

Theory vs Hypothesis

Cyrus Mohammadian, PhD

Chapman University

mohammadian@chapman.edu

February 12, 2018

- 1 Housekeeping
- 2 Final Research Proposal
- 3 In Search of Truth

- Homework 1 **Due Now!**
- Our first in-class group meeting for research proposal: **February 21**
- Office hours: **MW 12:1pm LLB 14** or by appointment
- Make sure to sign the **attendance** sheet!

Final Research Proposal

Examples of experimental research questions:

<https://revisesociology.com/2016/08/12/field-experiments-examples/>

Final Research Proposal

Examples of experimental research questions:

- 1) The Domestic Abuse in the Lift Experiment
- 2) The Ethnicity/ Gender and Bike Theft Experiment
- 3) The Ethnicity and Job Application Experiment
- 4) The 5 Note Theft and Social Disorder Experiment

In Search of Truth

- Fact
- Theory
- Hypothesis
- Law

- Observations about the world around us
- For example, it's bright outside when I look out the window



Hypotheses

- When we make explanations for those observations we record we're hypothesizing
- So if we see it's bright outside, we may hypothesize that the sun is probably out.
- It's not something we "prove", but rather test
- If we step outside and notice the sun is indeed out then our hypothesis is confirmed!



Hypotheses

- We usually posit multiple hypotheses to explain an observation.
- We eliminate the ones that are wrong
- What's left over is a possible explanation of a phenomenon
- When a hypothesis is confirmed it does not become a law or a theory
-it's simply evidence!

- When enough evidence (hypotheses) are confirmed we can turn them into something greater: a theory!
- Theory is the way we know something works based on all the evidence (hypotheses) we've collected.
- Used to **explain** phenomenon and make **predictions**

Facts -> Hypotheses -> Testing -> Theory -> Predictions

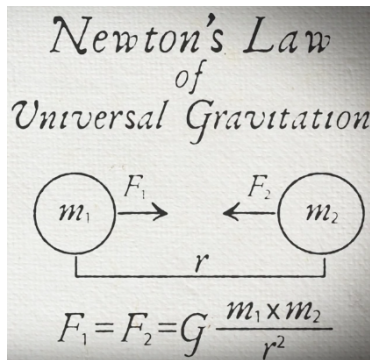
Obtaining status of theory is not a trivial matter.

It is near the pinnacle of scientific achievement!

- But what about laws?!?!
- Detailed description, usually using math, telling us how something happens
- Like the movement of gas molecules related to temperature or how mass and energy are always conserved
- But laws don't tell us why something happens

Example of Laws and Theories

- Gravity is a law *and* a theory
- Newton's law of universal gravitation tells how 2 objects attract (even gives us formula)
- Textbook example of a law!
- But Newton's equation doesn't describe what is happening or why. To do that we need a theory!



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- Not so fast...quantum mechanics...