- This talk is about the "evidential favoring" relation. That is:

$$E \text{ favors } H_1 \text{ over } H_2.$$

- I will take this (pre-theoretically) to imply that *E constitutes better evidence for the truth of H_1 than the truth of H_2*.
- And, I will only be discussing the favoring relation — as applied to (*contingent*) *empirical* claims (E, H_1, and H_2).
- Moreover, I will be focusing almost entirely on cases with *deductive-logical asymmetries* involving E, H_1 and H_2.
- To wit, here's a plausible *sufficient condition* for favoring:

  (PP) If H_2 entails $\sim E$ but H_1 does *not* entail $\sim E$, then E favors H_1 over H_2.

- This is a (weak) "Popperian Principle" concerning the *evidential asymmetry* between *refutation* / *non*-refutation.
- The "Popperian slogan" for (PP) would be: *non-refuting evidence confirms more strongly than refuting evidence.*

- I think the "Law of Likelihood" ([9], [8]) is meant to be a *probabilistic generalization* of the Popperian Principle (PP).

  (LL) Suppose H_1 confers probability p_1 on E, and H_2 confers probability p_2 on E. Then, E favors H_1 over H_2 iff $p_1 > p_2$.

- In other words, (LL) reduces "favoring" to a comparison of the *likelihoods* of H_1, H_2 [$p_1 = \Pr(E \mid H_1)$, $p_2 = \Pr(E \mid H_2)$].
- In the *limiting deductive case* involved in (PP), $p_2 = 0$, and $p_1 > 0$. In such *special cases*, *every* (good) theory of favoring will endorse the conclusion implied by (LL) [*viz.*, (PP)].
- So, of course, I accept (PP) as a *sufficient condition* for favoring. That is, (LL) is OK *in these special Popperian cases*.
- But, when we look at the consequences of (LL) for *other* cases, we can see that it *over*-generalizes the principle (PP).
- We can see (LL) is over-generalizing by considering a *different (deductive) sufficient condition* for favoring.

- To see why (LL) *over*-generalizes (PP), consider another (*deductive-special-case*) *sufficient condition* for favoring that I think should be (basically) as uncontroversial as (PP):

  ($\star$) If E entails H_1, and E does *not* entail H_2, then E favors H_1 over H_2.

- Principle ($\star$) can be thought of as a "dual" of Principle (PP).
- Basically, (LL) is meant to imply that if E is *conclusive evidence for H_1*, but E constitutes *merely inconclusive* evidence regarding H_2, then E favors H_1 over H_2.
- The slogan for ($\star$) would be: *conclusive evidence (for p) confirms more strongly than inconclusive evidence (for p).*
- To my mind, this "dual" of (PP) seems just as plausible as (PP) itself. [If one is a "Popperian" in the "critical rationalist" sense, then one will *deny* this. But, *that* part of Popper is *crazy*.]
- While (PP) is (severally) compatible with each of (LL) and ($\star$), it turns out that (LL) is *incompatible* with principle ($\star$).

- Here is an example illustrating the (LL)/($\star$) *incompatibility*.

  Example. Suppose we have deck of 100 playing cards, and *we know nothing about how the cards in the deck are distributed*, *except* for the following two facts: (*i*) there are some clubs and some red cards in the deck, and (*ii*) at least one ace of spades is contained in the deck. We shuffle the cards well, and we sample a card (c) at random from the deck. Now, consider the following three claims regarding c:

  (E) c is a spade.

  (H_1) c is a black card.

  (H_2) c is an ace of spades.

- Because E entails H_1 and E does not entail H_2, ($\star$) implies that E favors H_1 over H_2 in this case (which seems right).
- But, because $\Pr(E \mid H_2) = 1 > \Pr(E \mid H_1) > 0$, (LL) implies that E favors $\boldsymbol{H_2}$ over H_1, which *contradicts* what ($\star$) implies.
- I think this shows that, while (LL) can be seen as ***generalizing*** *one sufficient condition* for favoring (PP), it also ***contradicts*** *another sufficient condition* for favoring ($\star$).

- From a Bayesian point of view, (LL) is implied by the following principle about *quantitative confirmation*:

  (r) The *degree* to which E confirms $H = r(H,E) = \frac{\Pr(H \mid E)}{\Pr(H)}$.

- If we adopt (r), then (LL) follows from this *bridge principle*:

  (B) E favors H_1 over H_2 — according to a measure $\mathfrak{c}(H,E)$ of the degree to which E confirms H — iff $\mathfrak{c}(H_1,E) > \mathfrak{c}(H_2,E)$.

- That is, if you plug $\mathfrak{c}(H,E) = r(H,E)$ into (B), you get (LL).
- The ratio-measure approach to confirmation is flawed in many ways. I think the most telling objection to (r) is that it entails *commutativity* of "degree of evidential support" [2]:

  (C) For all E and H, $\mathfrak{c}(H,E) = \mathfrak{c}(E,H)$.

- But, (C) is clearly incorrect, since (*e.g.*) E might *entail* H ($E \vDash H$), while H does *not* entail E ($H \nvDash E$).
- I think this *underlies* the incorrectness of both (LL) and (r).

- There are various (Bayesian) alternatives to (LL)/(r) that are compatible with both (PP) and ($\star$), and which do not imply the commutativity of quantitative confirmation.
- One *naïve* Bayesian alternative to (LL) would involve a *comparison of posteriors*: $\Pr(H_1 \mid E)$ and $\Pr(H_2 \mid E)$. To wit:

  (NB) E favors H_1 over H_2 iff $\Pr(H_1 \mid E) > \Pr(H_2 \mid E)$.

- But, this "*naïve* Bayes" approach to favoring (NB) is *also inadequate*. Popper [7] showed that (NB) *violates*:

  (R) If E is *positively* (evidentially) relevant to H_1 and E is *negatively* relevant to H_2, then E does *not* favor H_2 over H_1.

  - There are *many* cases in which $\Pr(H_2 \mid E) > \Pr(H_1 \mid E)$, *while* E is *positively* relevant to H_1, but *negatively* relevant to H_2.

- Principle (R) makes sense because "favoring" is a relation of *comparative evidential support*. Moreover, (LL) *entails* (R), so (R) is something that "Likelihoodists" *must* (also) accept.
- We seek an explication of "favoring" that is compatible with (PP), ($\star$), *and* (R). As it happens, there are several of these.

- At the *quantitative* level, there are various measures of confirmation that undergird — *via* (B) — explications of "favoring" that are compatible with (PP), ($\star$), *and* (R). *E.g.*:
  - Likelihood-ratio-based measures ([5], [3], [4]).
  - A recent alternative to likelihood-ratio measures ([1], [10]).
- At the *qualitative* level, there are various sets of *probabilistic* sufficient conditions for favoring that can be seen as (proper) *generalizations* of (PP), ($\star$), *and* (R). *E.g.* [3]:

  (WLL) If $\Pr(E \mid H_1) > \Pr(E \mid H_2)$ *and* $\Pr(E \mid {\sim}H_1) \le \Pr(E \mid {\sim}H_2)$, then E favors H_1 over H_2.

- Joyce [6] calls this the "Weak Law of Likelihood" [*aptly*, since (LL) ⇒ (WLL)]. It's a principle that (almost all) Bayesian approaches to favoring [based on (B)] will agree upon.
- Of course, (WLL) appeals to "catch-alls", and so its *antecendent* will be controversial for *some* philosophers.
- I'll have to stop here. [See [3] and [4] for further discussion.]

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