Tutorial 2

Research Methods for Political Science - PO3110

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Homework 1: answer keys and review

Homework 1

- Comments?
- Feedback on previous tutorial and material?
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Key Concepts from the Lecture

Measures of Dispersion and CLT

- **Standard deviation:** spread of the sample;
- **Standard error of the mean:** spread of the means of many samples. That is, standard deviation of the sampling distribution;
- **Central limit theorem:** The mean of a large number of random samples will be normally distributed, regardless of the underlying distribution of that variable. That is, the **sampling distribution will take the form of a normal distribution!**

Calculating Dispersion

1. Estimate Mean: $\bar{x} = \frac{\sum x}{n}$
2. Sum of Squared Errors (SS): $\sum (x - \bar{x})^2$
3. Estimate Variance: $\sigma^2 = \frac{SS}{n-1} = \frac{\sum (x-\bar{x})^2}{n-1}$
4. Estimate Standard Deviation: $\sigma = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}} = \sqrt{\sigma^2}$
   - Remember that it is **NEVER** negative.
   - It can be 0 though in case of a uniform distribution.
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Hands-on exercise: Estimate $\bar{x}, \sigma, sd(\bar{X})$ for the following sample: $9, 2, 5, 4$

Solution

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Standard deviation: $\sigma = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}} = \sqrt{\frac{26}{4-1}} = 2.94392$

Standard error: $sd(\bar{X}) = \frac{\sigma}{\sqrt{n}} = \frac{2.94392}{\sqrt{4}} = 1.47196$

In-class Exercise

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

In-class Exercise

- Load the Data
- What do they represent? What are the observations here?
- Describe the variables we have.
- How are missing values coded?
- Subset the data in order to select just the Irish elections.
- Arrange the data based on ”left_right” from Left to Right.

In-class Exercise

- 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”?