

# Tutorial 6 HT

## Research Methods for Political Science - PO3110

---

Andrea Salvi

12 March 2019

Trinity College Dublin,

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

1. Hands-on: ANES 2016 Pilot

## Hands-on: ANES 2016 Pilot

---

## Download the data

Data: <https://tinyurl.com/anes16sav> Codebook:  
[https://www.electionstudies.org/wp-content/uploads/2016/02/anes\\_pilot\\_2016\\_CodebookUserGuide.pdf](https://www.electionstudies.org/wp-content/uploads/2016/02/anes_pilot_2016_CodebookUserGuide.pdf)

# Task 1

**Question 1** Run a linear regression with `fttrump` as the DV and four IVs (e.g. `compromise`, `ftsci`, `equalpay`, `gender`). General question: How do we proceed before running the regression?

**Question 1** Run a linear regression with `fttrump` as the DV and four IVs (e.g. `compromise`, `ftsci`, `equalpay`, `gender`). General question: How do we proceed before running the regression?

1. Check codebook

**Question 1** Run a linear regression with `fttrump` as the DV and four IVs (e.g. `compromise`, `ftsci`, `equalpay`, `gender`). General question: How do we proceed before running the regression?

1. Check codebook
2. Create descriptive statistics

**Question 1** Run a linear regression with `fttrump` as the DV and four IVs (e.g. `compromise`, `ftsci`, `equalpay`, `gender`). General question: How do we proceed before running the regression?

1. Check codebook
2. Create descriptive statistics
3. Recode missing values (into new variables)



**Question 1** Run a linear regression with `fttrump` as the DV and four IVs (e.g. `compromise`, `ftsci`, `equalpay`, `gender`). General question: How do we proceed before running the regression?

1. Check codebook
2. Create descriptive statistics
3. Recode missing values (into new variables)
4. Scatterplot `ftsci_recoded` over `fttrump_recoded`

**Question 1** Run a linear regression with `fttrump` as the DV and four IVs (e.g. `compromise`, `ftsci`, `equalpay`, `gender`). General question: How do we proceed before running the regression?

1. Check codebook
2. Create descriptive statistics
3. Recode missing values (into new variables)
4. Scatterplot `ftsci_recoded` over `fttrump_recoded`

## Task 2

**Question 2** Run and interpret the regression model (especially the unstandardised beta coefficients)

**Question 2** Run and interpret the regression model (especially the unstandardised beta coefficients) Let's save both the standardised and unstandardised residuals.

- Include an interpret the following:
  - SCATTERPLOT of ZRESID and ZPRED

**Question 2** Run and interpret the regression model (especially the unstandardised beta coefficients) Let's save both the standardised and unstandardised residuals.

- Include an interpret the following:
  - SCATTERPLOT of ZRESID and ZPRED
  - Include COOK's D and Durbin Watson Test

**Question 2** Run and interpret the regression model (especially the unstandardised beta coefficients) Let's save both the standardised and unstandardised residuals.

- Include an interpret the following:
  - SCATTERPLOT of ZRESID and ZPRED
  - Include COOK's D and Durbin Watson Test
  - Include collinearity Diagnostics, Save St and Un Residuals and Predicted Values

**Question 2** Run and interpret the regression model (especially the unstandardised beta coefficients) Let's save both the standardised and unstandardised residuals.

- Include an interpret the following:
  - SCATTERPLOT of ZRESID and ZPRED
  - Include COOK's D and Durbin Watson Test
  - Include collinearity Diagnostics, Save St and Un Residuals and Predicted Values
- Create an interaction term (e.g. between gender and equalpay)

**Question 2** Run and interpret the regression model (especially the unstandardised beta coefficients) Let's save both the standardised and unstandardised residuals.

- Include an interpret the following:
  - SCATTERPLOT of ZRESID and ZPRED
  - Include COOK's D and Durbin Watson Test
  - Include collinearity Diagnostics, Save St and Un Residuals and Predicted Values
- Create an interaction term (e.g. between gender and equalpay)
- Plot the interaction



**Question 2** Run and interpret the regression model (especially the unstandardised beta coefficients) Let's save both the standardised and unstandardised residuals.

- Include an interpret the following:
  - SCATTERPLOT of ZRESID and ZPRED
  - Include COOK's D and Durbin Watson Test
  - Include collinearity Diagnostics, Save St and Un Residuals and Predicted Values
- Create an interaction term (e.g. between gender and equalpay)
- Plot the interaction

**Question 2** Run and interpret the regression model (especially the unstandardised beta coefficients) Let's save both the standardised and unstandardised residuals.

