Overview

Popper’s speech, given in 1953, addresses two major problems in the philosophy of science that were of interest to him during most of his career. The first of these problems is that of distinguishing between science and pseudo-science. How can we tell when a theory should count as scientific? What is it that separates scientific theories from unscientific ones?

Popper proposes a seemingly simple answer to these questions. A scientific theory, he says, is one that can be put to the test. You must be able to design and carry out a test that determines whether the predictions of the theory are borne out. If you cannot design such a test, then there is no clear way to demonstrate that the theory is false, and so Popper would say that such a theory is not scientific.

The second problem that Popper wishes to address is the classical problem of induction that was brought to the forefront by David Hume. Consider the case of a glowing red stovetop. Our past experiences have most likely led us to believe that touching a glowing red stovetop will cause injury to our hand. We begin with a finite (and, we hope, very small!) number of such experiences and we generalize to the claim that “all glowing red stovetops will burn our hands.” When, in the future, we see a glowing red stovetop, we then say “we had better not touch that – it will burn us!”

But are we justified in making such a claim? Is this sort of reasoning, which we call induction, justified? After all, surely we have not been able to observe all such instances. Maybe there are times when a glowing red stovetop has not caused injury to some person’s hand when touched by that person. We might just be unaware of such events. If such events have occurred, then we are not justified in drawing our conclusion.

Popper believes he has solved this problem also. All we need to do is acknowledge that we never do fully justify a theory or law. Instead, we accept laws and theories only tentatively. Science proceeds through a process of proposing a hypothesis and then testing it. Those that are falsified are then rejected, while those that pass such tests are accepted as conjectures that may be refuted at any time in the future. As a result, the problem of induction simply vanishes.

Key Terms

confirmation – the establishment of the truth of a claim through the proper use of observation and experiment.

deduction – a conclusion that is drawn from premises in such a way that, if the premises are all true, the conclusion must be true.

demarcation – a line or property that separates one thing from another. In philosophy of science, we speak of a demarcation between science and non-science or pseudoscience.

empiricism – the thesis that all knowledge of the world is justified by experience through the five senses.

falsification – the demonstration that a statement is false by finding a counterexample (an observation of the physical world that is incompatible with the statement).

hypothesis – a claim that is made with the purpose of subjecting the claim to testing in order to obtain either confirmation or refutation of the statement.

induction – a conclusion that is drawn from premises in such a way that, if the premises are all true, the conclusion has some support but is not guaranteed to be true.

metaphysics – a basic area of philosophy that studies questions having to do with, among other things, what there is in the universe.
**pseudoscience** – a term that describes a system of claims that aspires to be scientific but which, for some particular reason or reasons, fails to meet the minimum conditions for being science.

**refutation** – see *falsification* above.

**testability** – a property of a statement (theory, law, etc.) that indicates that definite consequences for observation can be inferred from the statement and compared with actual observation to see whether the inferred consequences come true.

**verification** – see *confirmation* above.

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**Reading Questions**

The following questions are meant to guide and assist you in reading Popper's article. They will draw your attention to key passages and challenge you to think about what Popper is really trying to say. Although no page numbers are given, the questions come roughly in the order that you will find their answers in the text.

1. What is the primary question with which the entire article is concerned?
2. According to Popper, what is the most widely accepted answer to this question?
3. Explain what Popper means when he says that it was neither the doubting of the truth of pseudoscientific claims nor their lack of the same mathematical exactness of physics that motivated him to ask this question.
4. Why is the exchange between Popper and Adler in 1919 significant in the formation of Popper's views on the problem of separating science from pseudoscience?
5. On pages 40 and 41, Popper discusses an example involving a child and two men. What is the point Popper is trying to make through the use of this illustrative example?
6. Explain why Popper finds the idea of finding verifications to be an unacceptable answer to the question of what makes a theory science. Why is the appeal to constant verification a weakness rather than a strength?
7. How does Einstein's general relativity differ from the other theories that Popper has thus far considered? What is the significance of risk?
8. Clearly state Popper's proposed solution to the problem of demarcation.
9. How do each of the five theories that Popper considers in the speech (Einstein's relativity, Adler's individual psychology, Freud's theory of psychoanalysis, Marx's theory of history, and of course astrology) fare with respect to Popper's solution?
10. Explain why Popper compares the two psychological theories in particular to myths. Does he feel that there is any value to such myths? Explain.
11. What is the basic idea of “valid induction” as presented by Popper? What is Popper's basic position on this notion of “valid induction”?
12. What is the basic idea of the problem of induction? (The overview above may help you understand the problem.)
13. On page 45, Popper proposes three key ideas that all seem to hold: the problem of induction, the use of laws in science, and the principle of empiricism. Elaborate on each of these three ideas, and then explain why there appears to be a conflict between them.
14. How does Born solve the conflict that arises from the three principles in the preceding question?
15. Why does Popper maintain that there really is no clash among the three ideas? How does he claim to have solved the logical problem of induction? Has he succeeded?

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**Challenge Questions**

1. Can you think of any theories that are deemed scientific but that would fail to meet Popper's criterion of science?
2. Can you think of any theories that are deemed unscientific but that would successfully meet Popper's criterion?
3. In light of your answers to the previous two questions, can you think of a good way to revise Popper's criterion to account for these?