How to be Indifferent*

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Abstract

According to the principle of indifference, when a set of possibilities is evidentially symmetric for you – when your evidence no more supports any one of the possibilities over any other – you're required to distribute your credences uniformly among them. Despite its intuitive appeal, the principle of indifference is often thought to be unsustainable due to the problem of multiple partitions: Depending on how a set of possibilities is divided, it seems that sometimes, applying indifference reasoning can require you to assign incompatible credences to equivalent possibilities. This paper defends the principle of indifference from the problem of multiple partitions by offering two guides for how to respond. The first is for permissivists about rationality, and is modeled on permissivists' arguments for the claim that a body of evidence sometimes does not uniquely determine a fully rational credence function. The second is for impermissivists about rationality, and is modeled on impermissivists' arguments for the claim that a body of evidence does always uniquely determine a fully rational credence function. What appears to be a decisive objection against the principle of indifference is in fact an instance of a general challenge taking different forms familiar to both permissivists and impermissivists.

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The theory of chance consists in reducing all the events of the same kind to a certain number of cases equally possible, that is to say, to such as we may be equally undecided about in regard to their existence, and in determining the number of cases favorable to the event whose probability is sought.

Pierre-Simon Laplace, *Essai Philosophique sur les Probabilités*

The basis underlying such initial [probability] assignments was stated as an explicit formal principle in the *Ars Conjectandi* of [Jacob] Bernoulli (1713). Unfortunately, it was given the curious name: *Principle of Insufficient Reason* which has had, ever since, a psychologically repellant quality that prevents many from seeing the positive merit of the idea itself. Keynes (1921) helped somewhat by renaming it the *Principle of Indifference*; but by then the damage had been done. Had Bernoulli called his principle, more appropriately, the *Desideratum of Consistency*, nobody would have ventured to deprecate it…

Edwin T. Jaynes, "Where Do We Stand on Maximum Entropy?"

1 From Ignorance to Indifference

I'm about to flip a coin. What credence – what subjective degree of belief or level of confidence – should you have that the coin will land heads?

That depends.

If you know that the coin I'm about to flip is double-headed, then your credence should be 1. If you know that the coin is fair, it should be $\frac{1}{2}$. This is uncontroversial. Rationality requires you to align your credences with known objective chances.[1]

What if you're ignorant about the relevant objective chances? Suppose that you've seen me flip a coin of unknown bias many times and it's landed

[1]More precisely, according to the 'principal principle', your credence in p, conditional on the objective chance of p being c at time t, should be c, assuming you have no 'inadmissible evidence' at t. See Lewis (1980) and Hall (1994).

heads twice as often as it's landed tails. Since your evidence strongly supports thinking that the outcome in which the coin will land heads is twice as likely as the outcome in which the coin will land tails, you should be $\frac{2}{3}$ (or very close to $\frac{2}{3}$) confident that the coin will land heads on the next flip. This is also uncontroversial. Rationality requires you to conform your credences to your evidence.[2]

What if you neither know the relevant objective chances, nor have any relevant evidence about the coin? Imagine that, aside from the fact that a mystery coin will either land heads or tails, you have no information – including knowledge about the coin's bias, or evidence concerning the base rate of mystery coin flip outcomes – bearing on the question of how the coin will land. In particular, you have no reason for thinking that the coin is more likely to land one way rather than another, and no reason for thinking that it's perfectly fair. To what degree should you believe that the mystery coin will land heads when it's flipped?

Surely it would be absurd for you to be certain that the coin will land heads. And similarly it would be absurd for you to be certain that the coin won't land heads. Should you be, for instance, $\frac{1}{\pi}$ confident instead? That's objectionably arbitrary. Indeed, it's objectionably arbitrary for your credence to be anything other than $\frac{1}{2}$.

Is a credence of $\frac{1}{2}$ rational? It seems that it is: Because you have no more evidence for favoring the possibility that the coin will land heads rather than tails and no more evidence for favoring the possibility that the coin will land tails rather than heads, $\frac{1}{2}$ is the only level of confidence to have in each of the possibilities which respects the evidential symmetry present in the case. In the mystery coin example, a natural thought is that you're required to have credences which are indifferent between the two possible outcomes.

This kind of indifference reasoning in the absence of evidence is especially common in games of chance. For example, in the famous Monty Hall problem it seems that the only reasonable probability to assign the possibility that the car is behind any particular one of the three doors is $\frac{1}{3}$.[3]

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[2]See especially Williamson (2000) and Connee and Feldman (2004).

