# Exploring the Experiment's Design

In this set of exercises, we'll get our first look at the experiment we'll be analyzing in this course; curated data from the Steinmetz et al, 2019 paper.

Today's data is focused on three CSV files, each containing sessions from a different stretch of data collection. They contain trial-level data from the experiment:

- steinmetz_winter2016.csv
- steinmetz_summer2017.csv
- steinmetz_winter2017.csv

**Table of Contents**



## Loading and viewing data

Let's load in some csv data with MATLAB and see what we have!

| Code | Description |
|---|---|
| readtable('my_datafile.csv'); | read a csv file |
| data(row_start:row:end, :) | select rows from row_start to row_end from data |

**`Download datafiles`**

```
cwd = fileparts(matlab.desktop.editor.getActiveFilename);
url= "https://uni-bonn.sciebo.de/s/9FxelLhARmHpw85";
mkdir(strcat(cwd,'/data'));
```

```
Warning: Directory already exists.
```

```
websave(strcat(cwd,'/data/testfile.csv'), strcat(url, '/download') );
```

**Example:**

Load in the winter 2016 dataset and view the first 5 rows of the data

```
data = readtable('./data/steinmetz_winter2016.csv');
data(1:5,:)
```

```
ans = 5×15 table
```

...

| | trial | active_trials | contrast_left | contrast_right | stim_onset |
|---|---|---|---|---|---|
| 1 | 1 | 'True' | 100 | 0 | 0.5000 |
| 2 | 2 | 'True' | 0 | 50 | 0.5000 |
| 3 | 3 | 'True' | 100 | 50 | 0.5000 |
| 4 | 4 | 'True' | 0 | 0 | 0.5000 |
| 5 | 5 | 'True' | 50 | 100 | 0.5000 |

The variable data is a MATLAB table, we can see that in the Workspace pannel on the right.

**Exercises**

Load in the summer 2016 dataset and view the first 10 rows of the data

How many rows are in the summer 2016 dataset?

```
height(data)
```

```
ans = 3767
```

How many columns are in the summer 2016 dataset?

```
width(data)
```

```
ans = 15
```

What are the column names in the summer 2016 dataset?

```
data.Properties.VariableNames
```

```
ans = 1×15 cell
'trial'     'active_trials''contrast_left''contrast_right''stim_onset''gocue_tim ···
```

## Experiment Description: Calculating Statistics on Continuous Data

## Experiment Description: Calculating Statistics of Across Categorical Data

## Visualizing the Experimental Design using Plots

```
unique(data.session_date) % Note Matlab autoconverted session_dates to
datetime!
```

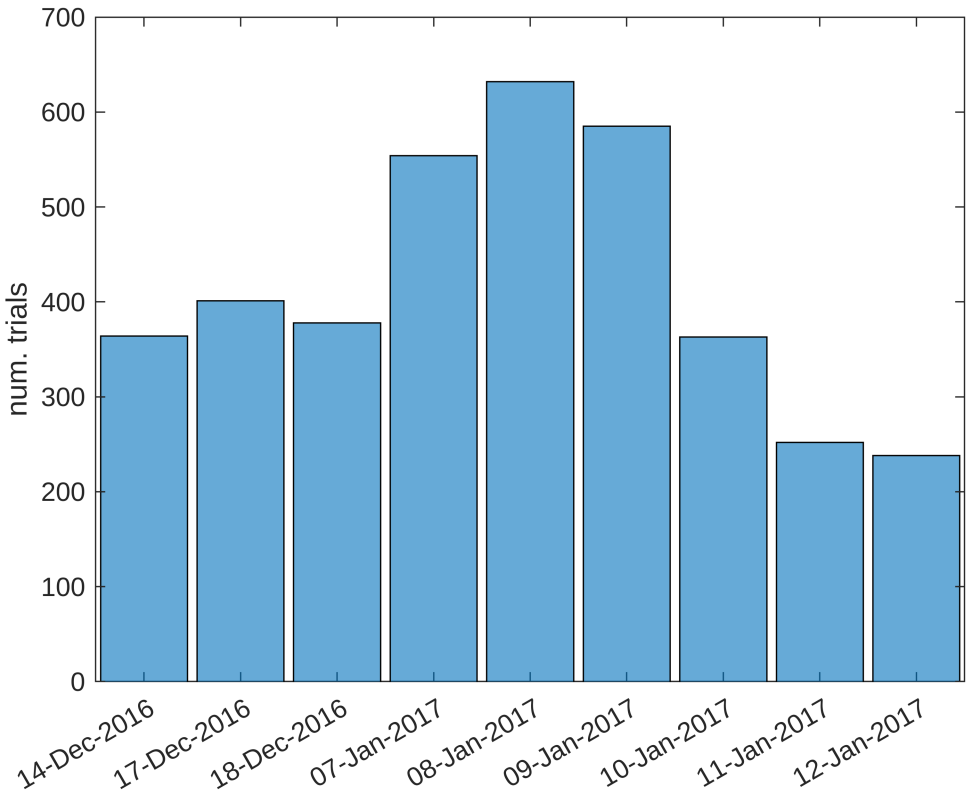
```
ans = 9×1 datetime
14-Dec-2016
17-Dec-2016
18-Dec-2016
07-Jan-2017
08-Jan-2017
09-Jan-2017
10-Jan-2017
11-Jan-2017
12-Jan-2017
```

```
trials_by_date = groupcounts(data,"session_date","day")
```

