

PSI 2219 Research Design and Methods

[Quantitative Reasoning]

McDaniel College Budapest

Short course outline

This course is an introduction to social science research. It will introduce students to the logic of quantitative reasoning with a focus on how to design, conduct, present, and evaluate quantitative research in Political Science according to the standards of the scientific method. The course is designed to provide students a solid foundation in inferential statistics, both in terms of its underlying logic and implementation. Only basic math skills are required. To understand the potentials and pitfalls of quantitative reasoning, we will not only learn the basics of inferential statistics but also discuss the quantitative-qualitative divide in Political Science. Note: The course will not follow a traditional lecture format. This means that I will call up every student in class to answer questions and contribute comments. Also, we will have several in-class exercises, so it is essential to do the mandatory readings beforehand.

Learning goals

This course will prepare students to both conduct and consume empirical social science research. Therefore, learning goals are divided into these two broad objectives:

Conceptually, students will be prepared to understand

- The first step of every research project;
- The principles of conceptualization, operationalization, and measurement;
- The potential and pitfalls of quantitative methods;
- The logic of descriptive and inferential statistics.

In practice, students will be able to

- Design a full research project, including a research question, hypotheses, literature review, methods and data;
- Formulate researchable questions and testable hypotheses;
- Conduct a review of relevant and state-of-the-art literature on the topic;
- Identify the kind of data needed to address the question and hypotheses;
- Find or collect data in an informed manner;
- Evaluate the feasibility of the project;
- Present a research project to an audience of peers;
- Evaluate the merits of published research and arguments based on their design/methods

Course requirements and grading

The final grade is composed of the following elements:

Task	Points
Participation	20

Homework assignments	40
Presentation	10
Final paper	30
Total	100

Participation:

This class will involve constant student participation. I will ask you for questions and comments, and we will have in-class group activities and exercises. Students will be evaluated on their preparedness and engagement in these activities
Homework assignments:

There will be homework assignments in order to practice statistical and research design concepts. The deadlines will be finalized in the first weeks of the semester. . Specific instructions will be given a week before the respective deadline. They should be submitted via the online platform (Blackboard).

Presentation

We will simulate an academic conference presentation, where students will have to present their own research projects and discuss an assigned colleague's presentation. 10 points will be given to your presentation, and 5 the comments on your colleague's. Presentations should last up to 10 minutes, and comments should not exceed 5 minutes. Afterwards, we will have 5-10 minutes of open-floor discussion for each paper. Presentations will take place in the last week of classes.

Final paper:

Students should submit a 1500 words or 5-page research proposal, following the structure and guidelines learned during the course. The deadline is **May 22nd, 23:55, CET.Honor code**

Students are expected to abide by the McDaniel College Honor Code. Violations of the Honor Code will result in downgrading and possible further sanctions. **Attendance** Students are expected to attend all class sessions. A maximum of two unexcused absences for the whole duration of the course is permitted. Each unexcused absence above the two will result in a 5% downgrade of the final course grade. Arrival more than 30 minutes late counts as half an absence

WEEKLY SCHEDULE AND READINGS

Week 1 (Feb 03-07) Day 1: Introduction

Day 1 will be a general introduction to the course, instructor, and students. We will have an overview of the course and requirements.

Overview of the course and requirements;

Why learn research methods and design?

Reading (recommended):

Keohane, R. O.: Political Science as a Vocation. in: PS, April 2009, p. 359–363.

Day 2: Theories

The Social Sciences have a vast amount of different theories. All serve the purpose to make sense of the world. Theories are the backbone for any research. We rely on them to draw research question or we use our research to test competing theories.

We will talk about:

What are (social) scientific theories?

Why do we need theories?

Reading:

Bryman, Alan: Social Research Methods, Oxford 2012, 4th Edition, p. 18-27. Johnson, J. B., Reynolds, H. T., & Mycoff, J. D. (2015). Political science research methods. Cq Press. PP-54-58.

Toshkov, D. (2016). Research design in political science. Macmillan International Higher Education. PP. 77-82

Week 2 (Feb 10-14)

Day 3: Design of the Research Question

A research question is the centerpiece of every research. We all start a new project with a rather broad question in mind and then specify/re-formulate it through a literature review. We will use this day to talk about:

What topics interest you;

What makes for a good and researchable question;

What is the most common way to develop a research question?

Readings: Toshkov, D. (2016). Research design in political science. Macmillan International Higher Education. PP. 44-55

Recommended reading: Sandberg, Jörgen; Alevesson, Mats: Ways of constructing research questions. Gap-spotting or problematization, in: Organization, Vol. 18 (1), 2011, p. 23-44.

