`. The first contains the combined data from this year's class and the last two year's (to get a bit more power). If you put this file in the same directory as your Matlab program and write the line:

```
theData = importdata('MullerRawData2013.txt');
```

then the data will appear in the Matlab matrix `theData`. Each row corresponds to one subject, each column to one trial.

Although the data file is not labeled, here is the design of the experiment. There was a standard line. We can call its length 100 in arbitrary units. There were two physical line lengths of the stimuli. These were 75 and 120 in the same units as the standard.

There were 8 trials. The order of the trials was

```
>--<, <->, <-->, --, >-<, -, >--<, <->
```

where the symbols indicate the physical line length (one dash -> 75, two dashes -> 120) and the arrows show you which variant of each length was shown on each trial. There were arrows in, arrows out, and no arrows trials for each line length. Note that the last two trials repeat the stimuli from the first two trials.

There were 26 subjects in the combined data set.

Your mission

Your mission is to analyze the data and make a nice plot, using a Matlab program. Your program should read in the data and make a useful plot that shows what happened in the experiment. You will have to make some decisions about what to plot, but below are some Matlab functions that may to be useful to you. For any comment, you can type `help thefunctionname` at the Matlab prompt and get some useful information about what it does. You can also type `doc thefunctionname` and get more extensive information.

`mean` – take the mean of rows or columns of a matrix (see `help mean` for how to specify rows vs columns)

`stddev` – take the standard deviation of the rows or columns of a matrix

`median` – take the median of the rows or columns of a matrix

`prctile` – find percentiles of rows or columns of a matrix

`sqrt` – take the square root of elements of a vector or matrix

`plot` – plot data in a figure window

`errorbar` – add errorbars to points on a plot

`saveas` – save a figure to a file

The `plot` command has many options. I recommend you spend a little while figuring out how to customize your plot a bit – for sure you will want to be able to control the scale of the axes and put labels, titles, and legends on your plot.

Use the `saveas` command to save your plot out as a PDF file.

Spend some time thinking about the best way to plot the data so that it is easy to see what they say. And, try to make your program as easy to read as possible, by adding clear comments and choosing sensible variable names.

After you plot the data, write a short paragraph about what the data show about the apparent length of the stimuli.

Turn in

Email me (brainard@psych.upenn.edu) your plot, your paragraph, and your program.