How do we assess claims to knowledge in social research?
What is a *theory*?

A theory is a postulation based on logical suppositions that explain generalizations.

- Theories are “Explanations”
- Theories answer “Why” questions
• Using systematic methodologies and theories help us learn about the world.

• We begin by describing our problem and then move on to explaining our phenomenon of interest.

• We do this by constructing theories and testing them.
Important traits of theories:

1. No theory can be completely correct.

2. Theories are simplifications of reality.

3. The goal is to seek general patterns.

4. Theories specify cause and effect relationships between variables. X causes Y
Theories and Concepts

- Theories order concepts as variables specifying directional relationships.

- For example, education (X) increases income (Y).

- Income (X) increases chance an individual votes Republican (Y).
The Hypothesis

Testable Propositions linking theory to knowledge
We test our theories by testing *hypotheses*.

Hypotheses are general propositions (assertions).

For example,

H1: Dictatorships get into more wars than democracies.
Hypotheses

- A hypothesis is a testable proposition that formalizes the expectations of a theory.

- It does this by stating the relationships of variables in a theory.

- One theory may produce several hypotheses, each tested singularly.
Hypotheses continued

- Hypotheses state how one variable affects another variable, in other words how the Dependent Variable is affected by an Independent Variable.

- The independent variable is what we expect causes variation, change in the dependent variable. X is often used to denote independent variables.
Hypotheses continued

- The variable being affected is the dependent variable, and the affecter is the independent variable.

- Other names for dependent variable is the outcome variable or Y.

- Names for independent variables include explanatory, covariates, X.
Hypotheses continued

- Hypotheses are usually stated as direct or inverse relationships, especially if they are your own, and not the null.
  - Direct (positive): X goes up, Y goes up.
  - Inverse (negative): X goes up, Y goes down.
Relationships between variables

Direct or positive relationship

Inverse or negative relationship

No relationship
The Null Hypothesis

- We often seek to discredit the Null Hypothesis, which states that there is no relationship between two given variables.

- Every theoretical hypothesis has its own null hypothesis.
Group Work:

1. Write a hypothesis specifying a relationship between the wealth of a country and democracy.

2. Specify the dependent and independent variables.

3. Write the null hypothesis
Group Work:

H1: State economic development increases democracy. **Direct relationship** (inverse relationship would be dev decreases dem)

Which are the independent and dependent variables?

X = Economic Development, Y = Democracy

What is the null hypothesis?

(H0): There is no relationship between democracy and development
Cause & effect

SINGLE CAUSE

\[ X \rightarrow Y \]

MULTIPLE CAUSE

\[ X_1 \rightarrow Y \]
\[ X_2 \rightarrow Y \]
\[ X_3 \rightarrow Y \]

SIMULTANEOUS CAUSE

\[ X \leftrightarrow Y \]

INDIRECT CAUSE

\[ X \rightarrow Z \rightarrow Y \]
Issue of Causality

- It is common to say something causes something else, although we tend to use this word loosely. A proper synonym is AFFECT.

- Causality is a deep issue that cannot really be true in its most literal meaning, which would be deterministic and not suitable for social science.

For example, Wealth causes Republican Party membership. (wealth=Republican) or _wealthy individuals must be Republican!!

Or

_Because Iraq has weapons of mass destruction, they will use them against the USA._
Issue of Causality

- By cause, we usually mean that some variable _AFFECTS_ another.

- It is best to use language and methods related to probability theory. How much does an increase in X affect Y, and how strong is this effect?
The issue of Causality and lack of absolutism of science are similar.

In the same way that we can not prove theories to be absolutely true, we can never be absolutely sure one variable is affecting another.

For this reason, it is more appropriate to say that a X variable increases or decreases the likelihood of a change in the Y variable with some probability, even if very high or low.