Hume on induction

Suppose you were asked to give your reasons for believing that the sun will come up tomorrow, in the form of an argument for the claim that the sun will come up tomorrow.

One natural response would be to cite evidence of past mornings, and give something like the following argument:

> The sun came up on 11/6/08.
> The sun came up on 11/5/08.
> The sun came up on 11/4/08.
> ....
> ....
> ---
> The sun will come up tomorrow.

The sort of reasoning exhibited by this argument is called *inductive reasoning*. This argument exhibits the simplest form of inductive reasoning: *enumerative* induction. When we use this sort of reasoning we offer instances of some generalization as reason for believing the generalization.

Is this sort of inductive argument valid?

Today we read David Hume's discussion of inductive reasoning. One way to understand Hume's worry about induction is by asking: how could induction be reasonable, given that arguments like this are not valid?

A natural response to this qustion is that we can, of course, make the argument we just discussed valid by adding a premise of the following sort:

> If the sun came up on 11/6/08 and the sun came up on 11/5/08 and ... then the sun will come up tomorrow.

This makes the argument valid; but a valid argument only provides good reason for believing its conclusion if we can know that the premises of that argument are true. So what we have to ask is: can we know that the if-then statement above is true and, if so, how?

Hume approaches this question by distinguishing between two sorts of knowledge: knowledge of relations of ideas, and knowledge of matters of fact:

> "All the objects of human reason or inquiry may naturally be divided into two kinds, to wit, *relations of ideas*, and *matters of fact*. Of the first kind are the sciences of geometry, algebra, and arithmetic; and in short, every affirmation which is either intuitively or demonstratively certain. ...Propositions of this kind are discoverable by the mere operation of thought, without dependence on what is anywhere existent in the universe. ...
>
> Matters of fact, which are the second objects of human reason, are not ascertained in the same manner; ...The contrary of every matter of fact is still possible; because it can never imply a contradiction, and is conceived by the mind with the same facility and distinctness, as if ever so conformable to reality. *That the sun will not rise tomorrow* is no less intelligible a proposition, and implies no more contradiction than the affirmation, *that it will rise*. ..."

In this passage, Hume not only distinguishes between knowledge of relations of ideas and knowledge of matters of fact; he also gives an argument that the claim we are interested in, namely

> If the sun came up on 11/6/08 and the sun came up on 11/5/08 and ... then the sun will come up tomorrow.

is not just a matter of the relations of ideas, and therefore cannot be known by "the mere operation of thought." How would you state Hume's argument for this point?

So, if we know the principle that

> If the sun came up on 11/6/08 and the sun came up on 11/5/08 and ... then the sun will come up tomorrow.

we must know this as know any matter of fact: by experience. But the problem, as Hume argues, is that it is hard to see how we could know the truth of claims like this by experience:

> “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 ...this is the main question on which I would insist. The bread, which I formerly eat, nourished me; that is, a body of such sensible qualities was, at that time, endued 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? The consequence seems no wise necessary.”

What is Hume’s argument here?

Let’s take another try at this. When asked to justify the belief that the sun will come up tomorrow, we realized that we could give the following valid argument for this claim:

The sun came up on 11/6/08.
The sun came up on 11/5/08.
The sun came up on 11/4/08.
....
....
If the sun came up on 11/6/08 and the sun came up on 11/5/08 and ... then the sun will come up tomorrow.

The sun will come up tomorrow.

Hume’s challenge can then be thought of as the question of how we know the premise in red. It seems that we can’t know it on the basis of mere thought -- it is not a matter of the relations of ideas -- and we can’t know it on the basis of experience, since we do not experience the relations between past and future times. But if we can’t know it, then it is hard to see how we could know that the sun is going to come up tomorrow.

At this point, a natural idea is that we know the if-then statement we have been discussing, namely

> If the sun came up on 11/6/08 and the sun came up on 11/5/08 and ... then the sun will come up tomorrow.

because it follows from something more general that we really do know: nature is uniform, in the sense that the future is, in general, like the past. But if we know this, that seems to explain how we could know this if-then statement, since this statement just says that the sun will, in the future, continue to behave in the way that it has in the past.

