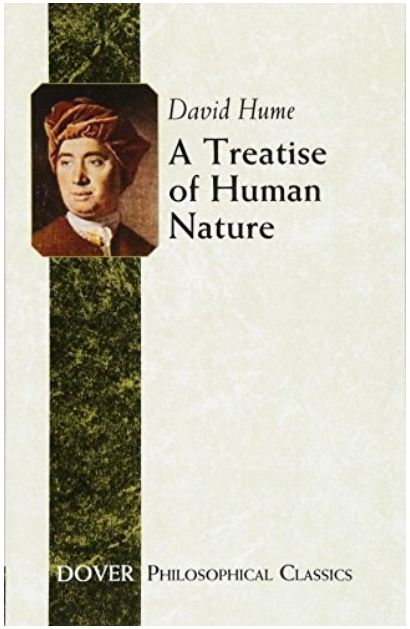

David Hume (1711-1776)

Philosophy of Science

The problem of induction

Chapman University. PHIL321. Lecture 3. 9/7/2021.
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Discussion board: due by Saturday (9/12)

- **Post 1**: In your own words, explain what you to take to be the most plausible solution to the problem of induction (please be specific -- your explanation should demonstrate your understanding of the reading). Then, explain why you think it is the most plausible solution. 200-300 words.
- **Post 2**: Provide constructive feedback to a post on another student's thread. 150-250 words.

Assignment Rubric Details

Discussion Board Posts

Criteria	Ratings			Pts
Post 1 Response to prompt	**5.0 pts** **Excellent** The post clearly answers the prompt, demonstrates understanding of the reading, and illustrates independent thinking.	**3.0 pts** **Adequate** The post attempts to answer the prompt, demonstrates partial understanding of the reading, but lacks independent thinking.	**1.0 pts** **Inadequate** Does not provide clear answer to the prompt and does not demonstrate understanding of the reading.	5.0 pts
Post 2 Constructive feedback	**5.0 pts** **Excellent** The post responds clearly to another student's post, offers constructive ideas, and is respectful.	**3.0 pts** **Adequate** The post attempts to respond to another student's post, but lacks either constructive ideas or respectful language.	**1.0 pts** **Inadequate** Does not respond to another student's post in way that demonstrates thoughtfulness.	5.0 pts

Total Points: 10.0

- **Netiquette**: before pressing submit, read your post and ask yourself: *is this something I would say out loud in class?*

Does the scientific method yield knowledge?

- *Epistemology*: the philosophical study of *knowledge*.
  (i) What is knowledge (as opposed to mere true belief)?
  (ii) Can we be certain that we have any knowledge?
  (iii) What do we in fact know?

- Standard answer to (i):
  - You know proposition P iff P is true and your belief in P *is justified*.

- Does *the scientific method* provide *justification for belief*?

Recap: two scientific methods

- 1. Aristotle (384 – 322 BC):
  - Scientific arguments are *deductively valid*. Example:

    (1) All things seek their natural place.

    (2) The natural place of fire is at the top of the terrestrial sphere.

    (3) Therefore, flames near the surface of the Earth rise.

  - Bacon's objections:
    - Why believe (1) and (2)?
    - Bacon: Scientific arguments infer *generalizations* from a *sample of observations*, so they *cannot* be deductively valid.

- 2. Francis Bacon (1561–1626):
  - Scientific arguments involve *enumerative induction*. Example:

    (Data) In our experience, all flames near the surface of the Earth have risen.

    (Theory) Therefore, flames near the surface of the Earth rise.

Recap: deductive validity

- An argument is **deductively valid** if and only if it is impossible for the premises to be true and conclusion false.
  - Captures the idea that *the truth of the premises guarantees the truth of the conclusion*.

- Argument 1:
  - If Socrates is Human then Socrates is Mortal.
  - Socrates is Human.
  - Therefore, Socrates is Mortal.
- Logical form:
  - If H then M.
  - H.
  - Therefore, M.
    - **Valid. Form: *modus ponens*.**

- Argument 2:
  - If Socrates is Human then Socrates is Mortal.
  - Socrates is Mortal.
  - Therefore, Socrates is Human.
- Logical form:
  - If H then M.
  - M.
  - Therefore, H.
    - **Invalid. Fallacy: affirming the consequent.**

David Hume (1711-1776)

- Scottish philosopher, historian, economist, and skeptic.

- Most influential philosophical works:
  - A Treatise of Human Nature (1740).
  - Enquiry concerning Human Understanding (1748)
  - Enquiry concerning the Principles of Morals (1751),
  - Dialogues concerning Natural Religion (1779).

- Almost all of his works are available free online at www.davidhume.org.

Two problems of induction

- The descriptive problem:
  - How do human beings form beliefs about the unobserved?

- The normative problem:
  - Are beliefs formed in this way justified?

Descriptive problem: two key concepts

- A proposition expresses a **relation of ideas** iff *its denial* is strictly impossible, inconceivable, or contradictory.
  - Examples: 'All bachelors are unmarried'; '1+1=2'; '((H→M)&H)→M'.
- A proposition expresses a **matter of fact** iff both it and its denial are fully conceivable, possible, and non-contradictory.
  - Examples: 'All bachelors are messy'; 'All metals expand when heated'.
- Hume's descriptive problem (improved formulation):
  - **How do human beings arrive at their beliefs concerning unobserved matters of fact?**

Hume's solution to the descriptive problem

- Knowledge of unobserved matters of fact must be derived *from experience*.

