

Political Science Research Methods – Practicum Study Guide

Equations for the Exam (you’ll be given these on the exam itself)

Mean

$$\bar{X} = \frac{\sum X}{n}$$

Standard Deviation

$$s = \sqrt{\frac{\sum (X - \bar{X})^2}{n - 1}}$$

Z-score

$$z = \frac{(X - \bar{X})}{s}$$

For each of these hypotheses:

1. “Republicans are more likely to vote in presidential elections.”
2. “Individuals with higher incomes are more likely to trust government institutions.”
3. “There is a difference between men and women in their levels of political efficacy.”
4. “There is a difference between freshmen and juniors on their quiz scores.”
  - A) Identify the independent variable.
  - B) Identify the dependent variable.
  - C) Identify if the hypothesis is directional or non-directional.
  - D) State the null hypothesis.
  - E) Specify the causal mechanism.

Consider the following dataset:

	Australia	Croatia	Mauritania	Poland	Switzerland
<b>GDP</b> (Measured in 1000s of dollars)	30.5	14.5	5.8	15.5	19.3
<b>Life expectancy</b> (Measured in average years lived)	75	75	65	80	80
<b>Landlocked</b> (0=yes; 1=no)	1	1	1	1	0
<b>Happiness</b> (Number of times “happy” appears in national newspaper in 2015)	4401	78	239	1003	851

For this dataset (you should be able to do the math by hand):

1. What are your variables? How many variables do you have?
2. What are your observations (or cases)?
3. What is the level of measurement for each of your variables?
4. What is the most appropriate measure of central tendency to report for each of these variables?
5. Calculate the most appropriate measure of central tendency for **life expectancy**.
6. Calculate the most appropriate measure of central tendency for **landlocked**.
7. Which variable has the most trouble with validity? Explain your reasoning.

	Ben Carson	Chris Christie	Ted Cruz	Carly Fiorina	Mike Huckabee	John Kasich	Rand Paul	Marco Rubio	Rick Santorum	Donald Trump
Percentage of voters who said they would vote for candidate in Iowa, 1/5-19	10	5	20	1	2	3	3	10	1	25
Years served in Congress	0	0	3	0	0	16	5	5	16	0
Gender (0=male, 1=female)	0	0	0	1	0	0	0	0	0	0

For this dataset (you should be able to do the math by hand):

1. What are your variables? How many variables do you have?
2. What are your observations (or cases)?
3. What is the level of measurement for each of your variables?
4. What is the most appropriate measure of central tendency to report for each of these variables?
5. Calculate the most appropriate measure of central tendency for **all your variables**.
6. Assuming that the standard deviation for *percentage of voters* is 2.00 and the standard deviation for *years served in Congress* is 1.00, calculate the z-scores for each of these two variables for **Marco Rubio**. On which variable is Marco Rubio more average?

SPSS Review (know how to do the following things in SPSS):

- Identify your observations
- Identify your variables
- Determine the level of measurement for variables in the dataset
- Look up the values of your categorical variables in your dataset
- Calculate and read frequency distributions for your variables
- Write your own hypotheses from the variables available in a SPSS dataset
- Calculate the appropriate descriptive statistics (both central tendency and variability) of your variables, dependent on level of measurement
- Be able to draw the appropriate graph of your variables, dependent on level of measurement
- Calculate z-scores for each observation of your variables and interpret its meaning

Reading

- Salkind, Statistics for People (Who Think They) Hate Statistics
  - Chapter 1: Statistics or Sadistics? It's Up to You
  - Chapter 7: Hypotheticals and You: Testing Your Questions
  - Chapter 6: Just the Truth: An Introduction to Reliability and Validity
  - Chapter 2: Means to an End: Computing and Understanding Averages
  - Chapter 3: Vive la Difference: Understanding Variability
  - Chapter 4: A Picture Really is Worth a Thousand Words

- Chapter 8: Are Your Curves Normal? Probability and Why It Counts
- Chapter 9: Significantly Significant: What It Means for You and Me
- Chapter 10: Only the Lonely: The One Sample Z-Test
- Steve Lohr: For today's graduate, one word: Statistics
- Geoffrey Lean: Using mobile phones while pregnant

## Key Terms

Political science	Variables	reliability
Statistics	Independent variables	test-retest reliability,
Missing numbers	Dependent variables	Validity
Confusing numbers	Intervening variables	face validity
Authoritative numbers	Extraneous variables	descriptive statistics
Scary numbers	Causality	Mean
Data	conditions for causality	Median
Qualitative	correlation	Mode
Quantitative	causal mechanism	Standard deviation
Inferential statistics	endogeneity	Range
Population	spurious variable	Variance
Sample	operationalization	Histograms
Research Methods	concept	Bar graphs
Science	measurement	Probability
Scientific method	levels (or scales) of	Frequency curves
Question	measurement	The normal curve
Hypothesis	nominal variables	Peak
Testing	ordinal variables	Tails
Analysis	categorical variables	68-95-99 rule
Criteria for good questions	interval variables	Z-scores
Theory	ratio variables	Characteristics of normal
Directional hypothesis	continuous variables	curve
Nondirectional hypothesis	dichotomous/binary	Statistical significance
Null hypothesis	variables	