

We will use anovan (n-way ANOVA) in MATLAB. To learn about how it works you can look at following link: <http://www.mathworks.com/help/stats/anovan.html> .

Assume that we have 2 participants for the experiment (S1 and S2) reaching to 2 targets positioned in a 10cm radius circle with angle 45 and 135deg from horizontal lane. Participants will reach to these targets in three head roll conditions: -30, 0, +30. We calculate their reach error in degree for our analysis. Then we have 3 tables:

- 1- Errors: [1.02 2.5 3.65]
- 2- Target positions: [45 135]
- 3- HR conditions : [-30 0 30]

I should note that I assumed that each subjects reached to each target one per different HR conditions. If you have repetition in your experiment you can find the error value for each condition by averaging among all the values.

Since we have more than one measurement for each participant, we should perform repeated measure ANOVA. To do so in MATLAB, we should add the subject number as another factor to our n-way anova and set it as random factor.

The following figure is an example of organizing your data:

Directional Error	Target	HR condition	Subject number
3.025	60	-30	1
2.054	120	-30	1
0.25	60	0	1
0.55	120	0	1
4.01	60	30	1
1.98	120	30	1
4.001	60	-30	2
3.05	120	-30	2
0.56	60	0	2
1.01	120	0	2
2.058	60	30	2
3.065	120	30	2

Then the MATLAB command could be:

```
[p,table,stats] = anovan(Directional Error,{Target,HRcondition,Subjects},...  
                        'random',3,'varnames',{'Targets','HR','Subjects'});
```