

# Falsification: Was Karl Popper Wrong About Science?



By Alex Berezow, PhD — August 19, 2016



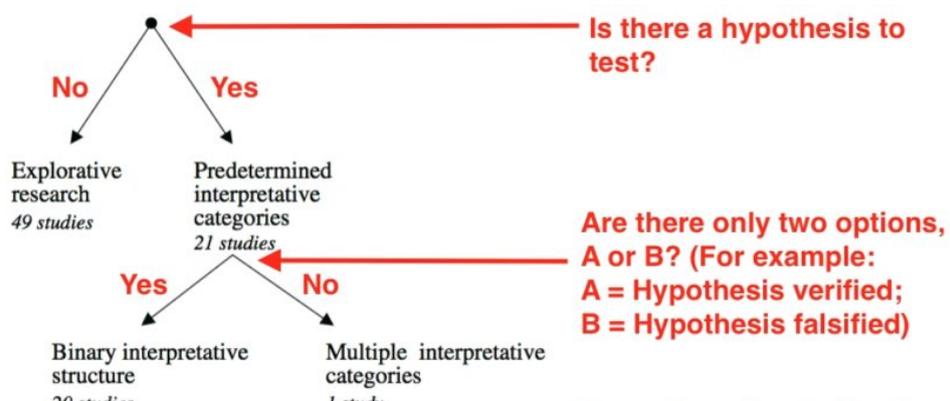
[1] Credit: Shutterstock

Science plays by a very unique and difficult set of rules. Those rules, which I wrote about at [RealClearScience](#) [2], include: (1) using clearly defined terminology; (2) measuring quantity over quality; (3) performing experiments in highly controlled conditions; (4) reproducing those experiments; and (5) testing predictions. We even could add a sixth rule: Experiments and hypotheses ought to make sense within the commonly accepted theories that govern the fields, such as evolution for biology and atomic theory for chemistry.

Karl Popper, who was a philosopher of science and -- according to Prof. [Ulf Persson](#) [3], "not a nice man" -- popularized the notion that science ought to be "falsifiable." In contrast to the more conventional view that experiments are meant to verify hypotheses, Popper believed that science done properly ought to attempt to falsify them. Taken to an extreme, Popper's logic suggests that hypotheses can never be verified.

Popper's views are highly influential. Indeed, few scientists would dispute the importance of falsifiability. But just how realistic is Popper's spin on the scientific method? Does science actually advance in this way? In a paper nearly a decade old in the journal *Foundations of Science*, philosophy professor Sven Ove Hansson argues that Popper is wrong.

To make his case, Dr. Hansson selected 70 papers\* from the journal *Nature* published in the year 2000. He asked a series of questions and classified the papers accordingly. His schema is shown below. (My explanations, which are additions to the original figure, are shown in red text.)



*Credit: Sven Ove Hansson, Found Sci, 2006. DOI: 10.1007/s10699-004-5922-1 (With modifications in red text by Alex Berezow)*

The very first question, whether or not a hypothesis even existed, eliminated 49 papers. The reason is because much of science is discovery-driven rather than hypothesis-driven. Determining the sequence of a gene or the structure of a protein is purely exploratory. There is nothing to hypothesize beforehand.

Then, Dr. Hansson subjected the remaining 21 papers to further scrutiny. Using his criteria, only two papers were deemed to have hypotheses that were easily falsifiable. The other 68 papers did not. (Of these two papers, only one was actually falsified.) Dr. Hansson writes:

*"Only two of the seventy studies under investigation tested a hypothesis that was more accessible to falsification than to verification. Since only one of these two hypotheses was falsified, only one of these seventy high-status articles... conformed to the falsificationist recipe for successful science."*

In other words, only one out of 70 papers fully met Popper's criteria of falsification. This suggests that while Popper's idea of falsification is a good one, it is far too difficult for scientists to implement regularly in practice. Science plods along just fine without adhering to Popper's overly burdensome guidelines.

Though he would surely dispute Dr. Hansson's conclusion that falsification has been falsified, hopefully Popper would have at least found it amusingly ironic.

**Source** <sup>[4]</sup>: Sven Ove Hansson. "Falsificationism Falsified." *Found Sci* 11 (3): 275-286. Published: September 2006. DOI: 10.1007/s10699-004-5922-1

*\*Dr. Hansson said in an email to ACSH that the 70 papers he used in his analysis were given the name "article," which is the highest status in the journal Nature.*

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