How might Hume reply to this idea?

Hume replies by asking how we can know that nature is uniform -- how we can know that the future will be like the past.

Can we know that nature is uniform by “mere thought”, in the sense we have been discussing?

It seems plausible, however, that we can know of the uniformity of nature on the basis of our experience: after all, in the past we have, many times, observed that the future goes pretty much the same way as the past. We can put this idea in the form of an argument:

The future relative to 11/5/08 was like the past relative to 11/5/08.
The future relative to 11/4/08 was like the past relative to 11/4/08.
The future relative to 11/3/08 was like the past relative to 11/3/08.
....
....

The future relative to 11/6/08 will be like the past relative to 11/5/08.

Is this argument valid?

It seems that, as Hume points out, this argument is not valid. It can be made valid by the addition of an extra premise:

> The future relative to 11/5/08 was like the past relative to 11/5/08.
> The future relative to 11/4/08 was like the past relative to 11/4/08.
> The future relative to 11/3/08 was like the past relative to 11/3/08.
> ....
> ....
> If the future relative to 11/5/08 was like the past relative to 11/5/08 and the future relative to 11/4/08 was like the past relative to 11/4/08 and ... then The future relative to 11/6/08 will be like the past relative to 11/6/08.
> ---
> The future relative to 11/6/08 will be like the past relative to 11/6/08.

But of course this extra premise just states the thesis of the uniformity of nature, which is what we are trying to prove. And a proof of the uniformity of nature which has the uniformity of nature among its premises does not look very convincing.

How might we reply to Hume's argument?

We could grant the conclusion that we cannot know things on the basis of inductive reasoning. But this seems implausible. After all, inductive reasoning is used widely in science; and doesn't it seem as though science, at least sometimes, gives us knowledge of the world?

However, one might accept this conclusion and suggest that we fall back on the slightly weaker claims that inductive reasoning, even if it cannot provide knowledge, provides us with *good reasons, or justification, for beliefs*. So perhaps we do not know that the sun will come up tomorrow, and perhaps we do not know the truth of scientific theories; but inductive reasoning does give us good reason to believe that the sun is likely to come up tomorrow, or that scientific theories of certain sorts are likely to be true.

The problem with this "fallback position" is that Hume's argument seems to show that we don't even have good reason for believing in the results of inductive reasoning. The *only* justification we can give for that sort of reasoning relies on that very sort of reasoning -- and this means that inductive reasoning seems to be in the same position as a belief supported only by an argument whose only premise expresses that very belief.

A similar point can be put like this. Suppose we are interested only in whether we have good reason for believing the claim

> There is a 90% chance that the sun will come up tomorrow.

But if we argue for this, we will rely on some premise like

> There is a 90% chance that the future will be like the past.

But how can we know this principle? It cannot be known by "mere thought", and the only argument we can give for it will rely on the premise that if in the past the future has been like the past, then it is likely that now the future will be like the past --- which is just what we are trying to show.

There is an interesting comparison here with *deductive* reasoning. Suppose that I am trying to convince you of some claim, q, and that you have already conceded the truth of two other claims: p, and if p, then q. I might try to get you to believe q by the following argument:

p
If p, then q.
---
q

Suppose that you believe the premises, but still reject the conclusion. How could I convince you otherwise?

I might try the following line of argument: “Look, if p is true, and its is true that if p, then q, q *has* to be true.” Let’s say that you concede the point, and suggest that I add this claim explicitly to my argument:

p
If p, then q.
If (p and if p, then q) then q.
---
q

Does this make my argument stronger? Should you be convinced by this argument, if you were not convinced by the first one?

(This example is from a paper by Lewis Carroll, “What the Tortoise Said to Achilles.”)

One thing this example suggests that is that deductive reasoning can only be justified by deductive reasoning; if so, perhaps induction is not in such bad shape.

On the other hand, it seems clear that inductive and deductive reasoning are better ways of forming beliefs than, for example, astrology. But what would this difference consist in, if we could give an argument, using premises from astrology, for the reliability of the astrological method of belief formation?