A Defense of The Principle of Indifference, `v 1.5, corrected`

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`May 14, 2009`

The principle of indifference (hereafter 'Poi') says that if one has no more reason to believe A than B (and *vice versa*), then one ought not to believe A more than B (nor *vice versa*). Many think it's demonstrably false despite its intuitive plausibility, because of a particular style of thought experiment that generates counterexamples. Roger White defends Poi by arguing from independent premises that its antecedent is false in these thought experiments. Like White I believe Poi, but I find his defense unsatisfactory for two reasons: it appeals to false premises, and it saves Poi only at the expense of something that Poi's believers likely find just as important. So in this essay I defend Poi by arguing that its antecedent does hold in the relevant thought experiments, and that the further propositions needed to reject Poi are themselves at best question-begging and at worst just plain false.[1] In showing this, I also note something that has to my knowledge gone unnoticed: given some innocuous-looking assumptions the denial of Poi is equivalent to a version of *epistemic permissivism*, and Poi itself is equivalent to a version of *epistemic uniqueness*.

1 What is the Principle?

The Principle of Indifference (Poi) is a conditional linking a state of *evidential symmetry* to a state of *belief symmetry*. It says that for any agent x, if x has no more reason to believe A than B and *vice versa*, then x ought not believe A any more strongly than B and *vice versa*. It has an antecedent about evidence, and a consequent that's a normative claim about relative belief-strengths.

Slightly modifying the terminology of Roger White (2008), I use the symbol '$\approx$' to denote the two-place relation between propositions that he calls 'evidential symmetry'. $A \approx B$ (for agent x) when x has no more reason to believe A than B and *vice versa*. Here 'reason' is meant to include all epistemically relevant factors, so it covers more than just empirical evidence. It covers everything that's an epistemically rational reason for belief.[2]

I use the symbol '$\sim$' to denote the two-place relation between propositions that I call 'belief symmetry'. $A \sim B$ (for x) when x believes A no more strongly than B and *vice versa*. There's more than one way for this to happen. Perhaps x has a total suspension of judgment, in which no degree of belief is granted to either proposition; or perhaps some degree of belief is granted, but each gets the same amount; or perhaps x outright disbelieves btoh A and B. I use '$\prec_b$' and '$\succ_b$' to indicate belief-*a*symmetries. These include such states as: outright belief in A together with outright disbelief in B; a higher degree of belief for A than for B; and, in cases where A and B are not contraries, states like suspension of judgment on A plus outright belief in B, etc.

[1] I play only defense in this essay; I don't argue that Poi is true, just that one popular refutation is faulty.

[2] I use '$\prec_e$' and '$\succ_e$' to indicate evidential asymmetry in a particular direction.

I am purposely *not* assuming that degrees of belief ought rationally to conform to the probability calculus ("belief-probabilism"), that degrees of belief are the only interesting kinds of belief, or even that degrees of belief exist at all (Poi is consistent with the view that all belief is of the all-or-nothing type).

Poi, then, can be written thus: if $A \approx B$ then one ought to have $A \sim B$. The 'ought' here is the 'ought' of epistemic rationality. I don't have a theory on what that is, but I think we can leave that fuzzy to discuss Poi. Sometimes I'll use '$\Box$' and '$\Diamond$' as abbreviations for epistemic obligation and permission, respectively, but I don't mean to bring on the baggage of various epistemic logics. For instance, Poi can be written

$$(A \approx B) \rightarrow \Box(A \sim B).$$

2 The Anti-Poi Argument

Demonstrations that Poi is false are varied but share a common form, so I'll pick one instance for illustrative reasons. I'll follow White (2008) in using the "Mystery Square Factory" case, which is an adaptation from one mentioned by van Fraassen (1989).

I visit a factory that makes four-sided, thin plates, such that all sides are of equal length. The Factory's foreman tells me that the square just produced has a side length between 0 and 2 inches, but I get nothing else. No relative frequencies (in fact, this may well be the first square they've ever produced), and no clues. The foreman brings to my attention the following six propositions, and asks me which ones I believe more than others:

L_1: the length of the square will be between 0 and 1 inches.
L_2: the length of the square will be between 1 and 2 inches.
A_1: the area of the square will be between 0 and 1 square inches.
A_2: the area of the square will be between 1 and 2 square inches.
A_3: the area of the square will be between 2 and 3 square inches.
A_4: the area of the square will be between 3 and 4 square inches.

Since I've got no relevant information at all about the Factory, except that it is about to produce a square,

(1) $L_1 \approx L_2$.

By Poi, then, I have

(2) $L_1 \sim L_2$.

Since the two length hypotheses are exhaustive, and my degrees of belief must be probabilities, it follows that

(3) $p(L_1) = p(L_2) = 0.5$.

Now for the area hypotheses. Since I've got no relevant information at all about the Factory,

(4) $A_1 \approx A_2 \approx A_3 \approx A_4$.

Since the four area hypotheses are exhaustive, I must have

(5) $p(A_1) = p(A_2) = p(A_3) = p(A_4) = 0.25$.