Day 4: Design of Hypothesis

Pollock III, P. H., & Edwards, B. C. (2012). The essentials of political analysis. Cq Press. 4th edition. pp. 48-58. Johnson, J. B., Reynolds, H. T., & Mycoff, J. D. (2015). Political science research methods. Cq Press. PP-109-117.

Week 3 (Feb 17-21)

Day 5: Literature Review

A literature review is normally the very first step in a research design. Before we can specify our question and conduct an analysis, we need to know “what is out there”. It may be that others already answered the questions we had in mind or that existing literature will lead us to a readjustment of our question.

On Day 3, we will look at:

How to conduct a literature review;

Finding useful published research;
Referencing the texts we have found.

Reading: Bryman, Alan: Social Research Methods, Oxford 2012, 4th Edition. pp. 98-124.

Day 6: Concepts I

Before we can start to measure and analyse the issues we are interested in, we need to conceptualise them, i.e., we need to develop concepts that make it possible for our peers to understand what it is that we are actually looking at. Without a proper concept formation, any analysis is deemed to fail. Due to the importance of concept formation, we will use both days in week 4 to discuss it.

On day 6 we will look at:

The 'what-is' question
Classes and comparisons

Readings: Mair, Peter: Concepts and concept formation, in: Della Porta, Donatella; Keating, Michael (eds.): Approaches and Methodologies in the Social Sciences. A Pluralistic Perspective, Cambridge 2008, Chapter 10, p. 177- 192

Week 4 (Feb 24-25)

Day 7: Concepts II

We will continue to talk about concept formation. More precisely, we will focus on: Satori's *ladder of abstraction*

Alternative approaches to concept formation

Operationalization of Concepts

Reading: Johnson, J. B., Reynolds, H. T., & Mycoff, J. D. (2015). Political science research methods. Cq Press. PP-121-126. Pollock III, P. H., & Edwards, B. C. (2012). The essentials of political analysis. Cq Press. 4th edition. pp. 12-17

Toshkov, D. (2016). Research design in political science. Macmillan International Higher Education. PP. 100-105

Day 8: Causation and Causal Mechanism

Reading: Johnson, J. B., Reynolds, H. T., & Mycoff, J. D. (2015). Political science research methods. Cq Press. PP-166-179.

Recommended reading: Falleti, Tulia G; Lynch, Julia F.: Context and Causal Mechanisms in Political Analysis, in: Comparative Political Studies, Vol. 42 (9), 2009, pp. 1134-1166.

Week 5 (Mar 02-06)

Day 9: Quantitative Research Design

Quantitative research designs are dominating in Political Science. To understand their general structure, we will use this day to discuss:

The main steps in a quantitative research,

Concepts and measurement,
Reliability and Validity
Causality, generalization, and replication Criticism.

Reading:

Bryman, Alan: Social Research Methods, Oxford 2008, 3rd Edition, Chapter 6, p. 159-182

Day 10: Qualitative Research Design

An increasing amount of research in Political Science follows a qualitative design. It differs strongly from the quantitative approach we are following in this class but it is important to know its main features. On Day 10, we will look at:

The main steps in a qualitative research,
Concepts in qualitative research
Reliability and Validity
Criticism.

Reading:

Bryman, Alan: Social Research Methods, Oxford 2008, 3rd Edition, Chapter 6, p. 379-410

Week 6 (Mar 09-13)

Day 11 – Math Review and Statistical Concepts

We will use Day 11 to go over some of the very basic mathematic that are needed to conduct quantitative research and introduce the terminology of statistics.

In practice, we will talk about:

Order of Operation,
Proportions (Fractions, Decimals, Percentages),
Exponents and Square Roots,
Population and Samples,
Dependent vs. Independent Variables,
Scales of Measurement

Reading:

Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 1, p. 2-32.

Day 12 – Frequency Distribution

Day 12 will be used to look at descriptive statistics. As the term already indicates, the purpose is to describe the distribution of our data without making any claims about the greater population, or when the population itself is too small to apply inferential statistics.

We will focus on:

Frequency Distribution Tables
Shape of a Frequency Distribution
Percentile and Percentile Ranks
Stem and Leaf Displays

Reading:

Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 2, p. 34-54.

Week 7 (Mar 16 – Mar 20)

Day 13: Central Tendency

Measures of central tendency reduce our data to a single number. Given that this single number can give us a lot of information about our data, any further step in inferential statistics will rely on the concept of central tendency.

We will talk about:

Mean, median, and mode,

Selecting a measure of central tendency,

Central tendency and the shape of the distribution.

Reading:

Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 3, p. 56-83.

