

# Induction and the Laws of Nature

**1. Laws vs. Accidental Regularities:** Return to the problem of induction. Perhaps The Assumption is justified because we know that there are LAWS which GOVERN nature? For instance, we know that objects have not only always fallen when we've let go of them, but we know that they will CONTINUE to do so because there is a **law of gravity!**

But, what in the heck is a "law" of nature? What EVIDENCE is there for such a thing? It seems that our only evidence for laws is our observation that, in the past, there has been a regularity, or constant conjunction; e.g., of objects falling toward the ground (or, more generally, of massive bodies attracting). From this, we infer that the UN-observed parts of the universe as well as unobserved future TIMES will behave according to this same pattern. But, what justifies this inference? Again, the answer is: The Assumption.

Hume still refers to the 'laws' of the universe, as if there ARE such things. But, on his view, there are no necessary connections in nature. In other words, there is nothing about the universe that NECESSITATES that, when I let go of material objects near the Earth's surface, they must move downward (i.e., there is no GOVERNING law of gravity). It just so happens that, as a matter of fact, objects HAVE fallen downward every time we let go of them. As such, the "law" of gravity is merely a DESCRIPTION of regularities that DO occur. In short, for the Humean, the laws of nature are merely **descriptive** rather than **prescriptive**—i.e., they do not PRESCRIBE what WILL or MUST happen. Objections:

1. The Human View Reduces All Regularities to Cosmic Coincidences: But, this isn't how we generally think of laws. Intuitively, it doesn't just HAPPEN to be the case that every object that's ever been dropped has moved downward. Rather, it seems to most of us that there must be some fundamental feature of the universe that MAKES this happen. The Humean view of laws turns all of the regularities that we observe into an enormous, preposterously improbably collection of **cosmic accidents!** (And this seems absurd.)

2. Accidental Regularities: Furthermore, if "laws" are just descriptions of observed regularities, then the following should count as evidence of a law of nature:

**Causing Coffee:** My alarm clock goes off at 5:59am every day. A minute later (at 6am), the local coffee shopkeeper makes some coffee and unlocks her front door.

There is surely a 'constant conjunction' between these two events. But, intuitively, there is no law of nature here; no cause and effect. My alarm clock does not CAUSE the coffee shop to open. There is no LAW of nature here. Intuitively, some constant conjunctions are evidence of laws and causation while others are not. But why? More examples:

### Accidental Regularities

- All human beings die before their 125<sup>th</sup> birthday.
- All aluminum foil spheres are less than 100 ft. in diameter.
- No animal travels faster than 75 miles per hour.
- All things with kidneys also have hearts (and vice versa).

(i.e., *All renates are chordates.*)

### Lawful Regularities

- All objects that are dropped fall to the ground.
- All uranium spheres are less than 100 ft. in diameter.
- Nothing travels faster than  $3 \times 10^8$  m/s (the speed of light).

ALL of these are universal regularities; exceptionless patterns with no counter-examples, but notice: It is not physically impossible for the regularities on the left to be violated. But, physicists tell us that it IS physically impossible for regularities on the right to be violated (e.g., a 100' wide uranium sphere would [exceed critical mass](#) and explode in a nuclear reaction). In other words, only the items on the right seem to be laws of nature. However, the Humean has no resources to differentiate between the two columns.

3. Inductive Skepticism: Finally, note that a sort of skepticism creeps in here. If laws are, as Hume believes, merely DESCRIPTIONS of what DOES happen, then there are no constraints that GOVERN the behaviors of objects. In that case, there is no feature of the world to prevent the observed regularities and patterns of the past from being broken in the next moment. For all we know, tomorrow water might be poisonous, people might fall away from Earth's surface into the sky, and roller skates may begin doing philosophy. If the laws are Humean laws (i.e., descriptive rather than prescriptive), then there is nothing about the nature of the universe to prevent these things from occurring. In short, the problem of induction is still entirely unsolved.

*[Consider Stephen Mumford's example of spilling puzzle pieces onto the floor and then starting to notice patterns. But, now imagine that you're scanning the haphazard pile of pieces slowly from left to right. You're about halfway across and you've noticed lots of patterns. For instance, every piece that has yellow is partially resting on top of another piece. Every piece with exactly two tabs is face-down. And so on. The dumping-out was random, so there is NOTHING to ensure that those patterns will continue as you scan the right half of the splatter of puzzle pieces. In fact, it seems UNLIKELY that they will continue! For, any "patterns" you've picked out so far are merely COINCIDENCES! Now note: The patterns you've picked out so far are analogous to Humean "laws" of nature.]*

**2. Two Anti-Humean Views of Laws:** So, we're still left with this question: What is a 'law of nature'? There are two Anti-Humean responses to that question. Both posit that there are some **necessary connections** that are just primitive features of our world:

(a) **Governing Laws are Relations Between Universals:** In the late 1970's, Fred Dretske, Michael Tooley, and David Armstrong proposed that laws are relations between universals (for this reason, it is called the 'Dretske-Tooley-Armstrong view', DTA.)

