

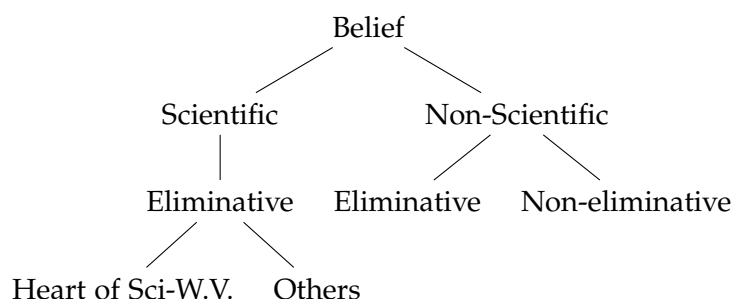
Stanford: Chasing Duhem

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CL 1008C
February 9th, 2021

The Problem of Unconceived Alternatives

Characterizing the evidential difference between such cases strikes me as **one of the hardest problems facing the contemporary philosophy of science**, but if I am right to suggest that the problem of unconceived alternatives poses **the most serious challenge to believing the claims of contemporary scientific theories**, sorting out this difference will prove to be important work worth doing. (p. 39)



What beliefs/theories are part of the “heart of our scientific conception of the world”? Stanford mentions explicitly facts and theories about:

- fundamental constitution/dynamics of constituents of the domains of the natural world
- remote history of the Earth
- remote history humans
- most minute working of our bodies
- farthest reaches of the universe
- nothing travels faster than light
- chemical bonds are constituted by electron transfer/sharing
- spiders and humans share common ancestor

Stanford thinks our justification for believing/accepting many or even all (p. 32) such claims are vulnerable to the problem of unconceived alternatives.

The Argument

Eliminative inferences are only reliable when we can be reasonably sure that we have considered all of the most likely, plausible, or reasonable alternatives before we proceed to eliminate all but one of them (or, in the limiting case, simply rest content with the lone contender). But the history of science shows that we have repeatedly

failed to conceive of (and therefore consider) alternatives to our best theories that were both well confirmed by the evidence available at the time and sufficiently plausible as to be later accepted by actual scientific communities. Even more briefly, the historical record suggests that in science we are typically unable to exhaust the space of likely, plausible, or reasonable candidate theoretical explanations for a given set of phenomena before proceeding to eliminate all but a single contender, but this is just what would be required for such eliminative inferences to be reliable.

P1 Eliminative inferences are reliable only when we consider all the most likely, plausible, or reasonable alternative before proceed to eliminate all but one.

P2 With respect to many or all of the beliefs/theories that are part of the “heart of our scientific conception of the world” we are not is a position to consider all the most likely...

C1 Therefore, these eliminative inferences are unreliable

C2 So, we are unjustified in our beliefs about many perhaps all aspects of our scientific conception of the world

Is this a fair reconstruction? See esp. p. 29.

Why P1? This is **Duhem’s Point**.¹

Why P2? This is a matter of **historical induction**. The history of science suggests we are typically unable to exhaust the space of likely, plausible, or reasonable candidate theoretical explanations for a given set of phenomena before proceeding to eliminate all but a single contender. But this is just what would be required for such eliminative inferences to be reliable.

Clarifications

- The Problem of Unconceived Alternatives targets a narrow band of our scientific beliefs: Scientific Beliefs/theories arrived at via eliminative inferential procedure many of which constitute the core of our scientific conception of the world
- Though these beliefs/theories are mainly arrived at through abductive inferences/inference-the-best-explanation², the problem is not with the reliability of abductive inference, but rather inference to the truth of the best (or only) explanation we have managed to come up with so far.
- This argument is not a twist on the Cartesian unmitigated skepticism. The Problem of Unconceived Alternatives is an evidential argument.
- The observable/unobservable distinction is beside the point.³
- Not an attack on commonsense ontology even if we agree with Quine that the objects in that ontology are just as “postulated” as those in our scientific ontology
- The Problem of Unconceived Alternatives rest on modest empirical reasoning of a piece with typical scientific methods.

¹ “Between two contradictory theorems of geometry there is no room for a third judgment; if one is false, the other is necessarily true. Do two hypotheses in physics ever constitute such a strict dilemma? Shall we ever dare to assert that no other hypothesis is imaginable? Light may be a swarm of projectiles, or it may be a vibratory motion whose waves are propagated in a medium; is it forbidden to be anything else at all?” ([1914] 1954 189–190)

² “inference to the best explanation, widely regarded as the central inferential tool of scientific inquiry...” Widely regarded by who? Fans of IBE?

³ Stanford discusses van Fraassen’s *Constructive Empiricism* at this juncture.

Failed Responses

The Problem of Unconceived Alternatives is part of the wider dialectic regarding underdetermination/confirmation-holism. Could a nuanced account of confirmation save us?

- Burden of proof argument: Once scientists (e.g. Perrin) have made careful, thorough effort to eliminate alternatives it falls to skeptics to give specific reasons for thinking otherwise. But this ignores this possibility that Perrin was (or we are) in position to exhaust space of plausible alternatives *even though we cannot specify a particular alternative not yet considered*
- Norton/Earman: Actual instances of eliminative inferences with a regimentation of the space of alternative. Response: Even admitting that regimentation exhaustive, assumes background theory that is vulnerable to PoUA
- Bayesian Response

Revisiting Problem of Pessimistic Metainduction

Preview of next week!

- Typical response to pessimistic meta-induction: Today's theories enjoy loads more theoretical virtues (precision, breadth, predictive power, fruitfulness, novelty etc.) that past theories lacked. Response: PoUA is immune to this rejoinder: present theories are no more likely to be true than past theories have turned out to be, but instead that present theorists are no better able to exhaust the space of serious, well-confirmed possible theoretical explanations of the phenomena than past theorists have turned out to be.
- Cognitive constitution explanation

Assessment

Why is this an HPS Paper?

- Philosophy: Themes: Underdetermination, confirmation, evidence,
- History: This non-historical chapter is followed by three historical chapters
- History and Philosophy: Philosophical thesis is evidential claim backed by historical inductive base.

Gems and anthracites/lignites/bituminous coals

- Paper not actually about Duhem; uses him as jumping off point
- Unclear how much argument depends on our scientific conception of the world depends on abductives inferences or IBE
- Open question what unites the set of beliefs/theories that are vulnerable to PoUA

- Suggestion that PoUA is not competitor to Pessimistic Meta-induction; the PofUA induction furnishes inductive argument for the claim that we have repeatedly and characteristically occupied a significant underdetermination predicament, failing even to conceive of theoretical alternatives well confirmed by the available evidence that would later be embraced by actual scientists and scientific communities.
- Pessimistic meta-induction explained by our cognitive limitations, contingent facts about our psychology.