

Tutorial 4

Research Methods for Political Science - PO3110

Andrea Salvi

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Trinity College Dublin,

<https://andrsalvi.github.io/research-methods/>

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Homework 2 - Keys

Homework 2

Questions? Comments?

Hypothesis Testing 101

An Irish "t(t)est": history of T-test

<https://www.youtube.com/watch?v=U9Wr7VEPGXA>

5 steps for hypothesis testing¹

1. State null (H_0) and alternative (H_1) hypothesis;
2. Choose level of significance (α);
3. Find Critical Values;
4. Find Test Statistics;
5. Draw Conclusion.

¹Credits to MathMeeting!

Example 1

The average IQ for the adult population is 100 with a standard deviation of 15. A researcher believes this value has changed. He tests the IQ of 75 individuals and find an average IQ of 105. Is there enough evidence to suggest that the average IQ has changed?

5 steps for hypothesis testing²

1. State null (H_0) and alternative (H_1) hypothesis;
2. Choose level of significance (α);
3. Find Critical Values;
4. Find Test Statistics;
5. Draw Conclusion.

²Credits to MathMeeting!

Example 2

The average IQ of the adult population is 100. A researcher believes the average IQ is lower. He takes a random sample of 5 adults that score: 69, 79, 89, 99, 109 ($\bar{x} = 89$, $sd = 15.81$). Is there enough evidence to suggest the average IQ is lower?

5 steps for hypothesis testing³

1. State null (H_0) and alternative (H_1) hypothesis;
2. Choose level of significance (α);
3. Find Critical Values;
4. Find Test Statistics;
5. Draw Conclusion.

³Credits to MathMeeting!

In-class Exercise 1

T-test in practice

- Download the following dataset on simulated rent prices in Dublin ⁴: <https://tinyurl.com/MT4dublinrent>
- Area: North Dublin; South Dublin; price: simulated price
- Observed value of 400; conduct one-sample t-test (for entire sample)
- Conduct independent samples t-test (compare means of South and North Dublin)

⁴Credits to Stefan Mueller

If time allows..

Bonus: In-class Exercise

- Download "parlgov elections.xlsx"
<https://tinyurl.com/datamt2>
- Download Parlgov Elections Codebook
<https://tinyurl.com/codebookmt2>
- You can work in pairs

In-class Exercise (from last tutorial)

- Subset the data in order to select just the Irish elections.
- Re-code the "election_type" variable into a numeric variable called "election_type_num" where "1" is "parliament" and 2 is "ep". Assign them a label accordingly.
- Create a new binary variable (0,1) called "left_right_binary" where "right" = 1 and "left" = 0 . How would you do that? (at least two ways!)
- "Split" the data-set based on the "election_type" variable (Hint: Data -> Split File). Now try to calculate the mean, standard deviation and Standard Error of the Mean for the "vote_share" variable. What happened?
- Plot a histogram of your choice that conveys meaningful information.
- How do you get rid of the "split"?