Recitation 1: Social Science Theory

International Politics (Fall 2023)

Dept. of Politics, NYU

September 13, 2023

Recitation Policies

- Recitation attendance is required

- Participation is essential to mathematical exercises

- Your TA:
  - Alper Sukru Gencer
  - Office: Room 230, 19 W. 4th St.
  - Email: `alper.gencer@nyu.edu`
  - Office Hours: Thursdays 4 pm - 6 pm (Room 416, 19 W. 4th St)

Goals

After the recitation, you should be able to explain

- Necessary and Sufficient Conditions
  - necessary condition
  - sufficient condition

- Theory
  - variables
  - assumptions
  - hypotheses
  - logical consistency
  - falsifiability
  - empirical predictions

Necessary and Sufficient Conditions

Necessary Condition

A necessary condition is a condition that must be present for an event to occur. It is a condition that must be present for the conclusion to be true. However, it is not enough by themselves to make the conclusion true.

Necessary and Sufficient Conditions

Necessary Condition

A necessary condition is a condition that must be present for an event to occur. It is a condition that must be present for the conclusion to be true. However, it is not enough by themselves to make the conclusion true.

- A is a necessary condition for B
    - = If B, then A
    - = If not A, then not B
    - = A if B
    - = A is "implied by" B

Necessary and Sufficient Conditions

Necessary Condition

A necessary condition is a condition that must be present for an event to occur. It is a condition that must be present for the conclusion to be true. However, it is not enough by themselves to make the conclusion true.

- A is a necessary condition for B
  - = If B, then A
  - = If not A, then not B
  - = A if B
  - = A is "implied by" B

- Examples
  - Oxygen is a necessary condition for water
  - Having three sides is a necessary condition for being a triangle
  - Being at least 35 years old is a necessary condition for being the President of the U.S.

Necessary and Sufficient Conditions

Sufficient Condition

A sufficient condition is a condition or set of conditions that will produce the event. It is what is enough for a conclusion to be true.

Necessary and Sufficient Conditions

Sufficient Condition

A sufficient condition is a condition or set of conditions that will produce the event. It is what is enough for a conclusion to be true.

- A is a sufficient condition for B
    - = If A, then B
    - = A only if B
    - = A "implies" B

Necessary and Sufficient Conditions

Sufficient Condition

A sufficient condition is a condition or set of conditions that will produce the event. It is what is enough for a conclusion to be true.

- A is a sufficient condition for B
  - = If A, then B
  - = A only if B
  - = A "implies" B

- Examples
  - Being a square is sufficient for having four sides
  - Being born in New York is sufficient for being born in the U.S.

Necessary and Sufficient Conditions

Necessary and Sufficient Condition

A necessary and sufficient condition is a condition or set of conditions that is both needed to produce an event but also enough to show that it is true.

Necessary and Sufficient Conditions

Necessary and Sufficient Condition

A necessary and sufficient condition is a condition or set of conditions that is both needed to produce an event but also enough to show that it is true.

- A is a necessary and sufficient condition for B
  - = If B, then A
  - = A only if B
  - = A if and only if (iff) B
  - = A is "logically equivalent to" B

Necessary and Sufficient Conditions

Necessary and Sufficient Condition

A necessary and sufficient condition is a condition or set of conditions that is both needed to produce an event but also enough to show that it is true.

- A is a necessary and sufficient condition for B
  - = If B, then A
  - = A only if B
  - = A if and only if (iff) B
  - = A is "logically equivalent to" B

- Examples
  - The shape is a square iff it has four sides of equal length

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license
  - Yes

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license
  - Yes

- Being a mammal is a sufficient condition for being human

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license
  - Yes

- Being a mammal is a sufficient condition for being human
  - No

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license
  - Yes

- Being a mammal is a sufficient condition for being human
  - No

- Being human is a necessary condition for being a mammal

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license
  - Yes

- Being a mammal is a sufficient condition for being human
  - No

- Being human is a necessary condition for being a mammal
  - No

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license
  - Yes

- Being a mammal is a sufficient condition for being human
  - No

- Being human is a necessary condition for being a mammal
  - No

- Being human is a sufficient condition for being a mammal

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license
  - Yes

- Being a mammal is a sufficient condition for being human
  - No

- Being human is a necessary condition for being a mammal
  - No

- Being human is a sufficient condition for being a mammal
  - Yes

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license
  - Yes

- Being a mammal is a sufficient condition for being human
  - No

- Being human is a necessary condition for being a mammal
  - No

- Being human is a sufficient condition for being a mammal
  - Yes

- Electrocution (death caused by electric shock) is a necessary condition for death

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license
  - Yes

- Being a mammal is a sufficient condition for being human
  - No

- Being human is a necessary condition for being a mammal
  - No

- Being human is a sufficient condition for being a mammal
  - Yes

- Electrocution (death caused by electric shock) is a necessary condition for death
  - No