[3]Hájek (2016) makes a similar point. Selvin (1975), who introduced the problem, and vos Savant (1990), who popularized it, both appear to implicitly rely on indifference

But indifference reasoning is often extended beyond contrived cases involving coins and doors. In ethics, it is used to address concerns that arise about the feasibility of calculating the expected values of actions given (what is often complete) ignorance about the long-term effects of those actions.[4] In physics, it is used to assign the prior probabilities of the microstates of a system that have the same energy.[5] Perhaps more speculatively, indifference reasoning is even thought to rationalize belief in God, solve certain skeptical puzzles, and justify doomsday estimates.[6]

It is, to be sure, disputable whether invoking indifference reasoning is legitimate in each of these cases. Perhaps there are easily overlooked subtleties (for instance, implicit in the background assumptions or between the possibilities themselves) which generate evidential asymmetries. Nevertheless it seems difficult to deny that at least *sometimes*, when a set of possibilities is in fact evidentially symmetric for you given your evidence – when your evidence in fact no more supports that any one possibility is more likely than any other – you should be indifferent between them. The question is whether evidential symmetry *always* demands such indifference. More precisely, whether:

> (INDIFFERENCE) Rationality requires you to distribute your credences uniformly among evidentially symmetric propositions.[7]

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reasoning in their canonical solutions to the Monty Hall problem.

[4]The concern is that insofar as all of the consequences of an action bear on its deontic status, it seems that you are often clueless about what you are morally (and perhaps even practically) obligated or permitted to do. Lenman (2000) considers indifference reasoning as a response, though is pessimistic about its prospects. See Greaves (2016) for a defense of indifference as a response, and Mason (2004) and Lang (2008) for relevant discussion. Interestingly, the general worry of cluelessness can be traced back to at least Bishop Joseph Butler, who appeals to evidential (a)symmetry as a solution in passages in the *Analogy*, Dissertation II.10.

[5]See especially Tolman (1938, pp.59-60) and Jackson (1968, p.83). See also Maxwell (1860, p.21) and Jaynes (1979) for other uses of indifference reasoning in physics.

[6]Jordan (2006, p.22) suggests that Blaise Pascal relies on some version of indifference reasoning in the *Pensées* when presenting the wager. On indifference and skeptical arguments, see especially Elga (2004), White (2015), and Builes (2024). On indifference and doomsday arguments, see Gott (1993, p.315), though see Goodman (1994) for an objection.

[7]Although the principle is often attributed to Pierre-Simon Laplace as quoted in the epigraph, Jacob Bernoulli's *Ars Conjectandi*, referenced in Jaynes's quote in the epigraph, predates Laplace, and also contains something that resembles the principle. Hacking

2 The Problem of Multiple Partitions

Orthodoxy has it that it doesn't. The reason is that there's an apparently decisive objection to INDIFFERENCE. Here is a version of that objection.[8]

First consider:

> (LENGTH) I've just drawn a mystery square. The only information you know about the square is that its length is between 0 inches and 2 inches. How confident should you be that the length of the square is between 0 inches and 1 inch?

In LENGTH, because you have no evidence about the length of the square aside from the fact that it's between 0 and 2 inches, it seems that the following two propositions are evidentially symmetric for you:

(l_1) The length of the square is between 0 and 1 inch.

(l_2) The length of the square is between 1 and 2 inches.

Next consider:

> (AREA) I've just drawn a mystery square. The only information you know about the square is that its area is between 0 square inches and 4 square inches. How confident should you be that the area of the square is between 0 square inches and 1 square inch?

In AREA, because you have no evidence about the area of the square aside from the fact that it's between 0 and 4 square inches, it seems that the following four propositions are evidentially symmetric for you:

(1975) argues that the idea behind the principle can be found in the work of Leibniz in 1678. The principle was earlier known as the 'principle of insufficient reason', dating back to at least 1871 in a textbook by Johannes von Kries. John Maynard Keynes, to whom the name the 'principle of indifference' is due, formulates a version of it in Keynes (1921). The principle of indifference is generally thought to be problematic, though for some recent defenses, see Bartha and Johns (2001), Huemer (2009), Bangu (2010), Novack (2010), White (2010), Pettigrew (2016), Williamson (2018), and Eva (2019).

[8] This version of the objection is from White (2010) which is based on the 'cube factory' example due to van Fraassen (1989). Other commonly discussed versions include the 'inscribed triangle' variation in Bertrand (1889) and the 'wine and water mixture' variation in von Mises (1929).

(a_1) The area of the square is between 0 and 1 square inch.

(a_2) The area of the square is between 1 and 2 square inches.

(a_3) The area of the square is between 2 and 3 square inches.

(a_4) The area of the square is between 3 and 4 square inches.

But wait. I could have drawn the *exact same square* in LENGTH and AREA: The length of a square is between 0 and 2 inches if and only if its area is between 0 and 4 square inches. The descriptions of the square in LENGTH and AREA are equivalent. However, because the length of the square is between 0 and 1 inch if and only if its area is between 0 and 1 square inch, l_1 is true if and only if a_1 is true. So shouldn't you be *equally* confident in l_1 and a_1? That would, given the background evidential symmetry assumptions, conflict with INDIFFERENCE, which requires your credence in l_1 to be $\frac{1}{2}$ and your credence in a_1 to be $\frac{1}{4}$.