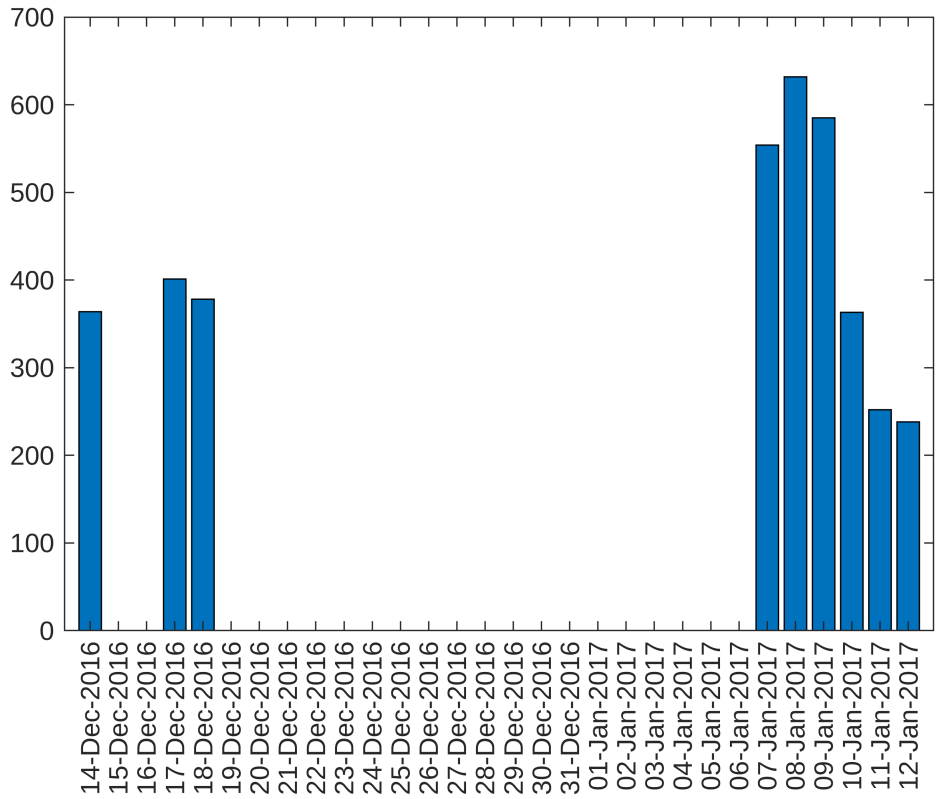
trials_by_date = 9×3 table

| | day_session_date | GroupCount | Percent |
|---|---|---|---|
| 1 | 14-Dec-2016 | 364 | 9.6629 |
| 2 | 17-Dec-2016 | 401 | 10.6451 |
| 3 | 18-Dec-2016 | 378 | 10.0345 |
| 4 | 07-Jan-2017 | 554 | 14.7067 |
| 5 | 08-Jan-2017 | 632 | 16.7773 |
| 6 | 09-Jan-2017 | 585 | 15.5296 |
| 7 | 10-Jan-2017 | 363 | 9.6363 |
| 8 | 11-Jan-2017 | 252 | 6.6897 |
| 9 | 12-Jan-2017 | 238 | 6.3180 |

```
histogram('Categories',
unique(trials_by_date.day_session_date ),'BinCounts',
trials_by_date.GroupCount)
ylabel('num. trials')
```




```
bar( unique(trials_by_date.day_session_date ), trials_by_date.GroupCount)
```




```
fileparts(matlab.desktop.editor.getActiveFilename)
```

```
ans =
'/home/ben/ibots/python_2_matlab/matlab/day1'
```