Day 14: Variability

While measures of central tendency reduce our data to a single number, measures of variability enable us to understand individual number in relation to the entire data. In other words, using variability, we can determine how much a single number differs from the average. To be able to determine this, we need to look at:

The range, Standard deviation and variance for a population.

Standard deviation and variance for a sample.

Reading: Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 4, p. 85-112.

Week 8 (Mar 23 – Mar 27)

Day 15: Z-Scores I

Using the numbers/scores of our data normally does not help us much if we want to compare two different datasets. Often those scores differ in terms of their measurement so any direct comparison is nonsensical. Z-Scores help us to overcome this dilemma by standardising distinct set of scores. We will learn on Day 15:

Z-scores and the location in a distribution,

The z-score formula,

How to determine a raw score from a z-score

Reading:

Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage

Day 16: Z-scores II

Reading:

Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage

Week 9 (Mar 30 – Apr 3)

Day 17: Probability I

The major goal of inferential statistics is to take a subset of a whole, analyse it, and use the results to make a claim about the whole; i.e., draw & analyse a sample and generalize from the sample to the population. Yet to be able to make this inference we need to rely on some basic concepts of probability.

We will focus on:

How to define probability,
What is random sampling,
Probability and the normal distribution.

Reading:

Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 6, p. 135-159.

Day 18: Probability II

Reading:

Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 6, p. 135-159.

Week 10 (Apr 6 – Apr 10) Eastern Holiday. No classes.

Week 11 (Apr 13 – Apr 17)

Day 19: Probability and Samples

On Day 19, we will focus a bit more on the issue of probability and the distribution of sample means. More precisely, we will look at:

Central limit theorem,
The shape of distribution of Sample Means,
Three different distributions
The difference between standard deviation and standard error.

Reading: Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 7, p. 161-187-

Day 20: Hypothesis Testing I

With everything we learned so far, we will be able to do our first actual statistical analysis – a hypothesis test. Once we state our hypotheses about our research question, we automatically get a predication about the characteristics of our sample. We then use the tool of hypothesis testing to see whether this prediction holds when compared to “real” data. If this is not the case, your hypothesis is falsified.

Hence, we will learn on Day 20:

The logic of hypothesis testing
Uncertainty and errors in hypothesis testing,
Assumptions for hypothesis testing with z-scores

Reading:

Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 8, p. 189-231.

Week 12 (Apr 20 – Apr 24)

Day 21: Hypothesis Testing II

Reading: Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 8, p. 189-231.

Day 22: T-Statistic

From Day 21 onwards, we will conduct our analysis with an alternative to the z-scores: the t-statistic. Often, we cannot get the actual z-scores because we don't have total information about the population. The t-statistic uses sample values instead of population values and thereby enables us to conduct statistical analysis even we don't have full information about the population:

Introduction to t-statistic,
Hypothesis testing with t-statistic
Measuring effect size for t-statistic

Reading: Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 9, p. 233-256.

Week 13 (Apr 27 – May 01)

Day 23: T-Test for two Independent Samples

The t-test for two independent samples is an extension of the t-statistic that we have learned on Day 21. It just extends our analysis from one sample to two samples. In other words, using this t-test we can make and test hypotheses about two different groups.

We will focus on:

Hypothesis for an independent-measures test
Formulas for the independent-measures hypothesis test
Estimated standard error
Pooled variance
Difference and similarities between single sample t-statistic and independent-measures t-statistic

Reading:

Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 10, p. 258-286.

Day 24: Estimation

So far, we focused on Hypothesis testing in order to draw inferences from a sample to a population. Estimation is an additional method for the same purpose.

We will look at:

Precision and Confidence in Estimation
Comparison between Hypothesis test and Estimation
Logic of Estimation
Estimation with the t-Statistic

Reading:

Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 12, p. 311-334.

Week 14 (May 04 – May 08)

Day 25: Correlation

This class on inferential statistics will introduce students to correlation. In contrast to previous concepts, correlation measures the relationship between two variables.

On Day 24, we will talk about:

Characteristics of a relationship

Pearson correlation

Usage and interpretations of the Pearson correlation

Hypothesis test with Pearson correlation

Reading:Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 6th Edition, Chapter 14.

Day 26: Linear Regression

The last class on inferential statistics will introduce students to linear regression.

Assumptions of linear regressions

Bivariate Linear Regression

Multiple Linear Regression

Reading:Gravetter, Frederick J./Wallnau. Larry, B.: Essentials of Statistics for the Behavioral Sciences, Cengage Learning, 2008, 8th Edition, Chapter 14.

Week 15 (May 11 – 15 May)

Both classes in Week 15 will be dedicated to Student Presentations

Week 16(May 18 – 22 May)No classes. The week should be dedicated to the writing of your final paper