Yet A_1 and L_1 are logically equivalent, and by the probability calculus must have the same probability, therefore

(6) $0.25 = p(A_1) = p(L_1) = 0.5$,

which is a contradiction.

There's more than one contradiction to be had in the Factory. For instance: from (3) and (5), it follows that

(7) $p(A_2) = p(L_2)$;

but that violates the probability calculus, if, as in this case, $p(A_3) \neq 0 \neq p(A_4)$. It's this contradiction, between (7) and "beliefs must obey the calculus", rather than the one embodied in (6), that contains the real difficulties (or so I'll show).

What gets the blame for the presence of contradiction? The Factory fans blame Poi, for it's what forced us to set probabilistically incoherent degrees of belief. They do not blame belief-probabilism, of course, nor do they blame either (1) or (4). There's nothing wrong with the latter two, so the thought goes, unless and until Poi is added to the mix.

One who likes Poi may think "this just shows the falsity of the view that degrees of belief must conform to the probability calculus". I admit an inclination this way myself, but one can't let matters rest like this. First, one would like to do better than "one man's *modus ponens* is another man's *modus tollens*" if at all possible. For another, dispensing with probabilistic degrees of belief does not by itself suffice to pull Poi from the flames.

3 A Probability-free Square Factory

The second contradiction I mentioned above—the conjunction of (7) with belief-probabilism—has an analog that can be had without appeal to the full apparatus of probabilism. Indeed, only some rather weak assumptions about the relation '$\sim$' are needed to land us in trouble, if we suppose the evidential symmetries are in place to begin with. White (2008) noted that, on this assumption, weak assumptions about the *evidential* symmetry relation suffice to land us in trouble. The present section is simply an adaptation of his argument.

Suppose that because of our utter ignorance in the Factory, both

(8) $L_1 \approx L_2$ and $A_1 \approx A_2$

are true. (The relation between A_3 and A_4, whether it's $\approx$, $\prec_e$, or $\succ_e$, plays no essential role in this argument; all that matters is that they're not viewed as ruled out).

By Poi, then, we have

(9) $L_1 \sim L_2$ and $A_1 \sim A_2$.

If we suppose that logically equivalent propositions must be credentially symmetric, we have

(10) $L_1 \sim A_1$.

And if we suppose that '$\sim$' is a transitive relation, we have

(11) $L_2 \sim A_2$.

But A_2 implies L_2, because L_2 is true if and only if $A_2 \vee A_3 \vee A_4$ is true. Surely, if A_2 implies L_2, and A_3 and A_4 are each still regarded as open possibilities, one is epistemically required to have

(12) $L_2 \succ_b A_2$.

That contradicts our result (11).

In this argument, there's no appeal to probabilities (though to be sure, it appeals to some *consequences* of belief-probabilism). There's a contradiction at the end, and it's clear that Poi *need* not be blamed. But if we put the blame on either $L_1 \approx L_2$, $A_1 \approx A_2$, or both, we seem to be saying that we have evidence for one of member of a pair even when by hypothesis we have nothing at all that bears on the issue. *Prima facie* the blame should go to Poi, until there is some independent reason brought forth for questioning the double-tie. White thinks he has just such an argument. If he is right, then the Square Factory isn't the house of horrors for Poi that it's made out to be.

Note that this leaner, meaner version of the Square Factory hinges on only the following assumptions:

1. $L_1 \approx L_2$ and $A_1 \approx A_2$.
2. A_3 and A_4 have not been ruled out.
3. The transitivity of '$\sim$' ($T_\sim$)
4. Monotonicity of '$\sim$' ($M_\sim$): if Q is genuinely weaker than P, then $P \prec_b Q$ (where a proposition Q is *genuinely weaker* than P, relative to an agent, if P implies Q but not *vice versa*, and the agent still regards $Q \wedge \neg P$ as an open possibility).
5. The Equivalence Condition ($E_\sim$): If $P \dashv\vDash Q$, then you ought to have $P \sim Q$.

These five are sufficient to rule out Poi.[3]

[3] In fact, strict monotonicity can be weakened so that its consequent reads '$P \not\succ Q$'. But since nobody would ever think that it should read '$P \succ_b Q$', we can go with the stronger formulation.

4 White's Escape

White thinks Poi is unscathed in the Square Factory—whether we appeal to probabilism or not—because he denies that the pair of evidential ties $L_1 \approx L_2$ and $A_1 \approx A_2$ exist in the first place. Rather than proving Poi false, the Square Factory argument provides a (vacuously) *true* instance of Poi instead.

His argument proceeds from three premises (though not all the names, and none of the abbreviations, are from White):

($T_\approx$) The transitivity of evidential symmetry: $[(A \approx B) \wedge (B \approx C)] \rightarrow A \approx C$

($M_\approx$) Monotonicity: If B is genuinely weaker than A, then $A \prec_e B$.

($E_\approx$) Equivalence condition: if A and B are logically equivalent, then $A \approx B$.