For instance, physicists tell us that 'force equals mass times acceleration' ( $F=ma$ ) is a law. The DTA view proposes, in this case, that the properties (universals) of 'having mass', 'having a force applied', and 'having acceleration' are sort of "glued" together by some necessary connections. That is, whenever an object instantiates two of these universals in some particular way, it is guaranteed to instantiate the third in some particular way.

(b) **Laws are Reducible to Dispositional Properties:** Dispositionalists claim that objects have irreducible modal properties called "dispositions". Objects that have such properties are fundamentally DISPOSED to act in certain ways in certain conditions. For instance, we say that a vase is '**fragile**'. If something has the (dispositional) property of 'fragility', then it is such that it will break when struck. Dispositions are such that they MUST manifest in a certain way when the object that instantiates it is placed in the manifestation condition; e.g., when you place an object with the disposition of fragility in the condition of being struck, it necessarily manifests as the object's shattering.

Other examples: Salt is **water-soluble**; that is, it is disposed to dissolve when placed in water. Even **mass** can be described dispositionally; e.g., 'has mass' is just the property of being disposed to attract other objects which also have this disposition.

*[Basically, dispositionalists impose necessity upon the behavior of objects from WITHIN, while law theorists impose necessity upon the behavior of objects from WITHOUT.]*

Solving the Problems: The Anti-Humean avoids all three of the problems raised above:

- (1) **Regularities are Not a Cosmic Accident.** If there are laws (e.g., a law of gravity), then the explanation for why I have observed every object to fall when dropped is not, "There's no reason. That there are any regularities is just a huge coincidence", but rather, "because there is a governing law of nature which MAKES objects fall."
- (2) **Distinguishes Accidental Regularities from Laws.** Anti-Humeanism has the tools to distinguish between the two; e.g., <All renates are chordates> is merely an accidental regularity, because the universals *having kidneys* and *having a heart* are not linked by any natural necessity. Having one of those properties does not necessitate the other. On the other hand, having mass DOES necessitate attraction to other massive bodies.
- (3) **No Skepticism; Induction Justified.** We don't have to worry about whether things will continue to fall when dropped, etc. There are laws which GUARANTEE that things will continue as usual. The existence of these laws is what justifies The Assumption that the future will continue to conform to the past. (*Problem: But, why should we think that the laws cannot suddenly CHANGE?*)

Problem: But, Anti-Humean views raise a NEW problem. They have yet to offer any satisfying account of WHY or HOW there can be such necessary connections. The Anti-Humean simply tells us that such connections are “primitive” features of the universe. But, what does that mean? That seems to be no explanation at all. Necessity remains perfectly mysterious; as Helen Beebe puts it, it’s “a bit of metaphysical hocus pocus.”

Furthermore, there is still not satisfying explanation for how we come to KNOW that there are governing laws. Isn’t our justification for the belief that there are governing laws just past observation of regularities? If so, the problem of induction is unsolved.

*[Brainstorm: Perhaps we are justified in believing that there are governing (i.e., non-Humean) laws based on an inference to the best explanation? It seems extremely UNLIKELY that we would see this much regularity in nature if there were no governing laws. The best explanation is that there ARE such laws.]*

**4. Conclusion:** Ultimately, we have two competing ways of responding to our observation of regularities in the world:

- (1) **Humeanism:** Regularities are nothing more than a cosmic accident. There is no feature of the universe which constrains the way that things behave. Main points:
  - There are NOT necessary connections between distinct things.
  - Laws are **descriptive**. They merely DESCRIBE what has happened.
  - There is law of gravity *because* every object has fallen when dropped.
  
- (2) **Anti-Humeanism:** Regularities are a result of governing laws. There are necessary connections between objects, which constrains the ways in which things are able to behave. Main points:
  - There ARE necessary connections between distinct things.
  - Laws are **prescriptive**. They GOVERN what has happened/will happen.
  - Every object has fallen when dropped *because* there is a law of gravity.

*[What do you think? Which view is better? Hume’s, or his opponent’s?]*