- Include an interpret the following:
  - SCATTERPLOT of ZRESID and ZPRED
  - Include COOK's D and Durbin Watson Test
  - Include collinearity Diagnostics, Save St and Un Residuals and Predicted Values
- Create an interaction term (e.g. between gender and equalpay)
- Plot the interaction

## Task 3

**Question 3** Run a bootstrap regression with `fttrump` as the DV and four IVs (e.g. `compromise`, `ftsci`, `equalpay`, `gender`).

## Task 3

**Question 3** Run a bootstrap regression with `fttrump` as the DV and four IVs (e.g. `compromise`, `ftsci`, `equalpay`, `gender`).

- If we have problems with the error distribution in terms of heteroskedasticity or non-normality of the error distribution, we can use a robust regression method instead.

## Task 3

**Question 3** Run a bootstrap regression with `fttrump` as the DV and four IVs (e.g. `compromise`, `ftsci`, `equalpay`, `gender`).

- If we have problems with the error distribution in terms of heteroskedasticity or non-normality of the error distribution, we can use a robust regression method instead.
- Bootstrapping: Random sampling with replacement from an observed dataset in order to estimate properties of the sampling distribution
- Remember to tick "Correct": This corrects for the fact that our bootstrap samples might be, on average, slightly different from our sample.

## Task 3

**Question 3** Run a bootstrap regression with `fttrump` as the DV and four IVs (e.g. `compromise`, `ftsci`, `equalpay`, `gender`).

- If we have problems with the error distribution in terms of heteroskedasticity or non-normality of the error distribution, we can use a robust regression method instead.
- Bootstrapping: Random sampling with replacement from an observed dataset in order to estimate properties of the sampling distribution
- Remember to tick "Correct": This corrects for the fact that our bootstrap samples might be, on average, slightly different from our sample.
- Keep "simple" for the sample as you have not extracted more complex samples (like stratified samples etc.).

## Task 3

**Question 3** Run a bootstrap regression with `fttrump` as the DV and four IVs (e.g. `compromise`, `ftsci`, `equalpay`, `gender`).

- If we have problems with the error distribution in terms of heteroskedasticity or non-normality of the error distribution, we can use a robust regression method instead.
- Bootstrapping: Random sampling with replacement from an observed dataset in order to estimate properties of the sampling distribution
- Remember to tick "Correct": This corrects for the fact that our bootstrap samples might be, on average, slightly different from our sample.
- Keep "simple" for the sample as you have not extracted more complex samples (like stratified samples etc.).
- We estimate 2000 regressions and their betas. SPSS shows the mean.

## Task 3

**Question 3** Run a bootstrap regression with ftrump as the DV and four IVs (e.g. compromise, ftsci, equalpay, gender).

- If we have problems with the error distribution in terms of heteroskedasticity or non-normality of the error distribution, we can use a robust regression method instead.
- Bootstrapping: Random sampling with replacement from an observed dataset in order to estimate properties of the sampling distribution
- Remember to tick "Correct": This corrects for the fact that our bootstrap samples might be, on average, slightly different from our sample.
- Keep "simple" for the sample as you have not extracted more complex samples (like stratified samples etc.).
- We estimate 2000 regressions and their betas. SPSS shows the mean.



## A note on bootstrapping

- NOTICE: There is no need for bootstrapping in regression analysis if the OLS assumptions are met – In such cases, OLS estimates are the most unbiased and efficient of estimates.

# A note on bootstrapping

- NOTICE: There is no need for bootstrapping in regression analysis if the OLS assumptions are met – In such cases, OLS estimates are the most unbiased and efficient of estimates.
- There are situations, however, when we cannot satisfy the assumptions and thus other methods are more helpful.

# Standardized Regression Coefficients

- Standardised beta coefficients are all measured in standard deviations (can range between -1 and +1), instead of the units of the variables: It is possible to compare size of coefficients to one another.

# Standardized Regression Coefficients

- Standardised beta coefficients are all measured in standard deviations (can range between -1 and +1), instead of the units of the variables: It is possible to compare size of coefficients to one another.
- Difference between the regular coefficients and the standardized coefficients is the units of measurement.

# Standardized Regression Coefficients

- Standardised beta coefficients are all measured in standard deviations (can range between -1 and +1), instead of the units of the variables: It is possible to compare size of coefficients to one another.
- Difference between the regular coefficients and the standardized coefficients is the units of measurement.
- Raw coefficient: A one-unit increase/decrease in X is predicted to increase/decrease Y by xyz units.

