General Philosophy: Induction

Deductive and inductive arguments

- Recall from the Introduction to Logic course that an argument is *logically valid* just in case, if all the premises of the argument are true, then the conclusion must also be true. Call such an argument a *deductive argument*.
  - E.g.: "Milo is a dog. All dogs are fun. Therefore, Milo is fun."
- Contrast this with *inductive arguments*. These are arguments in which one makes inferences about unobserved instances on the basis of observed instances. Importantly, in inductive arguments, the truth of the premises does *not* guarantee the truth of the conclusion.
  - E.g.: "The Sun has risen every morning in the past. Therefore, the Sun will also rise tomorrow morning."

Hume's problem of induction

Hume's *problem of induction* was first presented in §6, pt. I.III of his *A Treatise on Human Nature* (1738), and later §§4-5 of his *An Enquiry Concerning Human Understanding* (1748). The central question leading to the problem of induction is the following:

> **What reason do we have for believing that our conclusions about observed instances may be extended to include unobserved instances?**

The problem of induction is the observation that we appear to have *no justification* for so thinking that our conclusions about observed instances may be extended to unobserved instances—and so no justification for deploying inductive arguments. Hume puts the point as follows:

> *As to past* experience*, it can be allowed to give* direct *and* certain *information of those precise objects only, and that precise period of time, which fell under its cognizance: But why this experience should be extended to future times, and to other objects, which for aught we know, may be only in appearance similar; this is the main question on which I would insist. The bread, which I formerly ate, nourished me; that is, a body of such sensible qualities was, at that time, endowed with such secret powers: But does it follow, that other bread must also nourish me at another time, and that like sensible qualities must always be attended with like secret powers?* (Enquiry, §4.16)

To resolve the problem of induction, we must justify the assumption that our available body of evidence provides a guide to making inferences about as-yet unobserved results.

Question: Is there an analogous 'problem of deduction'? Cf. Lewis Carroll's 'What the Tortoise Said to Achilles'. (Mind, 1895)

Laws of Nature and Principles of Uniformity

One answer which may immediately come to mind on being presented with the problem of induction is that one may appeal to the *laws of nature*. The thought goes that we are justified in believing with sufficiently high probability that conclusions drawn on the basis of observed data may be extended to the as-yet unobserved on the basis of our knowledge of these laws. While this thought is compelling, it will not do—as Russell observes in ch. 6 of his *The Problems of Philosophy* (1912):

> *The interesting doubt is as to whether the laws of motion will remain in operation until tomorrow. If this doubt is raised, we find ourselves in the same position as when the doubt about the sunrise was first raised.* (Russell, ch. 6)

If we can't justify our belief that the laws of nature will continue to hold tomorrow, then we can't on that basis justify our belief that the sun will rise tomorrow.

In light of this, one might instead appeal to some general *principle of the uniformity of nature*—i.e., a principle that unobserved instances will be in line with observed instances. But this appears to be *question-begging*, insofar as it's merely a statement of what we are seeking to justify.

The Inductive Justification for Induction

Instead of appealing to the laws of nature or a uniformity principle in an attempt to justify our use of inductive arguments, one might simply seek to appeal to *further inductive arguments*. That is, one might say, "I am justified in believing that the future will resemble the past, because the future has always resembled the past." But this appears *circular*.

Note, however, that the reasoning need not be circular if, following Skyrms' presentation (*Choice and Chance*, ch. 3), we introduce different types, or 'levels', of inductive reasoning: (Below, read $\downarrow$ as 'justifies'.)

$$\begin{array}{c} \vdots \\ \text{induction}_3 \\ \downarrow \\ \text{induction}_2 \\ \downarrow \\ \text{induction} \end{array}$$

But still, one might think that this is not particularly satisfying, for:

- An independent justification for our use of inductive arguments is never forthcoming.
- The distinction between different 'levels' of induction appears *ad hoc*.

The Pragmatic Justification for Induction

Let's now consider a different approach, due to Reichenbach (*Experience and Prediction*, §39). This seeks to demonstrate the following:

> *The use of inductive reasoning will be successful, if any non-deductive mode of reasoning to infer conclusions from a given body of evidence will be successful.* (Reichenbach, §39)

Roughly, Reichenbach's argument runs as follows:

P1: Either nature is uniform or it is not.

P2: If nature is uniform, then inductive reasoning will be successful.

