In Lab 4b, you’ll analyze and write up the results of the class experiment. Again I want you to basically do this in the format of a lab report, although some of the pieces have already been given to you in Lab 2. Of course, the analysis will be the more interesting/challenging part, and I have included some tips on this below.

LAB 4 FORMAT

Current Question of Interest – The first paragraph should state the question of interest in the study in your own words.

Design – copy one item set of conditions a-d into the document for illustration of the design

Materials – at least one paragraph describing the key properties of the linguistic materials we used and what the class did to try to control them.

Procedure – at least one paragraph describing the procedure for running the experiment: the characteristics of the participants, what equipment was used to collect data, what instructions the participants were given, how long the experiment took, etc.

Results – describe the results, and illustrate them with graphs.

Discussion -- discuss how the results fit in with the previous work (summarized in the handout for Lab 4a) and any broader implications.

Future work – briefly describe a follow-up that might be interesting—could use different materials, different method, different participant groups, etc.

ANALYSIS

1. Basic format. I’m giving you an Excel sheet with two tabs, one for the L1 group and one for the L2 group. There are six columns in each: subject, condition, item number, response, RT (reaction time) and numeric response (this just codes the Yes and No as 1 and 0 so that it’s easier to compute % of yes responses). There is one row for each data point for each subject. I’m including separate files that have the age for each participant. Unfortunately, the language experience information seems not to have been saved for the L2 group.

2. Notes on the data. You are welcome to look at the RTs if you want, but the main thing you should be reporting in this lab is the % acceptability from the ‘numeric response’ column. Our items of interest were labeled a, b, c, and d in the ‘condition’ column. We also included ungrammatical and grammatical fillers (you can see them in the ‘giraffe.js’ text file), practice items at the beginning, and control items that were meant to flag
people who weren’t paying attention at all (they say things like ‘Press the Yes button on the next slide’).

3. **Notes on data cleaning.** One important data cleaning step before you start is to get rid of data in which the subject ‘timed out’. We didn’t let people respond if they took longer than 2 seconds, so any trial with a reaction time longer than 2000ms gets a ‘NULL’ response in the ‘RESPONSE’ column. Therefore we’d like to delete those missing data points before we start the analysis. You can do this in a program like Excel by selecting ‘Data’ and then choosing ‘Sort’ to sort the data by RT, then you can scroll down to the bottom and delete those trials where the RT is greater than or equal to 2000.

4. In this long format it is very hard to see the structure in the data. Therefore the rest of the lab can be done using the ‘PivotTable’ function in Excel (although you’re welcome to try other things as well if you want). Below I am going to copy instructions of how to do this in one version of Excel. You may have a different version, but the logic is basically the same, and you should use the help function if you get confused.

5. The minimal things I’d like you to take a look at in the results section (feel free to include more):
   a. What’s the average pattern of results across our 4 conditions of interest in L1? What about in L2? How are they similar and/or different?
   b. If we thought that some subjects should be excluded, what data other than our conditions of interest could we look at to decide who should be excluded and why? If you exclude some subjects on this basis, does the data look cleaner?

**Creating a PivotTable:**
- Make sure your cursor is on some cell that has data in it.
- Select “Data > PivotTable ...” from the menu bar.
- Specify the range of data you want to use. Excel will often specify all of the relevant data by default.

- Here or in the next step, you'll need to decide where to place the PivotTable. It's a good rule to always place it in a new worksheet to avoid confusion. It's often a good idea to rename that worksheet later so you can keep everything straight.
Now you need to select the layout of your PivotTable. In older versions of Excel, you need to press the ‘Layout’ button that will appear after you press ‘Next’ on the earlier window. In newer versions of Excel, the empty data frame and PivotTable options window will pop up automatically.

Choosing the layout is a critical step which you will be messing around with a lot in this lab, so you should get familiar with this step. In the “Field name” box of the PivotTable window, there should be a list corresponding to the column names from the datafile. You can now drag-and-drop these menu items into the appropriate position to create your desired tables. The three choices are, what will the columns be, what will the rows be, and what will the actual values be that you put in the table.

In this lab, you're basically always going to be interested in reaction time measures, so you will always be dragging ‘numeric response’ into the box labeled ‘Values’ or ‘Data’, depending on your version of Excel. Most of the time you will be interested in looking at
different kinds of averages, so you need to make sure that you change from the usual default of ‘Sum’ or ‘Count’ to ‘Average’. You can do this by double-clicking on ‘numeric response’ in older versions of Excel or just by clicking on the Values subfield in new versions.

Most of the interesting choices will be in what you decide for your rows and columns. You can try different things, but if you’re only going to make one table for this lab, it should be the one that has subjects in the rows and conditions in the columns.

Finally, one super useful function is the ability to ‘uncheck’ subjects or conditions from your pivot table that you want to temporarily ignore. For example, if there’s a subject that I think wasn’t paying attention, I can click on the gray arrow next to ‘Rows’ in the table, and then it will bring up a window where I can unclick that subject so that they’ll disappear from the table and the averages.
Now you know how to create pivot tables!

Be aware that plotting from a pivot table can be tricky. I often just copy the results that I’m interested in to a different part of the spreadsheet and plot from there rather than trying to get it to work from the pivot table!