From $T_\approx$, $E_\approx$, and $M_\approx$, we can prove that at least one of '$L_1 \approx L_2$' and '$A_1 \approx A_2$' is false:

1. $L_1 \approx L_2$, and $A_1 \approx A_2$ [assumption for *reductio*]
2. $T_\approx$ [premise]
3. $M_\approx$ [premise]
4. $L_2 \not\approx A_2$ [since L_2 is genuinely weaker than A_2, and $M_\approx$]
5. $L_1 \approx A_1$ [since $L_1 \dashv\vDash A_1$, and $E_\approx$]
6. $L_1 \approx A_2$ [by (1), (5) and $T_\approx$]
7. $L_2 \approx A_2$ [by (1), (6) and $T_\approx$]

Lines (4) and (7) contradict each other. Hence, from $T_\approx$, $M_\approx$, and $E_\approx$, it follows that the evidential ties that would force one into setting $L_2 \sim A_2$ and hence violating $M_\sim$, are not present in the Square Factory. But if we can't have both $L_1 \approx L_2$ and $A_1 \approx A_2$ in the first place, then there's no counterexample to Poi here. (In White's terms, evidential symmetry cannot spread across a "partition" of the space of possible squares that the factory produces).

5 Shedding More Bulk

We can distill even further the active ingredients from the Square Factory setup. In particular, we can change things so that we needn't appeal to $E_\approx$ or $E_\sim$. This isn't because I disbelieve either of those principles; to the contrary they're the surest things floating around the Factory. But I think the part of the Factory story that forces us to appeal to them is a red herring, and the more irrelevant things we can strip away the better.[4]

So forget about squares and factories. Consider instead three propositions, A, B, and C. Suppose that A and B are contraries, B and C are contraries, that A is genuinely weaker than C, and that all are contingent. Also, you have no other information at all that's relevant to these propositions.

[4]Other defenders of Poi focus on the two different "descriptions" of the problem, which, in this case, are areas and lengths, and devise invariance conditions (see e.g., Norton 2008). $E_\approx$ is one such condition. I think that the Poi-killing potential of the Factory and its ilk has nothing at all to do with different descriptions, except insofar as the different descriptions serve as an *aid* toward getting the reader's intuitions to say "yes, there is evidential symmetry here".

You're asked by a genie which you believe more, A or B. Not having any information at all that's relevant, you think $A \approx B$. Since you follow Poi, you have $A \sim B$. The genie then asks which you believe more, B or C. Not having any relevant information, you think $B \approx C$; since you follow Poi, you then have $B \sim C$. The evidential situation, as you see it, is $A \approx B \approx C$. I call a symmetry like this, in cases where A, B, and C have the relations described above, an *evidential bridge* (over genuine weakness).

If $T_{\sim}$ and $M_{\sim}$ are true, then either Poi is false or you can't have evidential bridges. Since both $A \approx B$ and $B \approx C$ appear to have the same credentials, Poi is false. Because the belief-probabilists buy $T_{\sim}$ and $M_{\sim}$, they must reject Poi if they allow evidential bridges. White, on the other hand, adopts corresponding principles about '$\approx$': $T_{\approx}$ and $M_{\approx}$. If both of those are true, then assuredly at least one of the two halves of every evidential bridge is false. This relieves the pressure on Poi.

6 Against White's Defense

One can't *simply* deny belief-probabilism to escape the Factory, since some of its surprisingly weak consequences suffice to generate a contradiction. The Factory, therefore, raises a tough question for those who believe Poi: if $A_1 \approx A_2$ and $L_1 \approx L_2$ are not both true, then in at least one of those cases we have a preponderance of "evidence" in favor of an option, despite the apparent fact that we are completely ignorant of anything remotely relevant to either of those questions. And one who believes Poi is likely to be equally fond of a sister principle, which I'll call the ignorance principle (or 'Ig' for short):

(Ig): For any contingent propositions P and Q, if one is ignorant of anything that bears on the question of which, if either of them, is true, then $P \approx Q$, i.e.,

$$i(P,Q) \rightarrow (P \approx Q).$$

This principle, coupled with the claims $i(L_1,L_2)$ and $i(A_1,A_2)$, deliver the evidential bridge $A_2 \approx L_1 \approx L_2$. (Or, in non-Factory terms, deliver $A \approx B \approx C$).

White's escape requires rejecting at least one of the following: Ig, $i(A_2,L_1)$, $i(L_1,L_2)$. But the latter two are true by hypothesis in the Factory, and Ig looks every bit as plausible as Poi. A defender of Poi seems to be throwing the baby out with the bathwater by making White's maneuver. Keeping Poi at the expense of Ig is a hollow victory.

I'll attempt to keep Poi, Ig, and the evidential bridges.

On the assumption (which I grant) of $E_{\approx}$, White argues that if $T_{\approx}$ and $M_{\approx}$ are true, there is no refutation of Poi in the Square Factory. But are those two true?