P3: If nature is not uniform, then no method of reasoning to infer conclusions about the future from past evidence will be successful.

C: Therefore, if any method of method of reasoning to conclusions about the future from past evidence is successful, induction is successful.

Thus, induction always wins out, so we should trust inductive reasoning—claims Reichenbach. But does this really solve the problem? (Compare Pascal's wager.) We might distinguish:

1. Justifying our *use* of induction over other non-deductive methods of inference.
2. *Given* our use of induction, justifying our having any degree of belief in the conclusions of inductive arguments, given the premises.

This is the distinction between, respectively, *pragmatic* versus *epistemic* justification. Arguably, Reichenbach achieves only (1)—but the problem of induction lies in (2). In this regard, Reichenbach's approach to the problem of induction is just as unsatisfying as Pascal's wager.

Induction and Rationality

Another approach to the problem of induction attempts to link our deployment of inductive arguments to rationality *by definition*. One 20th century advocate of this view is Strawson:

> *[T]he rationality of induction, unlike its 'successfulness', is not a fact about the constitution of the world. It is a matter of what we mean by the word 'rational' in its application to any procedure for forming opinions about what lies outside our observations or that of available witnesses.* (Strawson, p. 261)

This approach raises some natural questions:

1. Is Strawson correct in saying that it is rational to reason via inductive arguments?
2. Does Strawson's manoeuvre this provide epistemic justification for our inductive expectations that conclusions drawn on the basis of observed evidence may be extended to the as-yet unobserved? In other words, is Strawson again only achieving (1), not (2)?

Apriorism

One option which van Cleve (1984) considers in his paper is *apriorism*: the view that we know *a priori* (i.e., in the absence of experience) that induction is a legitimate mode of reasoning. But is this plausible? Can any *arguments* be mustered for this view?

Three important distinctions in philosophy

1. **A priori/a posteriori:** *A priori* propositions can be known in the absence of empirical experience; *a posteriori* propositions can only be known given empirical experience. This distinction is *epistemological*.
2. **Necessary/contingent:** *Necessary* propositions hold in all possible worlds; *contingent* propositions hold only in some possible worlds. This distinction is *metaphysical*.
3. **Analytic/synthetic:** *Analytic* propositions are true in virtue of the meanings of the words used to express them; *synthetic* propositions are not true in virtue of the meanings of the words used to express them. This distinction is *linguistic*.

Hume thought that a priori/necessary/analytic always went together (he called them 'relations of ideas'), and that a posteriori/contingent/synthetic always went together (he called them 'matters of fact'). Philosophers since Hume have argued that they can come apart. For example, Kant argued that there can be contingent a priori propositions (e.g., the truths of mathematics, or geometry).

Externalism about justification

The other option which van Cleve countenances in his paper is an externalist approach to justification (of the kind we saw last time), as applied to the problem of induction. The reasoning here would run as follows: if nature indeed *is* uniform, then we are (externally!) justified in believing that the sun will rise tomorrow.

The problem with this is: how does it do anything to resolve our *internal* sense of inductive angst? These are the same problems for externalism which we have seen before.

Hume's Approach

Hume states that, although we can offer no justification for our beleiving the conclusions of inductive arguments,

> *... There is some other principle which determines him [us] to form such a conclusions. This principle is* custom *or* habit. (Enquiry, §§5.4-5.5.)

Is this just a shrug of the shoulders, or is something deeper going on?

References

[1] David Hume, *An Enquiry Concerning Human Understanding*, 1748. E. Steinberg (ed.), Cambridge: Hackett, 1993.

[2] Bertrand Russell, *The Problems of Philosophy*, Williams and Norgate, 1912.

[3] Wesley Salmon, "An Encounter with David Hume", in J. Feinberg *et al*. (eds.), *Reason and Responsibility: Readings in Some Basic Problems of Philosophy*, 13th edition, pp. 245-263, Boston: Wadsworth, 2008.

[4] Brian Skyrms, *Choice & Chance*, fourth edition, London: Wadsworth, 2000.

[5] Hans Reichenbach, *Experience and Prediction*, Chicago: University of Chicago Press, 1938.

[6] Peter Strawson, *Introduction to Logical Theory*, London: Methuen & Co. Ltd., 1952.

[7] James van Cleve, "Reliability, Justification, and the Problem of Induction", Midwest Studies in Philosophy 9(1), pp. 555-567, 1984.