This mystery square example is an instance of the *problem of multiple partitions*.[9]

3 Problems with the Problem of Multiple Partitions

The problem of multiple partitions reveals an inconsistency between INDIFFERENCE and the conjunction of two claims about evidential symmetry:

(LENGTH-SYMMETRY) l_1 and l_2 are evidentially symmetric for you given your evidence.

(AREA-SYMMETRY) a_1, a_2, a_3, and a_4 are evidentially symmetric for you given your evidence.

The plausibility of LENGTH-SYMMETRY and AREA-SYMMETRY suggests rejecting INDIFFERENCE. Perhaps it is tempting to think that INDIFFERENCE is false, and only specific instances of the principle (for example as applied

[9]The problem of multiple partitions is also sometimes called 'Bertrand's Paradox', since it was first discussed by Joseph Bertrand, who concludes in Bertrand (1889, p.5) that such problems are not well-posed.

to games of chance), or restricted versions of it (for example concerning self-locating belief) are true.[10]

An obvious issue with this is that it is highly unsatisfying. Absent further conditions to distinguish between licit and illicit applications of indifference reasoning, to maintain that evidential symmetry sometimes requires indifference (on pain of irrationality) but sometimes forbids it (on pain of inconsistency) appears no more informative than to maintain that INDIFFERENCE is true except when it's false.

A less obvious issue is that the problem of multiple partitions, to the extent that it is a problem for INDIFFERENCE, is also a problem for the general principle:

> (TRICHOTOMY) For any two objects x and y which are evaluatively comparable with respect to gradable adjective F, either x is more F than y, or x is less F than y, or x and y are equally F.[11]

Applied to preferences, TRICHOTOMY states that for any two alternatives, either you prefer one over the other or you're indifferent between them.[12] Applied to population axiology, TRICHOTOMY states that for any two states of affairs, either one is better than the other or they are equally good.[13] Applied to evidential support, TRICHOTOMY states:

> (EVIDENTIAL-TRICHOTOMY) For any two propositions p and q, either p is more supported by your evidence than q, or p is less supported by your evidence than q, or p and q are equally supported by your evidence.

Assuming that rationality requires you to proportion your credences to your evidence, EVIDENTIAL-TRICHOTOMY entails INDIFFERENCE. For suppose p and q are evidentially symmetric for you. Then it's not the case that

[10] For defenses of a version of INDIFFERENCE restricted to self-locating belief, see in particular Elga (2004) and Builes (2024).

[11] See especially Dorr, Nebel, and Zuehl (2023) for a defense.

[12] This is a standard axiom in decision theory. See especially von Neumann and Morgenstern (1944). Whether rational preferences are complete in this sense has been extensively challenged. See for instance Aumann (1962) and Chang (2002).

[13] Standard versions of 'totalism' and 'averagism' entail a version of TRICHOTOMY. For background see Parfit (1984).

p is more supported by your evidence than q, and it's not the case that q is more supported by your evidence than p. By EVIDENTIAL-TRICHOTOMY it follows that your evidence equally supports p and q, so your credence in p should be equal to your credence in q – you should be indifferent between them. If the problem of multiple partitions requires rejecting INDIFFERENCE, then it also requires rejecting EVIDENTIAL-TRICHOTOMY and therefore TRICHOTOMY.[14]

These are indirect considerations against accepting the conjunction of LENGTH-SYMMETRY and AREA-SYMMETRY. Are there are also more direct considerations? Let $p \approx q$ denote that p and q are evidentially symmetric for you. Then LENGTH-SYMMETRY and AREA-SYMMETRY are jointly inconsistent with four plausible principles about the evidential symmetry relation:

(SYMMETRY) If $p \approx q$ then $q \approx p$.

(TRANSITIVITY) If $p \approx q$ and $q \approx r$ then $p \approx r$.

(EQUIVALENCE) If p and q are logically equivalent, then $p \approx q$.

(STRICT-WEAKENING) If p and q are both compatible with your evidence and are not logically equivalent then $p \not\approx p \vee q$.

Here is the argument:[15]

1. $l_1 \approx l_2$ (LENGTH-SYMMETRY)
2. $l_1 \approx a_1$ (EQUIVALENCE)
3. $l_2 \approx a_1$ (1, 2, SYMMETRY, TRANSITIVITY)
4. $l_2 \approx a_2 \vee a_3 \vee a_4$ (EQUIVALENCE)

[14] As far as I know no one has suggested rejecting TRICHOTOMY on the basis of the alleged inconsistency due to the problem of multiple partitions. Of course one possible response is to reject that rationality requires you to conform your credences to your evidence. I'll set aside this response here.

