Philosophy 203
History of Modern Western Philosophy

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Class #21
Hume on Causation and Induction

Business

- Panel Presentations review sessions
  - Two scheduled for Sunday, one for next Monday, two for next Tuesday
  - Note two small changes to panel compositions
  - Contact Emir
- Today
  - Review on Matters of Fact and Relations of Ideas
  - Moving forward on the Problem of Induction
- Schedule
  - Hume this week
  - Panel Presentations the week and a half following
  - Paper #2 due April 26
  - Three classes on Kant
  - Final Exam: Wednesday, May 9

Hume's Epistemology

An Overview

- Hume and Locke have similar, empiricist epistemologies.
  - We start with our sense experience (impressions).
  - We reflect, using our ordinary psychological capacities (generating ideas).
  - We may have some small, uninteresting capacity to create some ideas without impressions (missing shade of blue).
- Hume's three principles of connection among ideas
  - resemblance, contiguity, and cause and effect
- Hume agrees with Berkeley that Locke over-reaches concerning abstraction.
- Where Berkeley throws out both mathematics and science, Hume keeps mathematics by distinguishing between the two.

Matters of Fact and Relations of Ideas

- Matters of fact are a posteriori, contingent, and inductive.
- Relations of ideas are *a priori*, necessary, and deductive.
- The principle of contradiction is both sufficient and necessary for justifying our knowledge of all necessary truths, including those of mathematics.
  - "We are possessed of a precise standard by which we can judge of the equality and proportion of numbers and, according as they correspond or not to that standard, we determine their relations without any possibility of error" (*Treatise* I.3.1, p 8).

Beyond Contradiction

- It turns out that the principle of contradiction, by itself, can not do all the work that Hume wanted it to do.
- We need auxiliary tools to frame an hypothesis to determine whether a statement is in fact a contradiction
- So we really need two tools to identify relations of ideas.
  - RI1. The principle of contradiction.
  - RI2. The imagination's ability to recognize similarity and difference.
- In the late 19th Century, Frege develops a syntactic test for contradiction.
  - a formal language in which contradictions could be represented
  - $\alpha \bullet \sim\alpha$.
- Hume and the moderns did not have this criterion.
  - Locke and Hume appeal to our psychological ability to recognize contradictions.
  - "If we will reflect on our own ways of thinking, we shall find that sometimes the mind perceives the agreement or disagreement of two *ideas* immediately by themselves, without the intervention of any other. And this, I think, we may call *intuitive knowledge*" (Locke, *Essay* §IV.II. 1, AW 389a).

Hume on Intuition and Demonstration

- Only four [philosophical relations], depending solely upon ideas, can be the objects of knowledge and certainty. These four are *resemblance*, *contrariety*, *degrees in quality*, and *proportions in quantity or number*. Three of these relations are discoverable at first sight and fall more properly under the province of intuition than demonstration (*Treatise* I.III.1, p 7).
- When the mind cannot so bring its *ideas* together, as by their immediate comparison and as it were juxtaposition or application one to another, to perceive their agreement or disagreement, it is inclined, by the intervention of other *ideas* (one or more, as it happens) to discover the agreement or disagreement which it searches; and this is that which we call *reasoning* (Locke, *Essay* IV.II.2, AW 389b).

Relations of Ideas and Psychological Capacities

- For Leibniz and Locke and Hume, we have both intuitive knowledge or immediate apprehension of some basic principles, and derivative knowledge of more complex statements.
- Leibniz claimed that intuitive knowledge could not be explained by sense experience.
- Locke and Hume, believing it to be just the result of a natural psychological ability to recognize similarities, differences, and contradictions, argue that this ability is acceptable to empiricists, and includes no appeal to innate ideas.
- Still, Hume points out, our ability to identify relations of ideas applies only narrowly.
  - "The only objects of the abstract sciences or of demonstration are quantity and number...All other inquiries of men regard only matter of fact and existence and these are evidently incapable of demonstration. Whatever *is* may *not be*. No negation of a fact can involve a contradiction" (*Enquiry* XII.3, AW 599b).
- We can be certain about a narrow range of relations of ideas.
- For matters of fact, big questions remain.

