

Wicked Witch - ANOVA

Ahmed Ayman

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Agenda

- The story
- Dataset
- Business and Statistical Question
- Assumption checks
- test result
- after statistical significant difference

The story

A wicked witch make troubles in different areas [east, west, north, and south]
investigation team wonder if she makes troubles in some ares more than other areas



Dataset

Our Data contains two columns

- **Area:** an ordinal variable indicates the area
- **Complains:** a scalar variable indicates number of Complains we received from the citizens

 region	 complaints
North	0
North	1
North	3
North	1
North	0
South	1
South	3
South	1
South	2

Questions

- **Business:** Does she make troubles in some areas more than other areas?!
- **Statistical:** Complains(Area 1) = Complains(Area 2) . . . = Complains(Area n)

The test

The Statistical test is **ANOVA** (Hope: this test to be statistically significant)

This test requires some assumptions check

- Equality of variance
- We hope those tests to be (**statistically not significant**)

- The p-value of **Levene-test** < .05
- which means: The groups have similar variance: **Great**

Assumption Checks

Test for Equality of Variances (Levene's)

F	df1	df2	p
0.165	3.000	16.000	0.918

test result

- The p-value is much less than .05
- Which means there is difference in wicked witch behavior from area to another
- also the **Effect size** is large
- So, we confidently reject the H_0
- **Great**

ANOVA ▾

ANOVA - complaints ▾

Cases	Sum of Squares	df	Mean Square	F	p	η^2
region	37.750	3.000	12.583	10.486	< .001	0.663
Residual	19.200	16.000	1.200			

Note. Type III Sum of Squares

after statistical significant difference

As we are all know ANOVA is an omnibus test, which tells us if there is a difference between groups or not.

But don't tell us, which group is different, to know we have to do more analysis.

Post Hoc Tests ▾

Post Hoc Comparisons - region

		Mean Difference	SE	t	Ptukey
North	South	-0.400	0.693	-0.577	0.937
	East	-2.600	0.693	-3.753	0.008
	West	-3.200	0.693	-4.619	0.001
South	East	-2.200	0.693	-3.175	0.027
	West	-2.800	0.693	-4.041	0.005
	East	-0.600	0.693	-0.866	0.822

Descriptives

Descriptives - complaints

region	Mean	SD	N
North	1.000	1.225	5
South	1.400	1.140	5
East	3.600	1.140	5
West	4.200	0.837	5

Descriptives Plot

