Philosophy of Science // Fall 2016

Handout 7

Induction: introduction

Hume on induction. The old problem of induction was stated by Hume:

> [A]ll arguments from experience are founded on the similarity which we discover among natural objects, and by which we are induced to expect effects similar to those which we have found to follow from such objects. [I]t may surely be allowed a philosopher to have so much curiosity at least as to examine the principle of human nature, which gives this mighty authority to experience, and makes us draw advantage from that similarity which nature has placed among different objects. From causes which appear similar we expect similar effects. This is the sum of all our experimental conclusions. Now it seems evident that, if this conclusion were formed by reason, it would be as perfect at first, and upon one instance, as after ever so long a course of experience. But the case is far otherwise. Nothing so like as eggs; yet no one, on account of this appearing similarity, expects the same taste and relish in all of them. It is only after a long course of uniform experiments in any kind, that we attain a firm reliance and security with regard to a particular event. Now where is that process of reasoning which, from one instance, draws a conclusion, so different from that which it infers from a hundred instances that are nowise different from that single one? (EHU 4.20)

Hume's problem: Naive response. Let us give a paraphrase of Hume's classic argument. *Question*: Why to believe the statement 'The sun will rise tomorrow'? *Naive Response*: Because it has risen so many times in the past. This answer relies on the assumption that the past resembles the future. If in the past we had many tokens (instances) of the events of type A (sunrises in the east), then in the future A-events will also occur.

This indeed *is* naive. The mere fact of many sunrises in the past does not much increase the confidence in their future occurrences.

Sophisticated response. Now, let us try something more nuanced. We can say: The sun will rise tomorrow, because the laws of motion in conjunction with certain actual conditions necessitate the rise of the sun in such and such conditions. Here we do not express any expectation of the occurrence of specific events. A meteorite can come out from nowhere and hit the earth, the planet itself may explode—all these catastrophes we readily allow. Therefore, in one sense, the future does *not* have to resemble the past. However, we insist that the laws of nature will hold in the future as they did in the past.

Since we say that the laws of nature will hold in the future as they did in the past, we should be able to say that:

If A_1-events occur, then B_1-events will occur

If A_2-events occur, then B_2-events will occur

...

If A_n-events occur, then B_n-events will occur.

Thus: if the earth stays its orbit and the sun is in its current condition and ..., then the sun will rise tomorrow. But if the meteorite hits the earth and ..., then the sun will not rise tomorrow. And, whatever happens, these events will be in accordance with the laws of motion.

But it now seems that this enlightened reasoning contains the same less-than-enlightened assumption—namely, that the future should resemble the past. For the idea that the laws of nature hold forever and ever is based solely on the evidence that they held in the past. All these purportedly eternal uniformities have in fact held in the past. In the future a different set of uniformities can hold: for example, if A_1-events occur, then B_2-events will occur.

Objections and replies. We will now touch on some well-known attempted refutations of Hume's classic argument.

Objection 1. We have reliable hypotheses in science and daily life. Any sceptic about induction will go bankrupt (this is another reading of Russell's principle).

Reply. The objection misses the point. Hume asks whether we can *justify* statements about the future.

Objection 2. Natural selection allows us to form correct expectations about the future. That is, we have a built-in cognitive mechanism for correct predictions.

Reply. This does not advance us by way of justification, since the claim itself utilises induction.

Objection 3. Perhaps we have a pre-scientific *a priori* cognitive structure that allows us to draw inductive inference with *a priori* certainty (Kant).

Reply. This is a sly move, but how do we justify the existence of such a structure? Induction will penetrate this justification—unless we make metaphysical assumptions about the properties of human mind.

Strawson's objection. By far the most interesting objection is the one advanced by P. F. Strawson:

Objection 4. Let us use some conceptual analysis and argue as follows: It is a trivial truth that it is reasonable to have a degree of belief in a statement which is proportional to the strength of the evidence in its favour; and it is a trivial truth that, other things being equal, the evidence for a generalisation is strong in proportion as the number of favourable instances, and the variety of circumstances in which they have been found, is great. So to ask whether it is reasonable to place reliance on inductive procedures is like asking whether it is reasonable to proportion the degree of one's convictions to the strength of the evidence. Doing this is what 'being reasonable' simply means in such a context.

The critic here does not advance any justification of induction. He rather professes to not be able to understand what kind of justification could be required for inductive procedures. Compare this to the question, 'Is the legal system of China legal?' We may very well ask whether a particular regulation is legal—i.e. whether it contradicts certain laws of the given legal system, say the Chinese one. But it is meaningless to ask whether the Chinese legal system as a whole is legal. (If you say that it may be illegal by the lights of the international law, you will implicitly render meaningless the question 'Is the system of international law legal?') By the same token, I may very well evaluate individual instances of inductive inference, but I cannot evaluate the inductive inference as a whole.

Inferences good and bad. This analogy with law is instructive, though not in the way that Strawson intended it to be. For even though we cannot well ask whether International Law (or Chinese Law, or French Law) is legal, we can still ask whether it is 'acceptable'. We can ask whether it yields regulations and verdicts that to us appear unjust. If its implications are in this sense unacceptable, we are prepared to amend the system. If, on the other hand, we have a regulation or a verdict which contradicts a law we are unwilling to violate, then that regulation or verdict will be rejected. To think that a given legal system is not to be amended under any conditions is presumably to think of it as having some external standard of justification (e.g., a Divine command), or else to uphold a queer dogma as unconvincing, as it is repugnant.

Remark 1. Without going too far into this issue, observe that a utilitarian justification of the sanctity of the legal system is perfectly compatible with the possibility of amending it—when the costs outweigh the benefits.

Taking this line of thought one step further, consider also what kind of justification we can offer for deduction. If we do not want to postulate some self-evident truths, we once again will be engaged in the procedure of mutual adjustment of rules and inferences.

So the right task is not justify induction as a whole—that is, e.g., not to ask why to believe the Uniformity principle—but rather to sort inferences into good and bad, acceptable and unacceptable. Now, reverting back to Strawson's claims, we see that one assumption he makes is that constant conjunction presents, by definition (being an analytic truth, as he says), good evidence for a generalisation. This evidence not being fully conclusive, it in any case affords us rational inferences about the unobserved.

This contention should be challenged. On its own, the bare fact of constant conjunction offers us no good evidence. Sometimes constant conjunction indicates accidental correlations, whereas on other occasions it indicates lawlike correlations. Only in the latter case it should be rational for us, even according to the critic, to draw inferences about the unobserved.

Example 2 (Goodman). Every word I have spoken to you occurred before the last sentence of today's lecture. It would none the less be irrational for you to conclude that every word I will ever speak to you will occur before the last sentence of today's lecture. By contrast, every word I spoke to you was in English. Then it is rational for you to think that every word I will ever speak to you will be in English. (Indeed so: if I begin speaking to you in German, you will be at least mildly surprised.)

Thus Strawson was right to point out that we should rank our beliefs based on evidence, and that there can be no justification of induction, especially if we mean by that some proof of the Uniformity principle based on an external assumption. All the same, he appears to have missed the more important issue—that we must be able to tell good evidence from bad. Hume in effect claims that this is impossible. Unless we are allowed the use of the Uniformity principle, *all* evidence is bad.

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