Applying the Matters of Fact/ Relations of Ideas Distinction, I

- Let's return to some claims we might say that we know.
  - P1. It is chilly outside right now.
  - P2. It snowed in February.
  - P3. Shakespeare wrote *The Tragedy of Macbeth*.
  - P4. 2 + 2 = 4.
  - P5. I exist.
  - P6. Objects near the surface of the Earth accelerate toward the center of the Earth at 9.8 m/s^2.
  - P7. The sun will rise tomorrow.
- Hume claims that P1-P3 all state matters of fact and can be traced back to original impressions.
  - Our belief in P1 may be justified directly by sense perception.
  - Our belief in P2 is justified by memory.
  - Our belief in P3 relies on testimony from the sense perceptions of others.
- For these three propositions, Hume's claim seems plausible.
  - Though, it's trickier than Hume thought.
  - Carnap, *Logical Structure of the World*

Applying the Matters of Fact/ Relations of Ideas Distinction, II

- Consider
  - P4. 2 + 2 = 4.
  - P5. I exist.
  - P6. Objects near the surface of the Earth accelerate toward the center of the Earth at 9.8 m/s^2.
  - P7. The sun will rise tomorrow.
- P4 states a mathematical fact, and is thus a relation of ideas.
  - Hume's cool with P4.
- Our knowledge of ourselves leads to a complication to which we shall return.
  - Bracket it for now.
- P6 and P7 refers to physical laws, like Newton's laws of motion.
  - Not relations of ideas
  - Their denials do not lead to a contradiction.
  - We can not discover that denials of laws of nature are false by mere process of thought.

The Denial of a Law of Nature is Not a Contradiction

The course of nature may change, and...an object seemingly like those which we have experienced, may be attended with different or contrary effects. May I not clearly and distinctly conceive that a body, falling from the clouds, and which in all other respects resembles snow, has yet the taste of salt or feeling of fire? Is there any more intelligible proposition than to affirm that all the trees will flourish in December and January and decay in May and June? Now, whatever is intelligible and can be distinctly conceived implies no contradiction and can never be proved false by any demonstrative argument or abstract reasoning *a priori* (§IV.2, AW 546a-b).

Cause and Effect

- Scientific laws are generally taken to describe the causal structure of the universe.
  - There are no balls of uranium larger than one mile in diameter.
- But we have no sense impressions of many terms used, including ‘gravity’, ‘force’, ‘mass’, and ‘energy’.
- We have experience only of events, not their causes.
- “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 anything 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 *a priori*, is there anything 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?...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 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” (§IV.1, AW 543b-544a).

Secret Powers

- The secret powers, the connections between events, are hidden from us.
- The cohesion of marble
- “Let an object be presented to a man of ever so strong natural reason and abilities; if that object is 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 are supposed entirely perfect at the very first, 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” (§IV.1, AW 543a).

Connection and Conjunction

- When we perform inductions, and pronounce on the laws connecting events, we go beyond the evidence of our experience.
- We pretend that we see connections among events,
- But, in fact, all we ever see are conjunctions.
- “We only learn by experience the frequent conjunction of objects, without being ever able to comprehend anything like connection between them” (§VII.1, AW 560b).

No Causes, No Laws

- All our beliefs about the world are based on experience.
- Experience only tells us what was, not what has to be.
- This follows from the fact that we have no access to the causes.
- Laws of nature reduce disparate phenomena to simple statements.
- But, such reductions require insight into the causal structure of the world, which we do not have.
- Thus we can not establish the truth of laws of nature, despite our best efforts.
- "*The utmost effort of human reason is to reduce the principles productive of natural phenomena to a greater simplicity and to resolve the many particular effects into a few general causes by means of reasonings from analogy, experience, and observation*. But as to the causes of these general causes, we should in vain attempt their discovery, nor shall we ever be able to satisfy ourselves by any particular explication of them. These ultimate springs and principles are totally shut up from human curiosity and inquiry...Thus the observation of human blindness and weakness is the result of all philosophy and meets us at every turn in spite of our endeavors to elude or avoid it" (§IV.1, AW 544a-b, emphasis added).

