The Problem of Induction

Now, in Hume’s words, we’re going to raise some doubts about things that only a fool or a madman would question. But, surely, we philosophers will be allowed to raise these doubts in the interest of intellectual curiosity...

1. Two categories of knowledge: The sorts of things that we claim to KNOW via some reasoning process may be divided into two categories:

   (1) Relations of Ideas (deductive knowledge): Some things can be known merely by considering ideas in the mind and discovering the relations between them. For instance, merely by considering the definition of the term ‘triangle’, we can know that <triangles have 3 sides> is true. This knowledge does not require any experience of the world, and <triangles have 3 sides> would still be true regardless of whether or not any actual triangles existed in reality. Other examples include <2 + 2 = 4> and <All bachelors are unmarried>, which merely express relations between the concepts or ideas involved in those statements. These sorts of truths can be known with CERTAINTY; i.e., there is NO WAY that these statements could be false. To deny them would result in a contradiction. For instance, if you claimed that <Some bachelors are married> what you would really be claiming is that <Some unmarried males are married>, which contradicts itself.

   (2) Matters of Fact (inductive knowledge): Most of what we claim to know is not true by definition, but is rather based on our experiences. For instance, imagine that you knew the DEFINITIONS of ‘water’ and ‘fire’, but had never seen either before. Without experiencing first-hand or witnessing water suffocating a person, you would not be able to know that <Water will suffocate a person> is true. Similarly, with <Fire will consume a person>, or <The Sun will rise tomorrow>. These sorts of truths can only be known by EXPERIENCE. Denying them does NOT result in a contradiction. For instance, if you claimed, <The sun will NOT rise tomorrow>, this would not be false by definition, since the claim does not contradict itself. Since matters of fact are not true by definition, we cannot know them with absolute, 100% CERTAINTY.

2. How do we know matters of fact?: Relations of ideas can be known with certainty merely by understanding the concepts involved, and how those concepts can consistently be related to one another. But, how are matters of fact known?
As stated, matters of fact are known by experience. We have an experience of one thing, and then another, and then we infer that there is a connection between them. For instance, if you claim to know that <My friend is in Hawaii>, your reason for believing this might be the post card from Hawaii that you received. You cite the fact of the post card, and the claim that <My friend is in Hawaii> and you infer that there is some kind of connection between the two things. But, what is this connection? Hume claims that it is one of cause and effect. For instance, if you hear a voice speaking in the dark, you reason to the fact that <There is a person in this room> because you assume that the person and the voice are connected as a cause to an effect.

3. On cause and effect: So, matters of fact are known because of an assumed relation of cause and effect between two things, based on experience. But, then, how is this relation known? In other words, How can we know that something is the cause of something else?

Causation is known only by experience: Since effects are entirely different things than their supposed causes, effects cannot be discovered merely by examining their causes (as if effects were somehow contained within them). Cause and effect cannot be known by reason. We only learn what the effects of certain things are by EXPERIENCE. Imagine:

- You just popped into existence a moment ago. I roll one billiard ball toward another. What do you think will happen? YOU HAVE NO IDEA! Will it come to a halt? Will it travel straight THROUGH the second ball? You’ll probably be quite surprised when the first ball hits the second and comes to a stop while at that same moment the second ball starts moving!

Now imagine that I pick up a billiard ball and hold it in the air and then let go. What do you think will happen? YOU HAVE NO IDEA! Your best guess is probably that it will continue to hang right there. Imagine your surprise when it immediately begins moving downward! Why not upward? Or sideways?

In other words, prior to experience, we have no reason to expect that an object will behave a certain way or produce a certain effect.

Causation is known by REPEATED experience: Seeing one billiard ball strike another once, or seeing me drop one of the balls once, does not seem to be enough to justify any knowledge of cause and effect though. For instance, imagine that you had never seen bread before. Maybe you eat a bit of it, and find that it nourishes you. You don’t die, and your hunger is satiated. Now, the next time you see a brown, loaf-shaped
object with a certain smell, consistency, etc.—what reason can you possibly have for thinking that THIS object will ALSO nourish you?

If the ball went downward the first time, what reason do you have for believing that it will go downward the second time that I drop it? And so on...

There must be something more than a SINGLE experience, then.

Hume observes that we infer cause and effect when we observe a constant conjunction of things. When I am hungry and I have some bread, I do not hesitate to eat it. I do not stop to think, “Well maybe this time, this sort of object will kill me.” Why? Because every time that I have seen something that looked and smelled like bread in the past, it nourished me when I ate it. Therefore, bread + nourishment have always been ‘constantly conjoined’ together in my past experiences. So, when I see bread, I expect that it will AGAIN be conjoined with nourishment.

But, note the assumption that this inference relies on. We start from the fact <Bread has always nourished me in the past> and conclude that <This bread will nourish me now>. But, in order to go from the former to the latter, we must assume the following:

**The Assumption:** Things that have been joined together in the past will CONTINUE to be joined together in the future.

Or, put simply: **The future will conform to the past.**

Hume writes, “From causes which appear similar, we expect similar effects. This is the sum of all our experimental conclusions.”

