PurkinjePauseExperiment.m Script

On my Mac, this script runs all the way through, generating the Experiment structure, loading the raw data, analyzing the data, and generating a Figure folder with all the figures. Whether this will be true on other platforms remains to be seen.

To run the script, open Matlab, make sure the folder containing the script file (PurkinjePauseExperiment.m) is on Matlab’s search path, and call the script from the workspace (that is, type ‘PurkinjePauseExperiment’ {w/o the single quotes} and hit return).

The script is organized into cells, which are independently executable, and which provide a structure for the analysis. The cells are:

Cell 1: Creating the experiment structure

Cell 2: Daily START I always have this cell in a script in order to speed up getting started each time I return to the work. However, I have commented out the command that puts me in the right directory and the command that reloads the Experiment structure.

Cell 3a: Creating fields that are used to group subjects in accord with the experimental condition, that is to say in this case, in accord with

the CS-US interval used in training these decerebrate ferret subjects

Cell 3b: Fields specifying the US-US intervals and whether or not the spike recorder ran continuously, that is, during the intertrial intervals.

Cell 4: Raster plots for initial examination of data

Cell 5: Maximum and minimum interspike intervals

Cell 6: Inserting events into the raw data

Cell 7: Defining three trial types: MidCSon, CS, and PostCS. These trial types partition each trial into a pre-CS portion, a CS portion (during the CS, which was electrical stimulation of the dorsum of the paw), and a post-CS portion, allowing us to compute statistics separately for each portion on each trial

Cell 8(a,b,c,d & e): Some Basic Graphs

Cell 9: Differences between pre-CS and CS firing rates

%% Cell 10: Probability distributions for preCS, CS, and postCS interspike

% intervals

Cell 11: Histograms of interspike intervals for the 12 cells w continuous recording

Cell 12a: Computing & Graphing Fano Factors

%% Cell 12b: Checking exponential fits for the few subjects whose Fano Factors

% are within the Poisson range

Cell 13: Binarizing the data in preparation for using binary CP code to get pause stats.

Cell 14a: Computing pause stats. This is THE KEY CELL

Cell 14b Repeating above computation of pause parameters for subjects in other CS-US duration conditions.

Cell 15: Raster plots with Probability Distributions (PDFs) This cell creates a graph that shows the pause onsets and offsets found by the algorithm superimposed on the spike raster. The same figure shows the empirical probability distribution functions for the interspike intervals pre-, during and post-CS

Cell 16: Computing Pause Widths

Cell 17: Means, std's and coefficients of variation of pause onsets, offsets and widths

Cell 18: Pause parameter correlations

Cell 19: Quartiles of the Pause Stat Distributions for individual cells

Cell 20: Carrying pause parameters up to Subject level

Cell 21: Carrying pause parameters up to Group fields at Experiment level

Cell 22: Plotting Pause Onset & Offset Latencies and Pause Width and their CoVs

Cell 23: Plotting Correlations

Cell 24: CDFs of Group quartile pause-onset & pause-offset stats

Cell 25: CDFs of Group quartiles of pause width and maximum within-pause IspkI

Cell 26: CDFs of latency to onset of longest IspkI

Cell 27: Computing & plotting interspike intervals looking backward from pause onsets to CS onsets

Cell 28: Linear regressions on backward interspike intervals