Blindness and Weakness

- Hume claims that we have no knowledge of both particular and general claims about laws of nature.
  - We do not know that the sun will rise tomorrow.
  - The problem is not that there might be a big explosion; that could be consistent with physical laws.
  - The problem is that the laws could suddenly shift, from what we think they are.
- Our inability to know physical laws is generally known as the problem of induction.
- One challenge lies in how to determine when causes are similar.
  - How do we get knowledge of the unobserved?
- Hume argues that induction relies on analogy.
  - We have to consider when cases are similar in order to know when we can assimilate particular experiences and when a law applies.

Hume on Induction and Analogy

All our reasonings concerning matters of fact are founded on a species of analogy which leads us to expect from any cause the same events which we have observed to result from similar causes. Where the causes are entirely similar, the analogy is perfect, and the inference drawn from it is regarded as certain and conclusive. Nor does any man ever entertain a doubt where he sees a piece of iron that it will have weight and cohesion of parts as in all other instances which have ever fallen under his observation. But where the objects have not so exact a similarity, the analogy is less perfect and the inference is less conclusive, though still it has some force in proportion to the degree of similarity and resemblance. The anatomical observations formed upon one animal are, by this species of reasoning, extended to all animals; and it is certain that, when the circulation of the blood, for instance, is clearly proved to have place in one creature, as a frog, or fish, it forms a strong presumption that the same principle has place in all (§IX, AW 575a).

Bertrand Russell on the Problem of Induction

Domestic animals expect food when they see the person who usually feeds them. We know that all these rather crude expectations of uniformity are liable to be misleading. The man who has fed the chicken every day throughout its life at last wrings its neck instead, showing that more refined views as to the uniformity of nature would have been useful to the chicken (*Problems of Philosophy*, p 63).

Hume's Skeptical Argument About Induction

PI1. Our beliefs about future events and unobserved objects are matters of fact.

PI2. Beliefs about matters of fact are based on experience.

PI3. Experience tells us how things were, not how they will be; it tells us only about actually observed phenomena.

PIC. So, our beliefs about the future and the unobserved are unknown.

- PI1 is a definition.
- PI2 is the basic principle of empiricism.
  - Scientific generalizations which do not limit themselves to past observations go beyond sense evidence.
  - Descartes argued that innate principles can allow us to make the inductive leap.
  - An appeal to innate principles will not work for Hume.
  - We can not go beyond the evidence of our senses.

We Can Not Go Beyond the Senses

PI3 is the result of Hume's observations about causation.

"When we infer any particular cause from an effect, we must proportion the one to the other and can never be allowed to ascribe to the cause any qualities but what are exactly sufficient to produce the effect...If the cause assigned for any effect is not sufficient to produce it, we must either reject that cause or add to it such qualities as will give it a just proportion to the effect. but if we ascribe to it further qualities or affirm it capable of producing other effects, we can only indulge the license of conjecture and arbitrarily suppose the existence of qualities and energies without reason or authority" (§XI, AW 588a).

Fixing the Hole in the Inductive Argument

- Consider a specific version of the problem of induction.

  B1. I have seen one billiard ball strike another many times.
  B2. Each time the ball which was struck has moved, motion was transferred.
  BC. So, the struck ball will move this time.

- BC does not follow deductively from B1 and B2.
  - The argument is invalid.
  - The conclusion could be false, while the premises remain true.
- We can add a premise, the principle of the uniformity of nature (PUN).
  - PUN The future will resemble the past.

The Problem Resolved

- The new version of the argument is valid!
  B1. I have seen one billiard ball strike another many times.
  B2. Each time the ball which was struck has moved, motion was transferred.
  B3. The future will resemble the past.
  BC. So, the struck ball will move this time.
- The problem with the new version is that we have no basis for believing B3.
  "All inferences from experience suppose as their foundation that the future will resemble the past and that similar powers will be conjoined with similar sensible qualities. If there is any suspicion that the course of nature may change, and that the past may be no rule for the future, all experience becomes useless and can give rise to no inference or conclusion. It is impossible, therefore, that any arguments from experience can prove this resemblance of the past to the future, since all these arguments are founded on the supposition of that resemblance" (§IV.2, AW 547b).
- The past has resembled the future in the past, but we don't know that it will continue to resemble the future!