- In particular, by enumerative induction:
  - When we have noticed that in our experience *all Fs are G,* we tend to conclude that in general, *all Fs are G*, or at least, *the next F I will experience will be G*.

- Hume's solution to the descriptive problem:
  - **All beliefs about unobserved matters of fact are derived from experience by induction**.

The normative problem

- The normative problem:
  - Are beliefs about unobserved matters of fact justified, if they are derived from experience by induction?

- Note that induction is always deductively *invalid*:
  - (DATA) In my experience, all Fs are Gs
  - (THEORY) Therefore, in general all Fs are Gs, (or: the next F I examine will be G)

- Hume thinks our reasoning *is* deductively valid, because we unhesitatingly rely on a missing premise that validates the argument.
  - ***Uniformity of Nature (UN)***: For the most part, if a regularity (e.g. All Fs are Gs) holds in my experience, then it holds in nature generally, or at least in the next instance.

How do we know that nature is uniform?

- UN: If regularity R holds in my experience, then R holds in nature generally.
- Does UN express a *relation of ideas*, or a *matter of fact*?
  - *Matter of fact*: its negation seems conceivable. So, if (UN) is known at all, it is known on the basis of experience.
- Is UN a claim about *observed* or *unobserved* matters of fact?
  - *Unobserved matters of fact*: it is a claim, in part, about the future. Hence we cannot know it on the basis of experience alone.
- How do we form our beliefs about unobserved matters of fact?
  - *Hume's solution to descriptive problem*: by induction.
  - So, if there were any reason to believe UN, it would have to take the form of an inductive argument.
- Can UN be justified by induction?
  - UN figures as a premise in *any* inductive argument.
  - An inductive argument for the principle itself would thus be *circular*.
  - UN has no non-circular justification, so inductive arguments don't yield knowledge.

Hume's objection to induction

- **The descriptive problem**: how do human beings arrive at their beliefs concerning unobserved matters of fact?
  - **Hume's answer**: By induction (Data→Theory), validated by appeal to UN (uniformity of nature):
    - (DATA) In my experience, regularity R holds.
    - (UN): If R holds in my experience, then R holds in nature generally.
    - (THEORY) Therefore, R holds in nature generally.

- **The normative problem**: are beliefs formed in this way justified?
  - **Hume's answer**: No: UN concerns an unobserved matter of fact, so *must* have been inferred *by induction*:
    - (DATA) In my experience, regularity UN holds.
    - (UN): If UN holds in my experience, then UN holds in nature generally.
    - (THEORY) Therefore, UN holds in nature generally (i.e. UN is true).
  - **Hume**: this argument is *circular*, so gives no justification for UN.

Circular arguments

- Example (from Ladyman, p22):

  (1) The Bible says that God exists.

  (2) The Bible is the word of God and therefore true.

  (3) Therefore, God exists.

- The argument is deductively valid, however:
  - We only have a reason to believe (2) if (3) is true.

- A *circular argument* uses its own conclusion as one of its (stated or unstated) premises and is a logical fallacy.

Potential solutions

- Most philosophers do not concede to Hume's skepticism, but see it as a challenge to overcome.
- But there is widespread disagreement over how the challenge should be met.

(9) Retreat to probable knowledge.
(1) Induction is rational by definition.
(2) It is not reasonable to ask for a deductive defence of induction.
(3) Induction is justified by probability theory.
(4) Much of our scientific knowledge is *synthetic a priori*.
(5) Hume's argument is too general.
(6) Induction is justified as its a kind of inference to the best explanation.
(7) There really are necessary connections we can discover.
(8) Induction is no worse off than deduction, and deduction is justified.

(9) Retreat to probable knowledge

- A better answer to the descriptive problem is that our inductive arguments only draw *probabilistic* conclusions:
  - (DATA) In my experience, all Fs are Gs.
  - (THEORY) Therefore, **probably** all Fs are Gs (or the next F I experience will **probably** be G).

- Hume's response:
  - This inference requires:
    - (UN_P): If "all Fs are Gs" holds in my experience, then **probably** "all Fs are Gs" (or the next F I experience will **probably** be G).
  - But (UN_P) still concerns unobserved matters of fact.
  - So its justification is no less circular.

Hume's "solution" to the normative problem

- Hume's "solution" is summarised in an oft-cited passage:
  - "The intense view of these manifold contradictions and imperfections in human reason has so wrought upon me, and heated my brain that I am ready to reject all belief and reasoning, and can look upon no opinion even as more probable or likely than another [...] Most fortunately it happens that, since reason is incapable of dispelling these clouds, nature herself suffices to that purpose, and cures me of this philosophical melancholy and delirium, either by relaxing this bent of mind, or by some avocation and lively impression of my senses which obliterate all these chimeras. I dine, I play a game of back-gammon, I converse and I am merry with my friends; and when after three or four hours' amusement, I would return to these speculations, they appear so cold and strain'd, and ridiculous, that I cannot find in my heart to enter into them any further.
    - Treatise of Human Nature, Book I, Part IV, Section VII, p. 269 in the Selby-Bigge edition.
- One way of understanding this:
  - Induction is *non-rational*: no positive compelling justification can be provided.
  - But induction is *not irrational*: it is not optional; it is a matter of instinct.