

The problem of induction

1 Why is induction important?

Two examples of arguments:

Example 1: All bears are mammals. Winnie is a bear. So, Winnie is a mammal.

Example 2: The sun has risen every day in the past. So, the sun will rise tomorrow.

LOTS of the things we study rely on arguments like example 2: biology, chemistry, physics, economics, psychology, exercise science, sociology, engineering, aerospace engineering, ministry (to a degree), medicine.

In short: **It's bad news if induction is unjustified.**

2 Hume's Fork

<i>A priori</i> <ul style="list-style-type: none">• Can be known independently of your five senses (taste, touch, smell, sight, hearing).• Examples: $2 + 2 = 4$; all bachelors are unmarried men; triangles have three sides.	<i>Synthetic truths</i> <ul style="list-style-type: none">• Things that are true, but not in virtue of <i>just</i> the meaning of words.• Examples: Ice melts above 32 degrees, vaccines prevent viral infections.
<i>A posteriori</i> <ul style="list-style-type: none">• Can only be known by using your five senses.• <i>Examples:</i> The earth is round; vaccines prevent viral infections.	<i>Analytic truths</i> <ul style="list-style-type: none">• Things that are true <i>only by virtue of the meaning of words</i>.• Examples: all bachelors are unmarried men; MAYBE: it will rain or it won't.

Red: matters of fact

Blue: relations of ideas

For Hume, EVERY truth is either a **matter of fact (*a posteriori* & synthetic)** or a **relation of ideas (*a priori* and analytic)**

3 Cause and effect is a **matter of fact**

Argument 1 “I shall venture to affirm, as a general proposition, which admits of no exception, that the knowledge of [cause and effect] is not, in any instance, attained by reasonings *à priori*; but arises entirely from experience, when we find, that any particular objects are constantly conjoined with each other. Let an object be presented to a man of ever so strong natural reason and abilities; if that object be entirely new to him, he will not be able, by the most accurate examination of its sensible qualities, to discover any of its causes or effects. Adam, though his rational faculties be supposed, at the very first, entirely perfect, could not have inferred from the fluidity, and transparency of water, that it would suffocate him, or from the light and warmth of fire, that it would consume him. No object ever discovers, by the qualities which appear to the senses, either the causes which produced it, or the effects which will arise from it; nor can our reason, unassisted by experience, ever draw any inference concerning real existence and matter of fact.” (E 4.6, SBN 27)

Argument 3 “But to convince us, that all the laws of nature, and all the operations of bodies without exception, are known only by experience, the following reflections may, perhaps, suffice. Were any object presented to us, and were we required to pronounce concerning the effect, which will result from it, without consulting past observation; after what manner, I beseech you, must the mind proceed in this operation? It must invent or imagine some event, which it ascribes to the object as its effect; and it is plain that this invention must be entirely arbitrary. The mind can never possibly find the effect in the supposed cause, by the most accurate scrutiny and examination. For the effect is totally different from the cause, and consequently can never be discovered in it. Motion in the second Billiard-ball is a quite distinct event from motion in the first; nor is there any thing in the one to suggest the smallest hint of the other. A stone or piece of metal raised into the air, and left without any support, immediately falls: But to consider the matter *à priori*, is there any thing we discover in this situation, which can beget the idea of a downward, rather than an upward, or any other motion, in the stone or metal?” (E 4.9, SBN 29)

Argument 2 “And as the first imagination or invention of a particular effect, in all natural operations, is arbitrary, where we consult not experience; so must we also esteem the supposed tie or connexion between the cause and effect, which binds them together, and renders it impossible, that any other effect could result from the operation of that cause. When I see, for instance, a Billiard-ball moving in a straight line towards another; even suppose motion in the second ball should by accident be suggested to me, as the result of their contact or impulse; may I not conceive, that a hundred different events might as well follow from that cause? May not both these balls remain at absolute rest? May not the first ball return in a straight line, or leap off from the second in any line or direction? All these suppositions are consistent and conceivable. Why then should we give the preference to one, which is no more consistent or conceivable than the rest? All our reasonings *à priori* will never be able to shew us any foundation for this preference.” (E 4.10, SBN 29-30)

- These are all arguments that *cause and effect* statements are **matters of fact**
- **Question:** How do these arguments work? What are their premises?

Hint: They are all *modus tollens*.

4 How do we know about causes and effects?

Hume: EXPERIENCE. Specifically, via our five senses (taste, touch, smell, sight, hearing).

- But how do we know things via experience?

Hume: Well, some things we know via experience just by looking (E.g., you know I'm up here giving this lecture).

- But how do we know things about the future? "The bread, which I formerly eat, nourished me...but does it follow that other bread must always be attended by [the power to nourish]?" (E 4.16, SBN 32-4)

Hume: If we know things like this, we know it via arguments that move like this:

Induction: *I have found that such an object has always been attended with such an effect, THEREFORE other objects, which are, in appearance, similar, will be attended with similar effects.*

An important part of inductive arguments is that they are *never* valid. The premises never *force* the conclusion to be true.

5 How do we know we are justified in using induction? Are inductive arguments justified?

There are two options:

<p>Option 1: Induction is justified by DEDUCTIVE ARGUMENTS</p> <p>But when you have a good <i>deductive</i> argument, it is valid. But what is validity?</p>	<p>Option 2: Induction is justified by INDUCTIVE ARGUMENTS</p> <p>Why can't we justify induction <i>with</i> induction?</p>
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