

What is and is not Science?

- Karl Popper was trying to decide what was and was not science and was comfortable with calling Einstein's theory of relativity science, but not Freud's psychoanalysis, Adler's individual psychology, or Marx's theories of history. Why is that?
- All 4 theories have a lot of evidence that supports them, lots of "verifications"
- Adler talked about his "thousand-fold experience"
 - When is a tree not just a tree?
- Even when the three theories made predictions, no matter what the result they were able to be spun into support of the theory. In other words, predictions were not risky.
- Einstein on the other hand made a very specific prediction that if it was wrong the theory of relativity would be proven wrong.

Verifications/Predictions:

- Verifications for theories can be found anywhere if one is looking for verifications
- For a verification to count (according to Popper), it must be as the result of a risky prediction – one that can refute the theory
- Science is looking for anti-verifications, looking for those cases that would refute the theory.
- Freud's dream analysis – would say that a tree in a dream is a phallic object. Except when it isn't, sometimes a tree is just a tree.
- Einstein said that gravity bends light waves. Proposed an experiment where pictures would be taken during a solar eclipse when stars that are normally invisible due to the brightness of the sun would be visible.

What is Science: Popper's conclusions:

- Science must be verified by observations that confirm *risky* predictions.
- Good science prohibits certain things from happening, the more it prohibits the better it is.
 - Most experimentation should be looking to refute the theory
- If a theory is irrefutable (unfalsifiable) it is not science (it may still have value, but is not science)
- Every genuine test of a theory is one trying to refute it, and only results from these tests count as confirming evidence
- Theories can be rescued by an ad hoc modification, but that reduces its scientificness

Science as a series of Observations:

- Saying that one is going to simply observe is silly. We need some direction and meaning in our observations. (Observe what, where, for how long?)
- A series of Observations on its own is not science, it also requires refinement of hypothesis.
- Which came first the observation or the hypothesis?
 - An earlier observation or hypothesis!
- Popper says that science starts as myths, but that we analyze and criticize those myths

Discussion Questions:

- If we were to be strict Popper-ians how much of the work that we do could be considered science?
- Popper is not making value judgements about the worth of non-scientific theories, he is just calling them not science. What can we (or have we) gained from theories that are not scientific?
- In my previous field, education, there is a trend towards less scientific theories over time do we see this trend elsewhere? What do we make of such a trend?
 - Behaviorism (a la Skinner, or Thorndike) are quite scientific, where as social constructivism is much less so.