"Humean Supervenience Debugged"

Introduction

Background

- Published 14 years after "A Subjectivist's Guide to Objective Chance."
- Lewis is extending the work done in the "New Work for a Theory of Universals" to indeterministic worlds.
- Goal: That a reduction of laws and chances together into a Humean picture of the world is both possible and tenable. Lewis wants the Principal Principle *and* the Best-Systems Account of Laws, and he's going to solve the huge problem of holding these naively.

Strategy

1. Reintroduce Humean Supervenience and the Best-System Analysis of Laws.
2. Develop and reject symmetry and frequency as solutions to chance.
3. Introduce probabilistic laws and the addition to BSA that makes it possible: fit.
4. Bring up a problem for a Humean analysis of chance with undermining.
5. Solve the problem.

Humean Supervenience Reintroduced

The thesis

- We can be *a priori* certain that any continent truth is made true by the pattern of instantiation of fundamental properties and relations by particular things. "Truth supervenes on being."
- If two possible worlds are at all discernible, it must be because they differ in what things are in them or how those things are.
- So what are the "fundamental properties and relations"?

  - Armstrong: Immanent universals
  - Williams: Families of exactly resembling tropes
  - Humean Supervenience:

    1. The fundamental relations are exactly the spatiotemporal ones.
    2. The fundamental properties are local qualities.
    3. All else supervenes on the spatiotemporal arrangement of local qualities throughout all of history.

Defending Humean Supervenience

The point of defending Humean Supervenience is not to support reactionary physics, but rather to resist philosophical arguments that there are more things in heaven and earth than physics has dreamt of. Therefore if I defend the *philosophical* tenability of Humean Supervenience, that defense can doubtless be adapted to whatever better supervenience thesis may emerge from better physics.

- But even classical physics raises questions for Humean Supervenience. Is a vector field an arrangement of local qualities?
- Humean Supervenience is *contingent*, that it's true when of worlds that are free of fundamental properties that are alien to ours.

Spinning disks

- Counterexample of the spinning sphere. Take two worlds with spherical homogenous matter, but one is spinning and one is stationary.
- The way this world is not like ours is that ours is a "temporal- parts-world."

Symmetry and Frequency

Chance and credence

Chance Objective single case probability.

Credence Degree of belief.

- Chance is connected to credence: if a rational believer knew that a chance of an event was 50%, then almost no matter what else she may know or note would chance the credence of one event happening.
- Consider the consequences of Humean Supervenience on a credence function.
- That is, that *whatever makes it true* that the chance is 50% must also be *whatever makes it rational* to believe to degree 50% that the event will occur, if known.
- Lewis now proposes two candidates for chance-makers: *symmetries* and *frequencies*.

What are symmetries?

- Third paragraph of page 476,

    Suppose a drunkard is wandering through a maze of T-junctions, and at each junction we can find nothing that looks like a relevant difference between the case that he turns left an the case that he turns right. We could well understand if rational credence had to treat the cases alike, for the lack of relevant difference. If the symmetry is something that would, if known, constrain credence, then it is suitable to serve as a chance-maker.

Problems for symmetries

1. There is no reason to think that we have symmetries to underlie the chance phenomena that we think there are.

    It would be nice to think that each tritium atom contains a tiny drunkard in a maze of symmetrical T-junctions.

2. Symmetries are only defeasible constrainers of rational credence. Therefore, they can only be *defeasible chance-makers*.

    The symmetry of the T-junctions would no longer require 50-50 division of credence if we also knew that, despite this symmetry, the drunkard turns right nine times out of ten.

What are frequencies?

Frequencies A pattern in the spatiotemporal arrangement of qualities.

- You can pretty easily intuit how these patterns could constraint rational credence.

- Frequencies will not be a useful answer if we can't distinguish natural from gerrymandered kinds.

- This is expressed best at the top of page 477, emphasis added,

    Large chance systems seem to be put together out of many copies of very small chance systems; and very small chance system often do come in enormous classes of exact copies. *You see one tritium atom, you've seen them all.*

Problems for frequentism

1. Consider unobtainium[346]. It's hard to make the stuff, in all of space and time there have been only two. One had a lifetime of 4.8 microseconds, and the other a life of 6.1 microseconds. So what's the probability of decay? Ill-defined.
2. Consider unobtainium[349]. The isotope is even harder to make, and there isn't a single instance of it through space and time. So what's the probability of decay? Undefined.
3. If space-time is finite with a small chance-system, then all frequencies will be rational numbers. Yet many real numbers are irrational, and we have no reason to doubt that chances in a finite world can take irrational values.

Onwards to laws

- The answer to the problem of unobtainium is remembering that single-case chances follow from general probabilistic laws of nature.
- But what pattern in the arrangement of qualities makes the chances?

Best-System Analysis of Laws

BSA reintroduced

A regularity is a law if and only if it is a theorem of the best system.

- Take all deductive systems whose theorems are true.
- Some are *simpler*, better *systematized* than others.
- Some are *stronger*, more *informative* than others.
- These virtues compete: An uninformative system can be very simple and an unsystematized compendium of miscellaneous information can be information.

    – The best system is the one that strikes as *good* a *balance* as *truth will allow* between simplicity and strength.
    – How good this is will depend how kind nature has been.

The problem of standards

- Where do the *standards* of simplicity and strength come from?