But, Hume says, this assumption is not intuitive. How, then, is it justified? It is not known prior to experience, with certainty—for, its denial, <Things that have been joined together in the past will NOT continue to be joined together in the future>, does not result in a contradiction. Bread that makes one hungry rather than full, or a ball that moves upward when released rather than downward, or the Sun’s failure to rise tomorrow—these are all perfectly conceivable things. Therefore, The Assumption must be known by experience. Every time, in the past, that we tried to predict what the future would be like, we discovered that when those events arrived in the present, things DID conform to the past. So, this assumption is known via constant conjunction.

But, notice now that our chain of justification is circular. For example:
1. The Sun has risen every morning in recorded history.
2. The future will continue to be like the past.
3. Therefore, the Sun will continue to rise every morning.

But premise (2) is justified as follows:

1. Every time I made a prediction about the future based on past observations, the future has always met my expectations (in other words, in the past, the future has always been like the past).
2. The future will continue to be like the past.
3. Therefore, the future will continue to be like the past.

Clearly, the second argument is problematic. It reasons in a circle. The second premise and the conclusion are the same! You can’t support a conclusion by repeating the conclusion. That’s like saying:

“I conclude that Perry is the thief! How do I know? Because Perry IS the thief!”

That’s no evidence at all. In short, Hume points out that all induction is based on the following circular reasoning.

(a) Matters of fact are justified by matters of cause and effect.
(b) Matters of cause and effect are justified by (i) Our experience (of constant conjunction), and (ii) The assumption that the future will conform to the past.
(c) The assumption (b.ii) that the future will conform to the past is justified by (iii) Our experience (of constant conjunction), and (iv) The assumption that the future will conform to the past.
(d) The assumption (c.iv) that the future will conform to the past is justified by (v) Our experience (of constant conjunction), and (vi) The assumption that the future will conform to the past.
(e) The assumption (d.vi) … And so on, to infinity.

So, how is The Assumption justified at all? We seem to assume that, if a thing that looks a certain way (e.g., bread) has always produced a certain effect (e.g., nourishment), then it will ALWAYS do so. But, why? There is no reason for us to think that such a connection is a necessary one. All we ever observe are single instances. With bread, for instance, I never observe the necessary connection between bread and nourishment, per se. All I ever observe is the eating of bread, and my own nourishment. But, no matter how many times I observe this, it is exactly the same. The 1000th time, I still merely observe the
eating and the nourishment. The necessary connection—the causation—between the two is never observed.

There is, ultimately, no explanation for this assumption except custom, or habit. Due to the experience of constant conjunction of two things, our minds are naturally led to the conclusion that there must be some connection between those two things, with no reason that justifies this.

But, this is a PSYCHOLOGICAL explanation of The Assumption, not a philosophical justification of it.

Consider this story: My alarm clock goes off at 6am every day. Also, at 6am every day, the local coffee shopkeeper unlocks his front door. There is a “constant conjunction” between these two events. But, there is no causation here. My alarm clock does not CAUSE the coffee shop to open. The connection is only an “accidental regularity.” But, notice, constant conjunction is the only thing that is ever observed with ANY two things. So, why do we infer causation for some things but not others?

**Induction:** This worry is a problem for scientists, who conduct all of their investigations based on induction. Induction is the inference that, through repeated observation, future observations will conform to past ones. For instance, if I observe that the sun rises in the East 1000 times in a row, I can hypothesize that it will ALWAYS rise in the East. Likewise, if I have observed all 1000 of my test subjects have been cured of some disease by my vaccine, I conclude that this gives me a good reason to believe that the one-thousand and FIRST patient (#1,001) will probably ALSO be cured by the vaccine. This is how all scientific inquiry is conducted. But, if the assumption that the future will conform to the past is unjustified, then all of science is ultimately unjustified—because all hypotheses in science rely on it. According to Hume, whether I’ve observed the sun rising in the East one time, one thousand times, or one MILLION times, there is no more reason to believe that it will rise in the East NEXT time. This is total skepticism about all scientific inquiry.

How do we answer Hume?
Side Note on Skepticism in General: Hume notes that we intuitively take the existence of an external world for granted, “without any reasoning”. But, philosophical scrutiny has revealed that we have no firm reason for doing so. So, we are faced with two options: (1) Believe in the existence of an external world, following our natural inclinations but ignoring reason, or (2) Remain agnostic about the existence of the external world, ignoring our natural inclinations but following reason. Neither option is very inviting.

The Solution: Ignore the Problem: Hume ultimately “solves” external-world skepticism by ignoring it completely. Having admitted that we cannot refute skepticism with certainty, he concludes that we must act AS IF there IS an external world. So, it seems that he takes option (1). He writes, “But it is in vain to ask: Whether there be body or not? That is a point which we must take for granted in all our reasonings.” (Treatise on Human Nature, 1.4.2) Interestingly, this is the same way in which most philosophers still treat skepticism today.