6.1 Transitivity

'$\approx$' can be shown intransitive by appeal to sequences of pairwise indistinguishable options. At last year's FEW, Fitelson offered one something like the following.[5] You catch a glimpse of the

[5] White cites both Fitelson and Sober as offering objections to transitivity based on Sorites-ish cases.

getaway car as it drives away from a robbery. The police bring you to the station for a lineup. They show you two color swatches and ask "which one of these do you have more reason to think is the color of the getaway car?". You answer that there's no more reason for swatch #2 than swatch #1, because you can't tell the two shades apart (even though you've been assured by the policeman that they are distinct colors). Next comes the same question, but this time it regards swatch #2 and swatch #3. If these are indistinguishable, there's evidential symmetry. After enough pairs, the policeman shows you swatch #1 and swatch (say) #1000. Now you can tell them apart, and clearly have more reason to think that swatch #1 is the color of the getaway car than that swatch #1000 is.

Examples like this can be multiplied. As Fitelson (personal communication) points out, it doesn't hinge on vagueness since the relevant property is identity, not (e.g.) greenness. (Interestingly, I think examples almost exactly like these have equal refuting force against the transitivity of '$\sim$'! This is not a happy result for belief-probabilists).

Even if '$\approx$' isn't generally transitive, it might be transitive within the restricted domain of the Factory. Then the Factory argument can be reformulated with a restriction of $T_\approx$ in place of $T_\approx$. But the restricted $T_\approx$ requires an argument; in the meantime, the Factory argument that hinges on $T_\approx$ has a false premise.

6.2 Consequence Monotonicity

What about $M_\approx$?

One possible objection is that its plausibility hinges on just how we understand the relation '$\approx$'. If we read '$A \approx B$' as 'any reason for A is a reason for B and *vice versa*', then $M_\approx$ is vacuously false in any situation in which we're utterly ignorant of any relevant reasons. For then it's vacuously true that any reason for A is a reason for B and *vice versa*, there being no reasons for either of them. I'm not saying this is the correct reading of '$\approx$', only that it's not altogether crazy, so there are good reasons to doubt $M_\approx$. If there are many readings of '$\approx$', some of which imply $M_\approx$ and some which don't, then White's defense of Poi would at best only cover those readings that satisfy $M_\approx$.

I have other objections to a closely related principle, but I'll deliver them in the next section.

7 Making the Factory Escape Harder

Supposing I'm right about the unsatisfactoriness of White's escape, there's still the worry of what the Poi defender will say about the Square Factory. As shown in the example of a probability-free Factory, accepting that $A_2 \approx L_1$ and $L_1 \approx L_2$ means that Poi throws the matter over to the belief end of things, where dark forces lurk. In particular, $T_\sim$ and $M_\sim$ work in tandem to create a contradiction.

One obvious thing to say is that $T_\sim$ is false, and the same style of case that showed $T_\approx$ false will do the job. Without $T_\sim$, one can leave $M_\sim$ in place, because there wouldn't be a way to get from $A_2 \sim L_1 \sim L_2$ to the dreaded $A_2 \sim L_2$.

That's the obvious thing to say, but it doesn't quite work. Let me make the job even harder for myself: one can weaken the suppositions about belief that are needed to cause trouble for Poi *even further*, so that they lie somewhere between $M_\sim$ and $T_\sim \wedge M_\sim$ in logical strength. Disaster (for Poi) can strike even if $T_\sim$ is false. That's because there's a principle that's stronger than $M_\sim$, but doesn't entail $T_\sim$, that does the work of both of them.

I call this principle 'Heredity' ('$H_\sim$'), for reasons that are about to become clear. Heredity says that for any propositions P, Q, and R, such that R is genuinely weaker than Q: if $P \sim Q$, then one is epistemically required to believe P less strongly than R.

($H_\sim$): $(P \sim Q) \rightarrow \Box(P \prec_b R)$

P "inherits" some propositions than which it must be believed less strongly, and it inherits them via its relation to Q.

This obviously entails $M_\sim$ (at least if $P \sim P$), but it's consistent with $\neg T_\sim$. Moreover, Heredity rules out all *credential* bridges.[6] If C is genuinely weaker than A, and $A \sim B$, one must not, by $H_\sim$, have $B \sim C$.

Before we considered $H_\sim$, Poi crashed and burned because from $A \approx B \approx C$ it delivered $A \sim B \sim C$. From here, $T_\sim$ took over and from this fashioned $A \sim C$, and passed this over to $M_\sim$, which rejected it. If we get rid of $T_\sim$ and strengthen $M_\sim$ up to $H_\sim$, things are a bit different. Poi delivers $A \sim B \sim C$ as before, but $H_\sim$ rejects it already, without fashioning $A \sim C$.

To have both Poi *and* the claim that the two evidential ties hold in the Factory (i.e., $A_2 \approx L_1$ and $L_1 \approx L_2$), one is logically required to reject $H_\sim$. This is tough because $H_\sim$ has some initial plausibility even to those who aren't belief-probabilists. Fortunately, $H_\sim$ is false. Or so I claim; I'll give a counterexample, but some might think the example begs the question. I don't think that's right, but I do think that *if* it's right, the opposition's case to be made that what I say in the example is *false* is equally question-begging. So while I don't think my example begs, I can grant that it does because the opposite take on it would be begging as well. Forcing a standoff is one way to play defense.