[15] This argument is due to White (2010). I think SYMMETRY and EQUIVALENCE are incontestable. I'm inclined to accept TRANSITIVITY and STRICT-WEAKENING, though if rational credences can sometimes be 'imprecise' – if rational credences are sometimes better represented by an interval or a set of probability functions – then TRANSITIVITY and STRICT-WEAKENING appear less obvious. For discussion of this argument, see especially Meacham (2014), Smith (2015), Lando (2021).

5. $a_1 \approx a_2 \vee a_3 \vee a_4$ (3, 4 SYMMETRY, TRANSITIVITY)

6. $a_1 \approx a_2$ (AREA-SYMMETRY)

7. $a_2 \approx a_2 \vee a_3 \vee a_4$ (5, 6, SYMMETRY, TRANSITIVITY)

8. $a_2 \not\approx a_2 \vee a_3 \vee a_4$ (STRICT-WEAKENING)

Supposing that evidential symmetry respects SYMMETRY, EQUIVALENCE, TRANSITIVITY, and STRICT-WEAKENING, it follows that in the example of the mystery square, either the possibilities partitioned by length are not evidentially symmetric, or the possibilities partitioned by area are not evidentially symmetric.

INDIFFERENCE cannot be dismissed so quickly. But a defense of it requires rejecting one of LENGTH-SYMMETRY or AREA-SYMMETRY. Which one?

4 (Im)permissivism About Rationality

I have certain degrees of belief about who will win the next presidential election, whether there will be a third World War this century, and how likely it is that a particular stranger currently has a live jellyfish in their backpack. Suppose that given my total evidence, my credence function is perfectly rational. Does it follow that, conditional on you having the same total evidence, you would be less than fully rational if your credences in the same propositions differed from mine? That depends on the status of:

> (UNIQUENESS) A single body of evidence always uniquely determines a fully rational credence function.[16]

[16] UNIQUENESS is formulated in a number of ways. For example White (2005, p.445) understands it as the claim that "[g]iven one's total evidence, there is a unique rational doxastic attitude that one can take to any proposition" whereas Feldman (2007, p.148) understands it as the claim that "… a body of evidence justifies at most one proposition out of a competing set of propositions… and that it justifies at most one attitude toward any particular proposition". One choice point is whether UNIQUENESS constrains outright beliefs or credences (or both). Another is whether it applies on the intrapersonal level or the interpersonal level. Yet another is whether it's synchronic or diachronic. My present concern is with credence versions of UNIQUENESS.

Permissivists reject UNIQUENESS. Permissivists maintain that, at least sometimes, evidential requirements are not stringent. At least sometimes, you and I can have the same total evidence, have different degrees of belief in the same proposition, and yet both be perfectly rational.

Impermissivists endorse UNIQUENESS. Impermissivists maintain that evidential requirements are always stringent. Whenever you and I have the same total evidence, a difference in degrees of belief in the same proposition entails that at least one of us is being less than fully rational.

Permissivists and impermissivists can agree that many, perhaps even a majority of cases are impermissive ones. Cases involving simple arithmetic, clear perception, and known objective chances are plausibly impermissive. The disagreement is about whether *all* cases are like this. The next two sections offer guides, one for the permissivist, and one for the impermissivist, for how to respond to the problem of multiple partitions. The permissivist's guide is modeled on how they can respond to the challenge of answering what, other than evidence, determines rational credences. The impermissivist's guide is modeled on how they can respond to the challenge of explaining why purported permissive cases are actually all impermissive.

5 The Permissivist's Guide to Indifference

It's intuitively plausible that evidence, especially when it is sparse or complex, fails to always determine a single fully rational credence function:

> It should be obvious that reasonable people can disagree, even when confronted with a single body of evidence… Paleontologists disagree about what killed the dinosaurs. And while it is possible that most of the parties to this dispute are irrational, this need not be the case. To the contrary, it would appear to be a fact of epistemic life that a careful review of the evidence does not guarantee consensus even among thoughtful and otherwise rational investigators. (Rosen 2001, p.71)

Suppose, granting that there are permissive cases, some particular body of evidence makes it compatible with perfect rationality to have credence *c* in p and also to have credence c' in p. The permissivist doesn't think that you should be in the incoherent doxastic state of simultaneously having credences c and c' in p. That rationality is permissive is no reason to think that proportioning your beliefs to your evidence can lead to inconsistency. Rather, the permissivist will insist that because in permissive cases the evidence doesn't determine a unique rational credence function, you can be in complete compliance with the requirements of evidence whether you are c or c' confident in p. But if the evidence doesn't always settle what you should believe, what other considerations are relevant?

