

Hume, Popper, Putnam

Reason, Relativism, and Reality

Spring 2005

Deductive Validity & Inductive Strength

- Argument *A* is **deductively valid** iff it is *impossible* for the premises to be true without the conclusion being true
- Argument *A* is **inductively strong** iff it is *improbable* that the premises are true while the conclusion is untrue
- *A*'s premises *probabilify* the conclusion, so they give a reason, albeit not a conclusive reason, to believe the conclusion

Are there inductively strong arguments?

It sure seems so.

1. Lots of samples of salt have been found to dissolve in water.
2. These samples are randomly selected.
3. So, salt is soluble in water.

Hume's skepticism

Let "induction" be our practice of relying on invalid arguments of the type given. How can induction be justified? Only by appeal to the principle that nature is regular or uniform. But how do we justify *that*?

The uniformity principle is not a priori =_{Df} justifiable independently of experience. Nor is it observational =_{Df} deducible from observations.

Therefore the justification must be inductive. And now we're caught in a circle: induction depends on uniformity depends on induction.

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Popper

- Popper thinks Hume is right:
induction can't be justified
- One might expect him to conclude
that scientific inquiry is irrational,
since one of its basic principles
lacks justification
- How does he propose to avoid this
result?

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Popper's falsificationism

Science works like this: From a scientific theory T , together with statements I of "initial conditions," we validly deduce "basic statements" B that can be directly compared with experimental results E .

If B and E are consistent, then "the theory has for the time being passed its test: we have found no reason to discard it."

If B is found to conflict with E , then B is *falsified*, which in turn falsifies the theory T from which B was deduced.

Startling claim

"Nothing resembling inductive logic appears in the procedure here outlined...I never assume that...theories can be established as 'true', or even as merely probable"

So while inductive methods cannot confer probability, science is still OK; *because science relies only on deduction.*

Example

T: "All swans are white"

I: "There is a swan on the pond"

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These entail

B: "There is something white on the pond"

Suppose we observe

E: "There are two white things on the pond."

Then *T* is "corroborated" in the sense that it has survived an empirical test.

Corroboration isn't confirmation

The important point for Popper is that such observations, *no matter how many of them there are*, do not increase the probability of *T at all*.

Thus, according to Popper, *we have absolutely no reason to believe any scientific theory*--all we can reasonably say is that these theories have been subjected to severe tests; and so far *they have not been falsified*.

Puzzle: Can we say even that "they have not been falsified"? Our evidence for that would seem to be inductive!

Putnam's first criticism

- Popper is ignoring the practical use of scientific theories.
- "If there were no suggestion at all that a law which has to withstand severe tests is likely to withstand further tests, such as the tests involved in an application or attempted application, then Popper would be right; but then science would be a wholly unimportant activity."
- How can we entrust our lives to a scientifically designed bridge if we have no reason to believe the science is true?

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Putnam's second criticism

Scientific theories T do not typically *have* experientially falsifiable consequences B -- even when T is taken in conjunction with initial conditions I (which for Popper have to be singular statements).

E.g., let T be Newton's 3 Laws plus the Law of Gravitation. To deduce orbital consequences "we make certain simplifying assumptions.

(I) No bodies exist except the sun and the earth.

(II) The sun and the earth exist in a hard vacuum.

(III) They are subject to no forces but gravitational forces." A false consequence B might be blamed on T , but it might equally be blamed on (I)-(III).

Putnam's third criticism

Admittedly, a scientific theory *T* *does* have observational consequences in conjunction with certain "auxiliary statements" (AS). But

(a) it would "obscure profound methodological issues" to use 'theory' to refer to *T* & AS: *T* is supposed to be a system of *laws*, while AS is just a bunch of *accidental statements*.

(b) in the face of a recalcitrant experimental result, AS is more likely to be rejected than *T* (e.g. Neptune and Uranus).

Newton's theory of gravitation is not in Popper's sense falsifiable at all; "yet it is surely a paradigm of a scientific theory."