8 Two Cases Against Heredity

Heredity (for beliefs) says that if $P \sim Q$, then one (epistemically) ought to have $P \prec_b R$ (for any R genuinely weaker than Q). I don't think this is always true. That is, I think that there are *some* situations where it doesn't hold, even though it holds in plenty of situations.[7]

One kind of failure has to do with ignorance. For some choices of P, Q, and R, in which one has no information whatsoever, there's nothing epistemically wrong with violating Heredity. For instance, suppose that Descartes, while in the midst of meditating, is considering three

[6] A credential bridge is just like an evidential bridge, except with '$\sim$' instead of '$\approx$'.

[7] For instance, I believe 'the number of molecules in the Sun right at this instant is odd' no more strongly than I believe 'the number of molecules in the Sun at this instant is even'. I also believe, and *ought to believe*, the "oddness" proposition less strongly than I believe 'The Sun is at this instant composed of molecules'. Since the last proposition is genuinely weaker than the "evenness" proposition, this is a case where Heredity gets it right.

propositions:

> **Normal** (N): There's an external world, and I'm not being systematically deceived.
>
> **Demon** (D): I am being systematically deceived by a demon.
>
> **Trickster** (T): I am being systematically deceived by some Trickster being, whether it's a demon, a goblin, a genie, etc.

After further meditation, suppose, he comes to have the following credential attitudes: $N \sim D$ and $N \sim T$. This is a credential bridge. I don't think Descartes commits an epistemic sin here, despite the fact that T is genuinely weaker than D. Now maybe the reader thinks that Descartes got in this boat because (say) he's focusing too narrowly on the evidence delivered by his senses, and that's a sort of sin (ignoring good reasons for belief). But that would only show that Descartes is incorrectly ignoring rational reasons, not that his sin is the violation of Heredity. Presumably, those who are not Cartesian skeptics about the external world are so because they think that $N \not\sim D$ in the first place.

Notice that there's a credential bridge whether Descartes has $D \sim T$ or $D \prec_b T$. If he has the former, it's a violation of $M_\sim$ in addition to Heredity; if he has the latter, he obeys $M_\sim$ while violating Heredity. Suppose he winds up with the latter state, because he *followed* $M_\sim$ and thought "Gee, T is genuinely weaker than D, so I guess I believe T more strongly than D". Here again, I don't think Descartes sins by failing to conform to Heredity. (Some may think he sins by violating the transitivity of the "believes no less strongly than" relation, but I am unmoved since I think $T_\sim$ is false, and if $T_\sim$ is false then '$\preccurlyeq_b$' is not a transitive relation either).

This is not to say that Descartes can just *pick* whether he has $D \sim T$ or $D \prec_b T$. Which one he ought to have as his belief-state hinges on whether $M_\sim$ is true, whether he's ignoring reasons, and so forth. The point is simply that violating Heredity is in itself not automatically an epistemic sin.[8]

Here is another objection to Heredity. If we understand '$A \sim B$' so that the relation '$\sim$' holds if (but not only if) judgment is suspended on A and on B, then $M_\sim$ is demonstrably false. For one can easily suspend judgment on a proposition and also on something genuinely weaker than it, e.g., on 'Russell wore a blue sweater on his fortieth birthday' and 'Russell wore a blue sweater on his fortieth or forty-first birthday'. But $H_\sim$ entails $M_\sim$; therefore $H_\sim$ is false. Here's a more direct counterexample: suppose I suspend judgment on whether Russell wore a blue sweater or a red sweater on his fortieth birthday. Then I'm in a state of belief symmetry regarding those propositions. There would be nothing wrong with me also suspending judgment on 'Russell wore a red top of some sort on his fortieth birthday', which is a genuinely weaker proposition than one

[8]One might insist that Descartes is epistemically obligated to obey Heredity, because he's obligated to wind up here: $N \sim T$, $T \succ_b D$, $N \succ_b D$. (Thanks to an anonymous referee for raising this worry). All I can say is that he obviously isn't, and that I can't see any reason why he would be so obligated without appealing either to Heredity itself or to $M_\sim$. This is one form of the standoff I alluded to; the battle over Heredity might come down to a clash of intuitions on certain cases. No lover of Poi who shares my intuitions on this case ought to accept Heredity.

of the above. If I did this, I'd be belief-symmetric regarding the two. Yet $H_{\sim}$ says I'm epistemically obligated *not* to do this. That's absurd.

There's an evidential principle corresponding to Heredity. Call it '$H_{\approx}$' to distinguish it from $H_{\sim}$.

($H_{\approx}$) for any contingent propositions P and Q: if $P \approx Q$, then $P \prec_e R$ (for any R genuinely weaker than Q).