The general strategy for permissivists is to argue that in addition to evidence, certain background information about epistemic standards contributes to determining rational credences. For example: It seems that there are various theoretical virtues that a hypothesis may enjoy, such as simplicity, predictive accuracy, beauty, and robustness. These virtues can often conflict with one another as an increase in a hypothesis' simplicity can come at the sacrifice of its predictive accuracy, or an increase in a hypothesis' beauty can come at the sacrifice of its robustness.[17] Arguably there isn't a single required weight to assign each of these competing theoretical virtues for it seems reasonable that you might be more impressed by considerations of simplicity while I might be more impressed by considerations of predictive accuracy. If there are various, equally reasonable, ways of balancing the different theoretical virtues, then at least sometimes, rationality is permissive, for even if you and I have the same total evidence, you will tend to be antecedently more confident in simpler hypotheses whereas I will tend to be antecedently more confident in predictive hypotheses.[18]

If the degree to which a body of evidence supports a proposition depends in part on a set of background epistemic standards, the permissivist

[17] See especially Kuhn (1977).

[18] A complementary suggestion along similar lines, especially as it concerns permissivism about outright belief, is motivated by the observation – due to James (1896) – that sometimes the cognitive goals of believing truths and avoiding falsehoods can come into conflict. As Kelly (2014) suggests, perhaps in addition to your evidence, your cognitive goals influence what it is rational for you to believe given your total evidence, insofar as these goals in part determine how much evidence is required for a given belief, or how you evaluate the expected accuracy of a given belief. To the extent that there is no uniquely required Jamesian aim, at least sometimes rationality is permissive.

should object to understanding evidential support as:

> (SUPPORT-RELATION) Evidential support is a relation between a body of evidence, a proposition, and a degree of support.

Rather, they should propose understanding evidential support as:

> (SUPPORT-RELATION*) Evidential support is a relation between a body of evidence, a proposition, a degree of support, and a set of background epistemic standards.[19]

Provided that evidential support is relativized to a set of epistemic standards, how can the permissivist respond to the problem of multiple partitions? My suggestion is this: Permissivists should maintain that evidential symmetry is relativized to partitions. The permissivist should therefore reject:

> (SYMMETRY-RELATION) Evidential symmetry is a relation between a body of evidence and a pair of propositions.

Instead, they should accept:

> (SYMMETRY-RELATION*) Evidential symmetry is a relation between a body of evidence, a pair of propositions, and a partition.

Supposing evidential symmetry is partition-relative, whether two propositions are evidentially symmetric will depend in part on the partition, just as the degree of support conferred on a proposition by a body of evidence will depend in part on the background epistemic standards.[20] For

[19]In the Bayesian framework, information about the background epistemic standards can be captured in the priors.

[20]While SUPPORT-RELATION* and SYMMETRY-RELATION* naturally fit well with one another, it is possible to accept one and reject the other. In light of the Borel-Kolmogorov paradox, some, including Kolmogorov (1933), Easwaran (2008), and Rescorla (2015), have suggested that conditional probabilities are always relativized to partitions, in which case the evidential support relation would presumably be partition-relative, from which it follows, given how evidential symmetry is defined, that the evidential symmetry relation is partition-relative.

permissivists, INDIFFERENCE should be understood as a constraint on rational credences which, similar to evidential constraints, does not always fully determine a unique credence function.[21]

But epistemic standards and partitions appear to be quite different: While it is fairly clear what it means for you and me to differ with respect to our epistemic standards, it seems somewhat obscure what it means for you and me to differ with respect to our partitions. How should partition-relativity be interpreted?[22] That depends on how the analogy between epistemic standards and partitions is understood.

One possibility is to interpret the analogy quite closely and to understand partition-relativity as a type of epistemic standard. A partition of a set of possibilities might be thought of as a particular way of representing those possibilities. According to this view, just as you can choose how to balance the various theoretical virtues, you can choose how to represent a set of possibilities. The choice of partitions is then fully assimilated to the choice of epistemic standards: You might prefer to represent the set of possibilities more fine-grainedly, and I might prefer to represent the set of possibilities more coarse-grainedly. In the mystery square example, for instance, even if the square is described as in LENGTH, you would be perfectly rational by representing the possibilities as $\{a_1, a_2, a_3, a_4\}$, and

[21]An immediate worry about partition-relativity, voiced by for example Boole (1854, p.370), Keynes (1921, pp.52-46), and North (2010, p.30), is that this would make INDIFFERENCE arbitrary, for your rational credence function would partially depend on the partition. Practical rationality is certainly compatible with a kind of arbitrariness. On most theories of practical rationality, such as expected utility maximization, or the satisficing theory given by Slote (1985), or the risk-weighted expected utility theory given by Buchak (2013), it's consistent with perfect practical rationality – perhaps even required, for relevant discussion see Icard (2021) – that you flip a coin to choose between two actions that have equal (maximal or sufficiently high) expectation. Why think that epistemic rationality is any different? I think that the permissivist should happily accept that some degree of arbitrariness is perfectly rational, to the extent that what it's rational for you to believe can depend on your epistemic standards, and epistemic standards are not always subject to further constraints of rationality. See especially Kelly (2014, p.302). See White (2014) for a response.

