

Midterm Exam Study Guide

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The midterm exam is a 24 hour, take home exam which will start on Monday at 3:35 pm and will end on Tuesday at 3:35 pm. It will cover all of the material up to and including our class on September 26th. The midterm will cover mostly material covered in class but may also cover reading material. Where there is a conflict between lecture and the reading material always defer to the class lecture. Below is a listing of topics that will likely be covered on the midterm:

- **Descartes: Meditations on First Philosophy**
- **Differentiating Between Good and Bad Research Questions**
 - Be able to distinguish between a good and bad research questions and understand why they are good or bad.
- **Theories, models and hypotheses**
 - Understand the difference between a theory and a model.
 - Be able to identify a theory and a model.
 - Distinguish between empirically testable and un-testable theories.
 - Understand what a hypothesis is and how to correctly state an empirically testable hypothesis.
- **Variables**
 - Independent and dependent variables.
 - Indirect, direct and discontinuous relationships.
- **Causal Inference**

- Correlation and causation.
- Direct and reverse causality.
- Confounding.
- Counterfactual model of causal inference.
- Measuring causal effects.
- Selection bias.
- Treatment groups, control groups, average treatment effects.
- Internal validity, external validity and SUTVA.

- **Experiments**

- Why do we do experiments?
- Components of experiments: treatments, outcomes and randomization.
- Compliance.
- Field experiments.
- Lab experiments.

- **Natural and Quasi Experiments**

- Regression discontinuity designs.
- Other types of natural experiments (twin studies etc)

- **Observational Studies**

- Different types of observational studies and what they are used for.
- Cross-sectional, time series and longitudinal/panel studies.
- Causality and observational studies.

1 Sample Question

Jane is a researcher in political science who is interested in understanding the effects of obtaining American citizenship on measures of patriotism and nationalism among American immigrants. She believes that granting citizenship to immigrants makes them more patriotic than similar immigrants who have not been granted citizenship yet.

To test her hypothesis, she filed a FOIA (Freedom of Information Act) request and gathered the following data on 1000 immigrants that applied for citizenship in 2015:

- Age.
- Sex.
- Country of origin.
- Last name.
- Year first arrived in the US.
- Occupation.
- Marital status.
- Number of children.
- Answer to a question about whether immigrant identifies as American or as someone from their country of origin.
- Answer to a question about where the immigrant traveled in the past year.
- A score, produced by Immigration and Customs Enforcement, used to determine eligibility for citizenship for each immigrant. Range: 1-100, Cutoff: 50.
- Favorite color.
- Date of birth.
- Race.

1. What hypothesis is Jane testing here?
2. What are the independent and dependent variables that Jane should identify in this study?

3. Jane wants to make causal inferences about how citizenship affects patriotism. Can she do this using the data that she has collected?
4. If the answer to **3** is “yes”, then what kind of study, observational, quasi-experimental, or experimental should she use to answer the questions that she’s interested in (be specific!). If the answer to **3** is “no”, please explain why. Remember she can only use the data that she has collected, not hypothetical data.
5. Using the variables described above, explain how Jane should design her study. For example, one way to study a question related to favorite color and country of origin might be to designate favorite color as a dependent variable, country of origin as an independent variable and use age, sex, occupation and marital status as controls.