White affirms $H_{\approx}$, because it follows from the conjunction of $T_{\approx}$ and $M_{\approx}$. I think $H_{\approx}$ is false, for the reasons given above about ignorance, and because I think there are outright, intuitive counterexamples (e.g., isn't Descartes in this situation: $D \approx N \approx T$?). Moreover (and intuitions aside), not every theory of what evidential symmetry consists in implies $H_{\approx}$. Some even imply its negation.

For instance, Likelihoodism is the view that some evidence favors P over Q iff the probability of the evidence given P is greater than the probability of the evidence given Q. One could conjoin Likelihoodism to the view that $P \approx Q$ iff neither P nor Q are favored over the other by the evidence in hand. If one did this, then $H_{\approx}$ would be false (as would $M_{\approx}$, though $T_{\approx}$ would remain unscathed). That's because it's possible for some proposition E to have the same probability conditional on 'the getaway car was red' as it does conditional on 'the getaway car was red or maroon'. I'm not advocating this compound view; I'm only using it as an illustration of how nonobvious $H_{\approx}$ is.

9 What Won't Damage Poi

Poi says that if $A \approx B$, one epistemically ought to have $A \sim B$. If we assume that there exist at least *some* cases where evidential symmetry holds, then Poi is false if and only if there is at least one case in which symmetry holds yet one is *not* epistemically-rationally obligated to have $A \sim B$.

But if one isn't obligated to have $A \sim B$, then either:

1. $\Box(A \prec_b B)$. That is, one is epistemically obligation to lean towards A.
2. $\Box(A \succ_b B)$. I.e., one's obligated to lean towards B.
3. $\Diamond(A \prec_b B)$ and $\Diamond(A \succ_b B)$ and $\Diamond(A \sim B)$. That is, any three of the attitudes are individually permissible.
4. $\Diamond(A \prec_b B)$ and $\Diamond(A \succ_b B)$, though $\Box\neg(A \sim B)$. That is, one may not elect credential symmetry though leaning either way is acceptable.
5. $\Diamond(A \prec_b B)$ and $\Diamond(A \sim B)$, though $\Box\neg(A \succ_b B)$. That is, one may remain credentially neutral or lean towards A, but may not lean towards B.
6. $\Diamond(A \succ_b B)$ and $\Diamond(A \sim B)$, though $\Box\neg(A \prec_b B)$. That is, one may remain credentially neutral or lean towards B, but may not lean towards A.

I think that the latter two cases are absurd, but will not press that point here because it doesn't affect my argument. From now on I will leave them out of the discussion. So if one isn't obligated to have $A \sim B$, then either one must lean towards A, or one must lean towards B, or one has complete leeway, or one may lean towards either A or B so long as one stays off the fence.

Now I want to eliminate the first two cases, the ones in which leaning in a particular direction is mandated.

Suppose that one is epistemically obligated to lean in a particular direction, that is, obligated to have $A \succ_b B$ (the other case is perfectly symmetric). Then one's total evidence, in the broad sense—the grand total of one's epistemically rational forces—has obligated one to have $A \succ_b B$. But if one's total evidence has obligated one that way, it would never have been the case that $A \approx B$ in the first place, since by definition that could only be true if one's total evidence gives you no epistemically rational push either way.

Therefore a case of $A \approx B$ but $\Box(A \succ_b B)$ is logically impossible, and the same goes for a case of $A \approx B$ but $\Box(A \prec_b B)$. Call this condition 'Anticoercion'.

(Perhaps the reader detects a whiff of circularity here. Isn't the move from $\Box(A \succ_b B)$ to $A \not\approx B$ licensed by the contrapositive of Poi? It is not. Though one *could* use Poi for that purpose, that isn't what I'm doing. Poi's contrapositive is

$$\neg\Box(A \sim B) \rightarrow (A \not\approx B).$$

I'm appealing instead to $\Box(A \succ_b B) \rightarrow (A \not\approx B)$, which is equivalent by contraposition to

$$(A \approx B) \rightarrow \neg\Box(A \succ_b B);$$

that's obviously weaker than Poi. One can emphatically deny Poi but still agree with the latter, for instance if one thinks that sometimes when $A \approx B$ one is permitted to lean either way. Anyway, I'm not simply assuming this claim—I'm arguing for it.)

Hence only two real possibilities remain for what could be the case in a falsifying instance of Poi. One could be epistemically permitted to take any of the three attitudes,[9] or one could be obligated to get off the fence but in no particular direction. These two collapse so that there really is only *one* way that Poi could be false. Namely, if there is a case in which $A \approx B$, but one is nevertheless permitted to lean towards A and also permitted to lean towards B. (I blur the two cases into one because the issue of being forced off the fence rather than being permitted to stay is immaterial to the rest of the essay).

If I'm right about this, then two things are noteworthy.

First and foremost, this shows that a genuine counterexample to Poi has to be a case in which:

[9] I take it that one is also obligated to pick one of the three attitudes, since what one would think of as failing to make a choice at all is tantamount to choosing credential symmetry. An outright suspension of judgment counts as symmetry, since if one suspends judgment on A *versus* B, then one surely believes A no more strongly than one believes B and *vice versa*.