[22]Thanks to an anonymous referee for pressing this point. As the referee notes, there are certain interpretations of partition-relativity that aren't available here. For instance, Williamson (2018) suggests that you're required to satisfy INDIFFERENCE with respect to your language (but that no particular language is required). Since both the length and area partitions can presumably be formulated in your language, partition-relativity understood as dependent on your language won't work.

even if the square is described as in AREA, I would be perfectly rational by representing the possibilities as $\{l_1, l_2\}$; in a case in which you don't have a preference for one representation over another, choosing either one is permitted.[23] However, in the same way that not every set of epistemic standards is reasonable, not every partition of a set of possibilities is reasonable. Whatever makes it patently unreasonable to not give any weight to predictive accuracy because of a dogmatic commitment to simplicity similarly makes it patently unreasonable to partition the mystery square by $\{l_1, a_2, \neg(l_1 \vee a_2)\}$.[24] If partitions are subject to choice, like other epistemic standards, then the principle of indifference requires you to distribute your credences uniformly with respect to some reasonable partition determined by your choice.[25]

An alternative possibility is to interpret the analogy between epistemic standards and partitions as merely suggestive. This view eschews understanding partitions as a kind of epistemic standard and favors understand-

[23]Perhaps there's some inclination to want more guidance when you have no preference in such cases when you're deliberating about what to believe. I think the permissivist should resist this inclination. For instance, it doesn't seem problematic in examples like Buridan's Ass to maintain that the donkey should simply choose to eat one of the two bales of hay even if the donkey has no preference for one over the other. Similarly, if you can recognize that you're in a permissive case in which different epistemic standards yield different credence functions, it doesn't seem problematic for you to 'plump' for one set of standards even if you have no preference between the various equally reasonable ones.

[24]Importantly, which partitions are reasonable must not rely on which partitions respect evidential symmetry, for (on the permissivist's view advanced here) evidential symmetry is relativized to partitions. Compare: Which epistemic standards are reasonable must not rely on what the evidence supports, for (on the permissivist's view) evidential support is relativized to background epistemic standards. A tentative suggestion is that the reasonable partitions are the 'natural' ones. Admittedly appeals to naturalness may obscure the question of what makes certain partitions (un)reasonable, but this question is no more obscure than the question of what makes certain epistemic standards (un)reasonable.

[25]This is broadly inspired by Rescorla (2015), who argues that conditional probabilities are relativized in a way which depends on mental representations. As an anonymous referee points out, on this kind of view, mixtures of rational credences are not necessarily rational. I see no in principle reason for thinking that mixtures of rational credences must always be rational. For example, it seems possible to learn that one weighting of simplicity and predictive accuracy is reasonable, and a different weighting of simplicity and predictive accuracy is reasonable, but no mixture of these weights is reasonable. Insofar as this is possible, the permissivist should see this as an unproblematic consequence of their view.

ing it as a kind of parameter determined by context. Consequently, although there is no general single uniquely required partition of the space of possibilities, by fixing a context, a corresponding partition is fixed. For instance, in LENGTH, when the question is how confident you are that the length of the square is between 0 and 1 inch, the contextually salient partition is $\{l_1, l_2\}$, whereas in AREA, when the question is how confident you are that the area of the square is between 0 and 1 square inch, the contextually salient partition is $\{a_1, a_2, a_3, a_4\}$. If partition-relativity is understood in terms of a parameter fixed by context, then the principle of indifference requires you to distribute your credences uniformly with respect to the partition supplied by the context.[26]

However partition-relativity is understood, if evidential symmetry in part depends on a partition, the permissivist should reinterpret LENGTH-SYMMETRY and AREA-SYMMETRY as:

> (LENGTH-SYMMETRY*) Relative to the $\{l_1, l_2\}$ partition, l_1 and l_2 are evidentially symmetric for you given your evidence.
>
> (AREA-SYMMETRY*) Relative to the $\{a_1, a_2, a_3, a_4\}$ partition, a_1, a_2, a_3, and a_4 are evidentially symmetric for you given your evidence.

INDIFFERENCE is compatible with the conjunction of LENGTH-SYMMETRY* and AREA-SYMMETRY*. With respect to the length partition, you should be indifferent between l_1 and l_2, so you should be $\frac{1}{2}$ confident that the length of the square is between 0 and 1 inch. With respect to the area partition, you should be indifferent between a_1, a_2, a_3, and a_4, so you should be $\frac{1}{4}$ confident that the area of the square is between 0 and 1 square inch. Since l_1 is equivalent to a_1 and l_2 is equivalent to $a_2 \vee a_3 \vee a_4$, given the length partition, you should be $\frac{1}{2}$ confident in both a_1 and $a_2 \vee a_3 \vee a_4$, and given the area partition, you should be $\frac{1}{4}$ confident in l_1 and $\frac{3}{4}$ confident in l_2.[27] No *single* partition requires you to assign incompatible credences to equivalent propositions.

[26]Easwaran (2008) suggests that conditional probabilities are relativized to a partition determined by the context. The proposal here is independently motivated by the idea that questions partition the space of possibilities. See especially Yalcin (2018) and Hoek (2022).