# Standardized Regression Coefficients

- Standardised beta coefficients are all measured in standard deviations (can range between -1 and +1), instead of the units of the variables: It is possible to compare size of coefficients to one another.
- Difference between the regular coefficients and the standardized coefficients is the units of measurement.
- Raw coefficient: A one-unit increase/decrease in X is predicted to increase/decrease Y by xyz units.
- Standardised coefficient: A one standard deviation increase/decrease is predicted to increase/decrease Y by xyz standard deviations

# Standardized Regression Coefficients

- Standardised beta coefficients are all measured in standard deviations (can range between -1 and +1), instead of the units of the variables: It is possible to compare size of coefficients to one another.
- Difference between the regular coefficients and the standardized coefficients is the units of measurement.
- Raw coefficient: A one-unit increase/decrease in X is predicted to increase/decrease Y by xyz units.
- Standardised coefficient: A one standard deviation increase/decrease is predicted to increase/decrease Y by xyz standard deviations

# Parametric and Non-parametric Tests

- **Parametric test:** specific assumptions (e.g. normality) are made about the population parameter is known as parametric test. The t-test, for instance, rests on assumption that variable is normally distributed.



# Parametric and Non-parametric Tests

- **Parametric test:** specific assumptions (e.g. normality) are made about the population parameter is known as parametric test. The t-test, for instance, rests on assumption that variable is normally distributed.
- **Non-parametric test:** researcher has no idea regarding the population parameter/test does not require the population's distribution to be denoted by specific parameters

# Parametric and Non-parametric Tests

- Perform a Shapiro-Wilk Normality Test (commonly used for testing normality assumption) (Analyze ... Descriptives ... Explore ... Plots)

# Parametric and Non-parametric Tests

- Perform a Shapiro-Wilk Normality Test (commonly used for testing normality assumption) (Analyze ... Descriptives ... Explore ... Plots)
- What does the Sig. column under Shapiro-Wilk tell us? What is the null hypothesis?

# Parametric and Non-parametric Tests

- Perform a Shapiro-Wilk Normality Test (commonly used for testing normality assumption) (Analyze ... Descriptives ... Explore ... Plots)
- What does the Sig. column under Shapiro-Wilk tell us? What is the null hypothesis?
- Null hypothesis: variable not statistically significantly different from a normal distribution

# Parametric and Non-parametric Tests

- Perform a Shapiro-Wilk Normality Test (commonly used for testing normality assumption) (Analyze ... Descriptives ... Explore ... Plots)
- What does the Sig. column under Shapiro-Wilk tell us? What is the null hypothesis?
- Null hypothesis: variable not statistically significantly different from a normal distribution
- Rule:  $p\text{-value} < 0.05$ : reject null hypothesis that data come from a normally distributed population (but be careful with the interpretation (see lecture notes))

# Parametric and Non-parametric Tests

- Perform a Shapiro-Wilk Normality Test (commonly used for testing normality assumption) (Analyze ... Descriptives ... Explore ... Plots)
- What does the Sig. column under Shapiro-Wilk tell us? What is the null hypothesis?
- Null hypothesis: variable not statistically significantly different from a normal distribution
- Rule:  $p\text{-value} < 0.05$ : reject null hypothesis that data come from a normally distributed population (but be careful with the interpretation (see lecture notes))

# Parametric and Non-parametric Tests

- Does what a t-test is supposed to test, but when distribution of two samples deviate from a normal distribution

# Parametric and Non-parametric Tests

- Does what a t-test is supposed to test, but when distribution of two samples deviate from a normal distribution
- Mann-Whitney test rank orders all scores, determines the rank of each subject, and then computes the average rank for the two groups.



# Parametric and Non-parametric Tests

- Does what a t-test is supposed to test, but when distribution of two samples deviate from a normal distribution
- Mann-Whitney test rank orders all scores, determines the rank of each subject, and then computes the average rank for the two groups.
- In SPSS: Analyze ... Nonparametric ... Legacy Dialogs ... 2-Independent Samples Test

# Parametric and Non-parametric Tests

- Does what a t-test is supposed to test, but when distribution of two samples deviate from a normal distribution
- Mann-Whitney test rank orders all scores, determines the rank of each subject, and then computes the average rank for the two groups.
- In SPSS: Analyze ... Nonparametric ... Legacy Dialogs ... 2-Independent Samples Test