    – It *seems* to be from us. But that can't be right!
    – We can change the laws make them always have been different, just by changing the way we think!
    – Lewis uses to think that *rigidification* solved the problem. Lewis now thinks this is cosmetic only.

- If "nature is kind to us", the problem needn't arise.

    – Simplicity and strength are partly a matter of psychology.
    – It's not because of how we think that a linear function is simpler than a quartic or step function, for example.
    – If nature is kind, then the best system will be *robustly* best.
    – This trouble is with unkind nature, not on Lewis' analysis. Plus, "Cross the bridge when we get there."

The Best-System Analysis and Chance

Fit

- Goal: Modify the best-system analysis to make it deliver the chances and the laws in one "package deal." The way that Lewis does this? *Fit.*

- Take all deductive systems that pertain not only history, but also to what the various outcomes are in various situations (like the decay probabilities).
- Require these system to be true about history.
- Some of these system will *fit* the actual course of history better than others.
- The virtues of *simplicity*, *strength*, and *fit* trade off, and the best system is the system that get the best balance of all three.
    - And hopefully, robustly better.

Homogeneity

- In simple cases, this account reduces to frequentism.
- If all events fall into a large homogenous class, the following tradeoffs occur:
    - To exclude the chances of these events costs too much to strength.
    - To subdivide and assign different chances costs too much to simplicity.
    - To assign equal chances different from the frequency will cost too much to fit.
- The best-system might round off the actual frequency, and might have to do some weird work to account for gruesome classifications.
- Again, Lewis is optimistic about their being a decisive front-runner despite these sorts of problems.

Undermining

- Take a particular time and let C be the credence function for someone whose evidence is limited to the past and present.
- Let P be the function that gives the present chances of all propositions.
- Take A to be a propositions.
- Let E be any proposition that satisfies:
    1. It specifies the present chance of A in accordance with P.
    2. It contains no inadmissible evidence about future history.

$$C(A|E) = P(A)$$

- If A is an alternative future history with different present chances than the actual ones, and E is the whole truth about the present chances, then:
    1. $C(F|E) \neq 0$ because F has some present chance.
    2. $C(F|E) = 0$ because they're inconsistent.

A possible solution

- Future events can undermine present chances. Can we assume that the future chances manifest perfectly in past events? No, and here's why:

The Problem of the Early Moment What could make the chances at a moment not long after the beginning?

The Problem of Fluctuation It is not to be expected that the different chance-making patterns in these different segments will all make the same chance of decay.

The Problem of Drift Suppose early on, Js divide 50-50 between Ks and not-Ks, but so far there haven't been many Js together.

Then we should *expect* that there might be a chance to be a run of Ks or not-Ks, that would significantly raise or lower the chance of the next J to be a K.

Then the chance of being a K would drift to one or zero, and remain there for a long time after.

"No refuge"

- We can see how knowledge of frequencies or symmetries might constrain rational credence.
- It's more difficult to see how "a special relation $N*$" could come to be known and constrain rational credence.
- The challenge: how does knowing the fact that $N*(J,K)$ should make one believe to the degree it specifies that the next J will be K.

The Solution

The problem, again

- Our *problem* is, where F is an *un-actualized future* that would *undermine* the *actual present chances* given by E, is that $C(F|E) = 0$ because F and E are inconsistent, but $C(F|E) \neq 0$ by the Principal Principle because E specifies that F has non-zero chance of coming about.
- According to the best-system analysis, information about present chances is inadmissible because it reveals future history.
  - But this information should be admissible, we use it everyday.
  - Is every use of the Principal Principle fallacious?
- We need to investigate the concept of *admissibility.*

Admissibility

- Admissibility admits of degree

   A proposition E may be imperfectly admissible because it reveals something or or other about future history; and yet it may be very nearly admissible, because it reveals so little as to make a negligible impact on rational credence.

- Degrees of admissibility are a relative matter.

   The imperfectly admissible E may carry lots of inadmissible information that is relevant to whether B, but very little that is relevant to whether A.

- Near-admissibility may be good enough.

   If E specifies that the present chance of A is $P(A)$, and if E is nearly admissible relative to A, then conclusion that $C(A|E) = P(A)$ will hold, if not exactly, at least to a very good approximation.

Correction

- Let H_{tw} be the proposition giving the complete history of world w up to and including time t.
- Let T_w be the complete theory of chance for world w.
- Let P_{tw} be the chance distribution at time t and world w.
- If T_w were admissible, then the conjunction $H_{tw}T_w$ would also be admissible.
- So we could put it for E in the old Principal Principle.
- Dropping the subscripts, we have:

   (OP) $C(A|HT) = P(A)$

- The correction Lewis favors is:

   (NP) $C(A|HT) = P(A|T)$

How does this help?

- By conditionalizing on the theory of chance, you ignore undermining futures.
- Take A to be an undermining future of F:

$$C(F|HT) = 0$$

$$P(F) \neq 0$$

$$P(F|T) = 0$$

Against perfection

- (NP) is better from a Humean perspective, but (OP) is more intuitive and "key to our concept of chance."
- A feature of Reality deserves the name "chance" to the extent it occupies the role of chance.
- Occupying the role means obeying the old Principle.
- But undermining means that nothing occupies the role perfectly, so nothing perfectly deserves the name. But near enough is good enough.
- And if nature is kind, the chances ascribed by the probabilistic laws of the best system will obey the old Principle to a very good approximation.