[27]In presenting the conflict between SYMMETRY, TRANSITIVITY, EQUIVALENCE, and

Permissivists should embrace the problem of multiple partitions as an unsurprising consequence of the more general phenomenon that rationality is permissive. What is essential for the permissivist is that evidential symmetry is relativized to partitions, and, in instances in which there are multiple permitted partitions either because partitions are understood as your reasonable preference for how to represent the space of possibilities, or because the context determines the relevant partition, you're required to distribute your credences uniformly with respect that partition. The problem of multiple partitions, for the permissivist, is no more a genuine problem than the 'problem' of answering what, other than evidence, determines rational credences.

6 The Impermissivist's Guide to Indifference

UNIQUENESS enjoys a number of attractive features:

> … [UNIQUENESS] allows us to rule out skeptics, counterinductivists, and grue-projectors, and defend other substantive ratio-

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STRICT-WEAKENING (assuming LENGTH-PARTITION and AREA-PARTITION) I denoted evidential symmetry as $p \approx q$. But if evidential symmetry is partition-relative, properly understood it should be denoted as $p \approx_T q$ where T is the relevant partition. SYMMETRY and TRANSITIVITY should then be understood to be their partition-relative counterparts SYMMETRY* and TRANSITIVITY* (that is, if $p \approx_T q$ then $q \approx_T p$, and if $p \approx_T q$ and $q \approx_T r$ then $p \approx_T r$), whereas EQUIVALENCE and STRICT-WEAKENING should be understood as their partition-neutral counterparts EQUIVALENCE* and STRICT-WEAKENING* (that is, if p and q are logically equivalent, then $p \approx_T q$ for any T, and if p and q are both compatible with your evidence and are not logically equivalent then $p \vee q \not\approx_T p$ for any T). The permissivist should reinterpret of the argument with LENGTH-SYMMETRY* and AREA-SYMMETRY* as follows (where L is the length partition and A is the area partition):

1. $l_1 \approx_L l_2$ (LENGTH-SYMMETRY*)
2. $l_1 \approx_L a_1$ (EQUIVALENCE*)
3. $l_2 \approx_L a_1$ (1, 2, SYMMETRY*, TRANSITIVITY*)
4. $l_2 \approx_L a_2 \vee a_3 \vee a_4$ (EQUIVALENCE*)
5. $a_1 \approx_L a_2 \vee a_3 \vee a_4$ (3, 4 SYMMETRY*, TRANSITIVITY*)
6. $a_1 \approx_A a_2$ (AREA-SYMMETRY*)

Crucially the transitivity of evidential symmetry, when it is relativized to partitions, cannot be applied to (5) and (6) thus blocking the conclusion to $a_2 \approx a_2 \vee a_3 \vee a_4$.

nal requirements traditionally discussed by epistemologists. It is also broadly in line with how we often think about evidence: we talk about "what the evidence supports" as if there is only one evidential support relation, and we ask what a rational agent would believe under certain circumstances as if there is only one option for what that could be… (Horowitz 2014, p.46)

Provided that all cases are impermissive, given a body of evidence there's always a single unique credence function you should have. The impermissivist, however, is not committed to the claim that you are always in a position to determine what that uniquely rational credence function is. What the impermissivist is committed to is the claim that there's exactly one rationally permissible set of epistemic standards, even if there appear to be multiple reasonable ones.[28] What considerations support this?[29]

One strategy for explaining the appearance of multiple reasonable epistemic standards is to appeal to *indeterminacy*. Consider a classic example of vagueness that generates the Sorites paradox:

(P_1) 1 grain of sand is not a heap.

(P_2) If i grains of sand is not heap, then $i+1$ grains of sand is not heap.

[28]Impermissivists accept SUPPORT-RELATION and reject SUPPORT-RELATION*. A common response by impermissivists is that the background epistemic standards should simply be considered as part of your total evidence.

[29]I'll be discussing two possible strategies below, but I'll be following Kelly (2014) in setting aside the the impermissivist view that appeals to 'imprecise' probabilities. According to such a view, perhaps in a case like the mystery square, you should have a *set* of probability functions, one of which that assigns $\frac{1}{2}$ and another that assigns $\frac{1}{4}$ to l_1 (or equivalently, a_1), or perhaps you should be maximally imprecise and your credences in these propositions should be the *interval* $[0,1]$. One reason I won't be discussing this strategy is that I'm tempted to agree with Elga (2010) that credences should not be imprecise. Another reason is that I'm tempted to agree with Carr (2019) that higher-order uncertainty is a better representation to model the kind of cases that motivate imprecise probabilities. A third reason is that I'm tempted to agree with Rinard (2014) – although see Weatherson (2007) and Joyce (2010) for relevant discussion – that a principle of indifference, generalized to imprecise probabilities is unsustainable (at least if its precise probability counterpart is unsustainable). As I see it, insofar as the principle of indifference can be defended for sharp or precise credences, that is a strike against one of the motivations for imprecise credences. That said, I hope it will be clear how to generalize my arguments below to imprecise probabilities.