1. $(A \approx B)$, and
2. $\Diamond(A \succ_b B)$, and
3. $\Diamond(A \prec_b B)$.

No tactic that tries to force a case of $A \approx B$ at the same time that it mandates leaning in a *particular* direction (e.g., towards A) can succeed against Poi. Opponents of Poi, if they wish to argue against it by straight counterexample, *must* find a case where both $A \succ_b B$ or $A \prec_b B$ are epistemically open.

10 Poi and Permissivism

The second noteworthy item is a connection between Poi and another issue in epistemology. Given three inoffensive assumptions, the negation of Poi is equivalent to an epistemic principle I'll call 'Permissivism' (this is a modification of usage in White (2005). Permissivism says that, for at least some agents, at least sometimes the sum total of one's complete epistemic state epistemically permits both $A \succ_b B$ and $A \prec_b B$, where A and B are contraries. An opposing view (but not *the* opposing view) to Permissivism is 'Uniqueness' (Feldman ///, White 2005). This is the view that there is always exactly one mandatory attitude wrt contraries A and B; that is, in every evidential setting, either $\Box(A \succ_b B)$, $\Box(A \sim B)$, or $\Box(A \prec_b B)$. It turns out that Poi, *modulo* the inoffensive assumptions, is equivalent to Uniqueness.

I've departed from White's usage here in saying that there are only three attitudes to choose from, and that they are, for lack of a better term, "merely directional" attitudes. Uniqueness, as I've described it, is consistent with it being permissible to believe A to degree 0.5 and B to degree 0.2, and also permissible to believe A to degree 0.8 and B to degree 0.02.[10] White makes no restriction to the "directional" attitudes. He calls epistemologies more or less 'permissive' insofar as "they permit a range of alternative doxastic attitudes" (p. 445). In his central examples employed against permissive epistemologies, he considers ones that permit both belief in A and belief in a proposition contrary to A. So I think my usage of 'Permissivism' isn't too far off target. In fact, White gives the following the name 'Extreme Permissivism':

> There are possible cases in which you rationally believe P, yet it is consistent with your being fully rational and possessing your current evidence that you believe not-P instead. (p. 445)

That looks close to how I've defined 'Permissivism' above.

Perhaps one would want to call my version of Uniqueness 'Directional Uniqueness' and White's version something like 'Cardinal Uniqueness' (and in parallel, 'Directional' and 'Cardinal' Permissivism). For the sake of brevity I'll continue to use 'Uniqueness', but the thesis of this section is more precisely stated as follows: given the connecting assumptions, Poi is equivalent to the negation of Directional Permissivism, and equivalent to Directional Uniqueness.

[10] Thanks to an anonymous referee for advising that I be more explicit about this.

One other note: Uniqueness and Permissivism here are theses about one agent. They do not say anything at all about what two agents with "the same evidence" ought to do. This is, in the main, in accord with White's article. While he cites the question of interpersonal disagreement as a motivation for thinking about permissivism, his anti-permissive arguments are about one person.

If Permissivism is true, then there's a case where both $\Diamond(A \succ_b B)$ and $\Diamond(A \prec_b B)$ are true. What's the corresponding evidential state that leaves both options open? Surely it's not $A \succ_e B$. For if $A \succ_e B$, how could it possibly be that $\Diamond(A \prec_b B)$? Remember, '$\succ_e$' is *everything you've got*. The sum total of everything relevant points to A over B. Therefore you should believe A more strongly than B, contrary to hypothesis. By parallel reasoning, it couldn't be the case that $A \prec_e B$ and $\Diamond(A \succ_b B)$ at once. This amounts to a condition I'll call 'Antirebellion': if the total evidence points one way ($\succ_e$ or $\prec_e$), one isn't permitted to lean the opposite way.

Hence, if Permissivism is true, the only evidential state left that could give rise to the permissiveness is '$\approx$'. Permissivism requires that there are at least some choices of A and B for which $A \approx B$, yet $\Diamond(A \prec_b B)$ and $\Diamond(A \succ_b B)$. Which is to say, Permissivism requires a state of affairs that Poi rules out. Permissivism implies the falsity of Poi.

The falsity of Poi implies Permissivism, provided two other conditions are in place:

(i) Anticoercion: the claim, argued for in the previous section, that $(A \approx B) \wedge \Box(A \succ_b B)$ is absurd; that is, that given $A \approx B$, $\neg\Box(A \succ_b B)$.