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license
  - Yes

- Being a mammal is a sufficient condition for being human
  - No

- Being human is a necessary condition for being a mammal
  - No

- Being human is a sufficient condition for being a mammal
  - Yes

- Electrocution (death caused by electric shock) is a necessary condition for death
  - No

- Electrocution is a sufficient condition for death

Necessary and Sufficient Conditions

- Having a driver's license is a sufficient condition for passing a driver's test
  - Yes

- Passing a driver's test is a necessary condition for having a driver's license
  - Yes

- Being a mammal is a sufficient condition for being human
  - No

- Being human is a necessary condition for being a mammal
  - No

- Being human is a sufficient condition for being a mammal
  - Yes

- Electrocution (death caused by electric shock) is a necessary condition for death
  - No

- Electrocution is a sufficient condition for death
  - Yes

Necessary and Sufficient Conditions in Case Study

TABLE 1.1	**Regime and Cooperation: Necessary but Not Sufficient Condition**	
Regime	**Cooperation**	**Conflict**
Yes	10	10
No	0	20

- Regime is a necessary condition for cooperation
- Regime is not a sufficient condition for cooperation

TABLE 1.2	Regime and Cooperation: Sufficient but Not Necessary Condition	
Regime	Cooperation	Conflict
Yes	20	0
No	10	10

- Regime is a sufficient condition for cooperation
- Regime is not a necessary condition for cooperation

TABLE 1.3	Regime and Cooperation: Necessary and Sufficient Condition	
Regime	Cooperation	Conflict
Yes	20	0
No	0	20

- Regime is a necessary condition for cooperation
- Regime is a sufficient condition for cooperation

Necessary and Sufficient Conditions in Case Study

TABLE 1.4	**Regime and Cooperation: Necessary but Not Sufficient Condition**	
Regime	**Cooperation**	**Conflict**
Yes	10	10
No	10	10

- The presence of regimes predicts cooperation probabilistically

Social Sciences

- Probabilistic claims: "This is the way" in Pol. Sci. and IR
- Hard sciences vs. "Social" sciences:

Social Sciences

- Probabilistic claims: "This is the way" in Pol. Sci. and IR
- Hard sciences vs. "Social" sciences:
    - Laws of Nature
    - Systematic human behavior and interaction
- Humanities vs. social "Sciences:"

Social Sciences

- Probabilistic claims: "This is the way" in Pol. Sci. and IR
- Hard sciences vs. "Social" sciences:
    - Laws of Nature
    - Systematic human behavior and interaction
- Humanities vs. social "Sciences:"
    - Peculiar and idiosyncratic explanations
    - Systematic and generalizable explanations
- Ethics vs. social "Sciences:"

Social Sciences

- Probabilistic claims: "This is the way" in Pol. Sci. and IR
- Hard sciences vs. "Social" sciences:
    - Laws of Nature
    - Systematic human behavior and interaction
- Humanities vs. social "Sciences:"
    - Peculiar and idiosyncratic explanations
    - Systematic and generalizable explanations
- Ethics vs. social "Sciences:"
    - Normative
    - Objective
- Ideologies vs. social "Sciences:"

Social Sciences

- Probabilistic claims: "This is the way" in Pol. Sci. and IR
- Hard sciences vs. "Social" sciences:
    - Laws of Nature
    - Systematic human behavior and interaction
- Humanities vs. social "Sciences:"
    - Peculiar and idiosyncratic explanations
    - Systematic and generalizable explanations
- Ethics vs. social "Sciences:"
    - Normative
    - Objective
- Ideologies vs. social "Sciences:"
    - Always true
    - Falsifiable

Theory

- Theory states the expected relationships between variables
    - UN peacekeeping mission decreases rebel movements
   - Arms race increases war

Theory

- Theory states the expected relationships between variables
  - UN peacekeeping mission decreases rebel movements
  - Arms race increases war

- Theory is deductive (not inductive)
  - consists of a set of assumptions
  - rules of logic to derive predictions (hypotheses)

Theory

- Theory states the expected relationships between variables
  - UN peacekeeping mission decreases rebel movements
  - Arms race increases war

- Theory is deductive (not inductive)
  - consists of a set of assumptions
  - rules of logic to derive predictions (hypotheses)

- Theory includes
  - variables
  - assumptions
  - hypotheses

Variables

- Generic term for any characteristic or element that **changes**
- Entity that can take **different values (more than one)** across individuals, states, and time
    - Example: age can be considered variable because age can take different values for different people or for the same person at different time