Cause, Effect, and Uniformity

- If we had knowledge of cause and effect relations, of the connections among events, we could tie them together to yield PUN.
- We would know what the hidden springs are by experience.
- But, we only have knowledge of constant conjunction.
- So, all scientific generalizations which do not limit themselves to observed evidence are unjustified.
- Physical laws like Newtonian gravitation, or the gas laws, go beyond experimental evidence.

Skepticism About the External World

- Even the existence of a material world is a scientific hypothesis generated by experience.
- “It is a question of fact whether the perceptions of the senses are produced by external objects resembling them; how shall this question be determined? By experience, surely as all other questions of a like nature. But here experience is and must be entirely silent. The mind never has anything present to it but the perceptions and cannot possibly reach any experience of their connection with objects. The supposition of such a connection is, therefore, *without any foundation in reasoning*” (§XII.1, AW 595a, emphasis added).

Skepticism and Revolution

- Philosophers speculate broadly about the world and its laws.
- Hume insists that such speculation is unfounded.
- He proposes that philosophy be rid of such speculation.
- “When we run over libraries, persuaded of these principles, what havoc must we make? If we take in hand any volume - of divinity or school metaphysics, for instance - let us ask, *Does it contain any abstract reasoning concerning quantity or number?* No. *Does it contain any experimental reasoning concerning matter of fact and existence?* No. Commit it then to the flames, for it can contain nothing but sophistry and illusion” (§XII.3, AW 600b).

More Problems of Induction

The Weak Problem of Induction

WI: We have limited intelligence and experience.

- There is not enough evidence to draw the conclusions that we draw.
- Scientific theories are generally under-determined by the evidence.
- Often there are two or more competing yet equally well-supported theories about the world.
- Such theories agree on all the empirical evidence we have gathered.
- Even if we presume that physical laws will be uniform and stable, we don't know which theory to use.
- If we were smarter or had more time, we could solve the problem of WI by gathering more evidence.
  - E.g. the fine-structure constant
- WI is not Hume's problem of induction.
  - It is just a problem of limitations on evidence.
  - It is not really a philosophical problem.

The Strong Problem of Induction

SI: Even given all possible evidence from the past, we can not know that the laws of nature will not shift radically and unexpectedly.

- SI is Hume's problem.
- Despite Hume's complaints about inductive processes, we do make successful predictions.
- We presume that the laws of nature will remain uniform and stable, even if that assumption is unjustified.

The New Riddle of Induction

from Nelson Goodman

- Consider the property called ‘grue’.
  - An object is grue if it has been examined prior to 1/1/2020, and found to be green or not so examined and it is blue.
- Consider the competing claims G1 and G2.
  - G1 All emeralds are green.
  - G2 All emeralds are grue.
- All evidence for an emerald being green is also evidence for its being grue.
- G1 and G2 each describe a lawlike generalization.
- They are equally well confirmed by the evidence.
- Goodman’s new riddle is to determine why we think that G1 is a law and G2 is not.
- NRI Even given that the laws of nature remain stable, we do not know which predicates are confirmed.

The Persistence of the Problem

- SI and NRI are among the most serious problems in philosophy, especially in the philosophy of science.
- Berkeley had shown that Lockean empiricist principles led to difficulties with our beliefs in an external, material world.
- Hume shows that these problems infect all of science, not merely belief in matter.
- Goodman's riddle shows that the problem infects even our most common uses of language.
- Berkeley thinks that we can continue to speak with the vulgar and think with the learned.
- Hume shows that even the most learned beliefs are unjustified.

The Naturalist Hume

- We formulate laws of nature from regularities we have perceived.
- We can not know that the regularity will persist.
- Still, we do believe that there are connections between events.
- We exit through the door, not the window.
- We do not really doubt that the sun will rise.
- “When one particular species of event has always, in all instances, been conjoined with another, we make no longer any scruple of foretelling one upon the appearance of the other, and of employing that reasoning which can alone assure us of any matter of fact or existence. We then call the one object *cause*, the other *effect*. We suppose that there is some connection between them, some power in the one by which it infallibly produces the other and operates with the greatest certainty and strongest necessity” (§VII.2, AW 563a).