(ii) a condition I call 'Evenhandedness'. This says that if leaning towards A is permitted-but-not-required, then so is leaning towards B (and *vice versa*). That is, we have $\Diamond(A \succ_b B) \wedge \neg\Box(A \succ_b B)$ iff $\Diamond(A \prec_b B) \wedge \neg\Box(A \prec_b B)$.[11]

If Poi is false, then $A \approx B$ yet $\neg\Box(A \sim B)$. Anticoercion tells us that we aren't forced to lean towards A and aren't forced to lean towards B. Evenhandedness (even the restricted form) tells us that if leaning towards A is permitted-but-not-required, so is leaning towards B. This rules out

$$\Box([A \succ_b B] \vee [A \sim B]) \wedge \Diamond(A \succ_b B) \wedge \Diamond(A \sim B).$$

There are only two credential profiles left to take when $A \approx B$:

- $\Diamond(A \succ_b B) \wedge \Diamond(A \prec_b B) \wedge \Box\neg(A \sim B)$, and
- $\Diamond(A \succ_b B) \wedge \Diamond(A \prec_b B) \wedge \Diamond(A \sim B)$,

and each of these implies Permissivism.

[11] In fact for this part of the argument one can get by with a weaker form of Evenhandedness, where it's restricted to only those cases where $A \approx B$. Evenhandnedness is consistent with both Poi and Permissivism. In fact, Poi implies the restricted form of Evenhandedness, and fans of the Square Factory are free to uphold the full-blown form; Permissivists are also free to deny Evenhandedness, since the latter makes a claim about *every* case of being permitted-but-not-required to lean in a particular direction, while Permissivism only make a claim about some such cases.

To my knowledge nobody has noticed this connection. If the intermediary assumptions, i.e., (restricted) Evenhandnedness, Anticoercion, and Antirebellion, are correct then any argument for Permissivism is an argument against Poi, and any argument against Permissivism is an argument for Poi. In particular, this gives rise to the following argument for Permissivism:

1. $H_\sim$, Heredity, is true.
2. There are evidential bridges.[12]
3. Therefore Poi is false.
4. Therefore Permissivism is true.

So a what looks like a relatively weak *structural* assumption about how '$\sim$' can be spread around can give rise to Permissivism, if only the existence of evidential bridges are granted.

Here's another one:

1. $T_\sim$ is true (transitivity of '$\sim$')
2. $M_\sim$ is true too.
3. There are evidential bridges.
4. Therefore Permissivism is true.

Such arguments can go a step further. Given the almost the same intermediary assumptions (we need *un*restricted Evenhandedness), Poi is equivalent to Uniqueness. Here's a quick argument:

Suppose Uniqueness is true, and that $A \approx B$. According to Uniqueness, exactly one credential attitude is required. Anticoercion says that $\neg\Box(A \succ_b B) \wedge \neg\Box(A \prec_b B)$. The only remaining option is $\Box(A \sim B)$, which is exactly what Poi says.

On the other hand, suppose that Poi is true. To establish Uniqueness, one has to account for what happens when $A \succ_e B$ (the case of $A \prec_e B$ is parallel). Antirebellion says that when $A \succ_e B$, it isn't the case that: one is permitted-but-not-required to lean towards B. Is one permitted-but-not-required to lean towards A? Evenhandedness says that *if* one is merely permitted to lean towards A, one *would* also be merely permitted to lean towards B. Therefore, one isn't merely permitted to lean towards A in the first place. Hence one is either *required* to lean towards A, or one is *required* to have $A \sim B$. Either way, we have Uniqueness (namely, Directional Uniqueness).

So in light of the intermediary assumptions Poi is equivalent to Uniqueness, and therefore Permissivism is equivalent to the negation of Uniqueness.[13] This means that Uniqueness is inconsistent with the conjunction of "there are evidential bridges" with either Heredity or $T_\sim \wedge M_\sim$.

[12] Recall that this occurs when $A \approx B \approx C$, C is genuinely weaker than A, and B is contrary to both A and C.

[13] Without the intermediaries, Uniqueness implies the falsity of Permissivism but the reverse implication doesn't hold.

11 Conclusion

The Principle of Indifference (Poi) has taken a beating. Belief-probabilism in the Mystery Square Factory, coupled with an assumption that there are evidential symmetries that form a bridge from the length hypotheses to the area hypotheses, refutes it.

Even rejecting belief-probabilism won't by itself help, since some of it's consequences can still do the job for it. Roger White denied that those bridging symmetries are really there, and that relieves the pressure on Poi. But I think that's a Pyrrhic victory. Plus, White's premises that lead him to abandon the symmetries are false.

The pressure on Poi from the Factory case can be isolated even further, to a principle of Heredity. I argued against Heredity, thereby pulling Poi up off the mat, and without abandoning the bridging symmetries.

I also argued that, *modulo* some assumptions, Poi is (a) equivalent to the negation of Permissivism (the thesis that at least sometimes one's total mass of epistemic reasons is such as to epistemically permit leaning toward *P* rather than its contrary *Q*, and also permit leaning toward *Q*), and (b) equivalent to Uniqueness (the thesis that one's total mass of epistemic reasons always epistemically mandates exactly one merely-directional credential attitude with regard to a pair of contraries). Hence the Square Factory arguments are also arguments for Permissivism and against Uniqueness. If I have relieved the pressure on Poi from the Factory, I've also relieved some pressure on Uniqueness.

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