- Note: constants are not variables since they have only one value
- Theories are about variables but not about constants (explaining things that change)
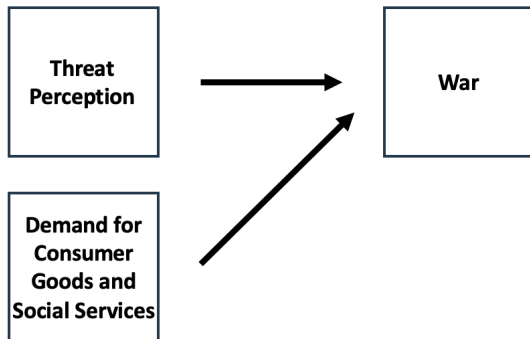
Variables
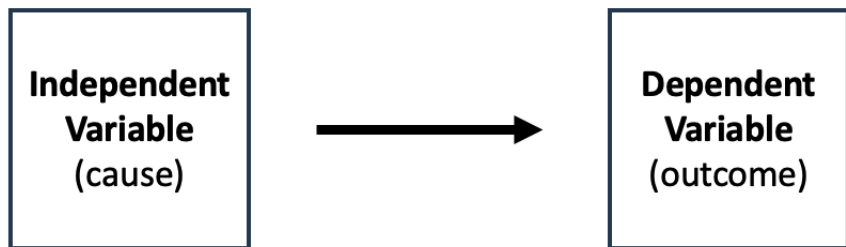
- Independent variable is something that we think will provide us with all parts of the explanation of the different values taken on by the dependent variable
- Dependent variable is something we hope to explain
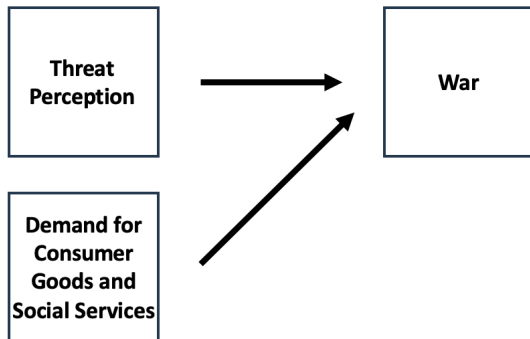
Variables (Arms race theory by Lewis Richardson)

- Arms race theory argues
    increases in the level of a perceived threat and decreases in public demand for consumer goods and social services together are expected to lead to an increase in the likelihood of war

Variables (Arms race theory by Lewis Richardson)

- Arms race theory argues
    - increases in the level of a perceived threat and decreases in public demand for consumer goods and social services together are expected to lead to an increase in the likelihood of war

- What are the independent variables here?
- What is the dependent variable?

Assumptions

- Acts of taking for granted, or supposing a thing without proof
- Simplifying conditions under which a theory is expected to hold true (scope condition)
- Principle means by which theories simplify reality
- Empirical tests investigate the logical implications of assumptions but do not test assumptions

Assumptions

- Acts of taking for granted, or supposing a thing without proof
- Simplifying conditions under which a theory is expected to hold true (scope condition)
- Principle means by which theories simplify reality
- Empirical tests investigate the logical implications of assumptions but do not test assumptions

- Examples
  - Political leaders strive to maintain their office
  - States act rationally (rationality next week)
  - Countries are "black boxes" that operate on the world stage (realism later in the course)
  - Countries are in a strategic situation modeled by a Prisoners' Dilemma (game theory basics in a few weeks)

Hypotheses

- Relationships between independent and dependent variables
- Implications drawn from a theory's logic
- Should be testable to test the theory's explanation and predictions

Hypotheses

- Relationships between independent and dependent variables
- Implications drawn from a theory's logic
- Should be testable to test the theory's explanation and predictions

- Examples of testable hypotheses
    - Students who attend recitations have higher grades than students who skip class
    - People exposed to high levels of ultraviolet light have a higher incidence of cancer than the others
    - External security threats by an enemy increase the probability of nuclear armament

- Logical consistency
  - No contradictions between theory's assumptions
  - Fundamental requirement of any theoretical proposition or prediction since predictions follow logically from assumptions
  - Does the theory's hypothesis follow logically from the assumptions?

Judging Theories

- Logical consistency
  - No contradictions between theory's assumptions
  - Fundamental requirement of any theoretical proposition or prediction since predictions follow logically from assumptions
  - Does the theory's hypothesis follow logically from the assumptions?

- Examples of logically inconsistent assumptions or hypotheses
  - (a-1) The primary goal of a state is to maximize power
  - (a-2) Status quo nations do not pursue dramatic military buildups to change the distribution of power
  - (b-1) Democracies are less likely to go to war with each other
  - (b-2) Democratizing states can be more prone to conflict

Judging Theories

- Falsifiability
  - Logical possibility that a hypothesis or theory can be shown to be false by an observation or experiment
  - A statement is falsifiable when (a) it makes a prediction about an outcome and (b) what is predicted is observable

Judging Theories

- Falsifiability
  - Logical possibility that a hypothesis or theory can be shown to be false by an observation or experiment
  - A statement is falsifiable when (a) it makes a prediction about an outcome and (b) what is predicted is observable

- Empirical predictions (hypotheses)
  - Judged by how well a theory predicts real-world behavior
  - One of the standards to evaluate the usefulness of a theory
  - More cases a theory explains, the better the theory's predictive power