Belief in Laws is a Habit

After a repetition of similar instances the mind is carried by habit upon the appearance of one event to expect its usual attendant and to believe that it will exist. This connection, therefore, which we *feel* in the mind, this customary transition of the imagination from one object to its usual attendant, is the sentiment or impression from which we form the idea of power or necessary connection...The first time a man saw the communication of motion by impulse, as by the shock of two billiard balls, he could not pronounce that the one event was *connected*, but only that it was *conjoined* with the other. After he has observed several instances of this nature, he then pronounces them to be *connected*. What alteration has happened to give rise to this new idea of *connection*? Nothing but that he now *feels* these events to be *connected* in his imagination, and can readily foretell the existence of one from the appearance of the other. When we say, therefore, that one object is connected with another, we mean only that they have acquired a connection in our thought (§VII.2, AW 563a).

Habits Come from Experience

- Consider if a person were suddenly brought into the world.
- She would have no habits, and so no beliefs about regularities or causal powers.
- By experience, she would develop certain habits, certain expectations, all while never having any experiences of causal connections.
- "Suppose...that he has acquired more experience and has lived so long in the world as to have observed familiar objects or events to be constantly conjoined together - what is the consequence of this experience? He immediately infers the existence of one object from the appearance of the other. Yet he has not, by all his experience, acquired any idea or knowledge of the secret power by which the one object produces the other, nor is it by any process of reasoning he is engaged to draw this inference. But still he finds himself determined to draw it. And though he should be convinced that his understanding has no part in the operation, he would nevertheless continue in the same course of thinking. There is some other principle which determines him to form such a conclusion. This principle is *custom* or *habit*" (§V.1, AW 549a-b).
- What she has developed is a mental capacity, not an insight.

The Mental Interpretation of 'Cause'

- Remember, Hume agrees with Berkeley that we experience our sensations, and not their causes.
- We have no experience of the things in themselves.
- Thus, the term 'cause' refers to a mental phenomenon.
  - "The appearance of a cause always conveys the mind, by a customary transition, to the idea of the effect. Of this also we have experience. We may, therefore, suitably to this experience, form [a] definition of cause, and call it *an object followed by another, and whose appearance always conveys the thought to that other"* (VII.2, AW 563b).
- Properly distinguished, causes are internal, rather than external.
  - They are not in nature, but in our minds.
  - Causes are psychological, rather than objective.

The Radical Hume

- Berkeley, when faced with the limits of what we can know, interpreted the terms we use that seem to refer to objects as referring to our mental states.
- Hume, rejecting Berkeley's idealism, assumes that there is a material world.
- Still, we can not know about the laws which govern the interactions of objects in the world.
- Instead of internalizing the world, Hume internalizes cause and effect.
- Compare Hume's views with those of Frege, writing in 1884, responding to Mill's psychologistic view of numbers, which is essentially the same as that of Locke and Hume.
  - "Number is no whit more an object of psychology or a product of mental processes than, let us say, the North Sea is. The objectivity of the North Sea is not affected by the fact that it is a matter of our arbitrary choice which part of all the water on the earth's surface we mark off and elect to call the North Sea. This is no reason for deciding to investigate the North Sea by psychological methods. In the same way number, too, is something objective. If we say 'The North Sea is 10,000 square miles in extent' then neither by 'North Sea' nor by '10,000' do we refer to any state of or process in our minds: on the contrary, we assert something quite objective, which is independent of our ideas and everything of the sort" (Frege, *Grundlagen*, §26).
- Hume recognizes that we speak as if the world and the causal laws are objective, existing independently of us.
- But he argues that we are unjustified in believing that.
- Thus, we are left as skeptics with unjustified but perhaps explicable habits.

Topics in Hume

✓1. Causation and Induction

2. The Bundle Theory of the Self

3. Free Will and Compatibilism