

For the purposes of illustration, I will give summaries and opinions on both readings, but students only need to give a summary of one of the readings each week.

(1) 1st Reading: K. Popper, *Conjectures and Refutations*, pp. 33-39:

Popper introduces the *possibility* of being shown to be false—that is, *falsifiability*—as the essential criteria for a theory being considered to be scientific. He hopes to be able to distinguish between theories like Einstein’s theory of relativity, on the one hand, and Karl Marx’s theory of history, Sigmund Freud’s theory of psycho-analysis, and Alfred Adler’s theory of individual psychology, on the other. He argues that explanatory power, and confirmations, do not contribute to make a theory more scientific, but rather the opposite. He argues that a good scientific theory makes very specific claims that certain states of affairs can never be—that is, it is a negation of certain possible experiences.

Agreement: I agree that a precise scientific theory should expose itself to the possibility of being wrong. It should make clear what claims follow from it, and what claims are contradicted by it.

Disagreement: Popper never makes clear exactly what it will mean to falsify a theory. Surely one experiment will not be able to discredit a useful theory, but then how many disconfirmation experiments would be needed to actually falsify a theory?

(2) 2nd Reading: T. Kuhn, *The Structure of Scientific Revolutions*, chap. 3, “Normal Science as Puzzle-Solving,” chap. 9, “The Nature of Revolutionary Science” (selections)

Kuhn argues that science develops in two very different ways during periods of “normal science” and during periods of “revolutionary science”. During periods of normal science, a group of scientists accept some given *paradigm* and work to make progressive, incremental progress in developing that paradigm—like solving a puzzle with well-known rules. They take for granted fundamental natural laws, methods of scientific practice, metaphysical assumptions, social norms, and general ideology. Over time, scientists carrying out normal science will make new discoveries that do not fit into the current paradigm, anomalies, which then become the basis of new theories that make different predictions from those of the current paradigm. Kuhn argues that successive paradigms are both incompatible and incommensurable with each other.

Agreement: It does seem that disciplines that have settled paradigms make more *progress* than those that do not.

Disagreement: If successive paradigms are really incommensurable with each other, how is it possible for scientists to make a decision to work in one rather than in another? When we look at the history of science in detail, I do not agree that we see such clear epistemic breaks as Kuhn’s proposed paradigm shifts.