(C) 1,000,000 grains of sand is not a heap.

P_1 is clearly true and C is clearly false. So despite its initial plausibility, P_2 must be false.[30]

According to supervaluationism, vagueness is fundamentally a linguistic phenomenon which results from, for example, semantic deficiency or indecision. Natural languages admit of various precisifications on which every statement of the precisified language is either true or false. The valuation of a statement in a (unprecisified) language can be made to depend on the admissible precisifications of it. Standard supervaluationists equate the truth of a statement with its being *super-true* and the falsity of a statement with its being *super-false*, where a statement is super-true just in case it's true on all admissible precisifications and super-false just in case it's false on all admissible precisifications; a statement which is neither super-true nor super-false is indeterminate (neither true nor false).[31]

The statement '1 grain of sand is not a heap' is true on any admissible precisification and so super-true (and therefore true), and the statement '1,000,000 grains of sand is not a heap' is false on any admissible precisification and so super-false (and therefore false). The supervaluationist can vindicate the intuitive judgments about P_1 and C while denying P_2: The statement 'if i grains of sand is not a heap, then $i+1$ grains of sand is not a heap' is true on some admissible precisifications and false on others for some fixed i, and so is indeterminate (since it is neither super-true nor super-false) for those values of i. Indeterminacy requires the supervaluationist to reject bivalence. However, the supervaluationist can retain the law of excluded middle because on any precisification, 'either i grains of sand is a heap or i grains of sand is not a heap' is true.

The method of supervaluations has found applications for issues ranging from empty singular terms to the liar paradox to conditional excluded middle.[32] Impermissivists who think that what appears to be multiple reasonable epistemic standards is in fact indeterminacy about the uniquely required one can similarly appeal to supervaluation: It's determinate that

[30]Some disagree. See for instance Unger (1979).

[31]For discussion see especially Fine (1975), Williamson (1994), and Keefe (2000).

[32]Van Fraassen (1966), who develops the supervaluationist ideas, applies it to address empty singular terms and the liar paradox. Stalnaker (1980) appeals to the method of supervaluations in defending conditional excluded middle.

there's a uniquely required set of epistemic standards, though it's indeterminate which one it is.[33] If it's indeterminate which set of epistemic standards is the required one, then it can be indeterminate which particular credence function is the uniquely rational one.[34] But the claim that it's indeterminate whether some particular credence function is the uniquely rational one differs importantly from the claim that there are a range of permitted credence functions each of which is maximally rational. Permissivism does not follow from indeterminacy. My suggestion to the impermissivist who accepts indeterminacy about the rationally required set of epistemic standards is to extend this to the problem of multiple partitions. On the resulting picture, although there sometimes appear to be several equally natural partitions of a given set of possibilities, in every case there is a unique partition to which the principle of indifference should be applied, but it can be indeterminate which one it is. In the mystery square example, it may be indeterminate whether you should partition the possibilities by length and indeterminate whether you should partition the possibilities by area, though it is determinate that you should either partition the possibilities by length or by area.

A competing strategy for explaining the appearance of multiple reasonable epistemic standards is to appeal to *higher-order uncertainty*. Often, although I'm uncertain about some proposition, I'm certain that my level of uncertainty is rational. I'm $\frac{1}{2}$ confident that a fair coin will land heads when it's flipped, and moreover, I'm certain that I should be $\frac{1}{2}$ confident. But sometimes, in addition to being uncertain about some proposition, I'm also uncertain how uncertain I should be. In such instances, I'm higher-order uncertain. Can it be rational to be higher-order uncertain?

Cases in which you're either uncertain what your evidence supports or what your evidence is are purported ones in which you should be higher-order uncertain. For example: Suppose that you're a doctor who has diagnosed a patient with some particular condition. You've carefully assessed all of the relevant evidence available to you including the patient's symp-

[33]What is giving rise to indeterminacy? The natural suggestion is that there are different ways of precisifying 'rational', so on one precisification, one set of epistemic standards is the uniquely required one, and on another precisification, a different set of epistemic standards is the uniquely required one.

[34]See especially Greco and Hedden (2016, p.367) and Christensen (2007, footnote 8).

toms, medical scans, and background history, and on the basis of this information you are highly confident that the patient has the condition you've identified. But then you learn that because you've been awake for over 24 hours, you're likely suffering from sleep deprivation. If you're suffering from sleep deprivation, your ability to assess your evidence would be severely impaired. It seems that given credible reason to believe that you're sleep deprived, you should be uncertain whether you've properly evaluated your evidence. And because you should be uncertain whether you've properly evaluated your evidence, you should be higher-order uncertain about your diagnosis.[35]

Uncertainty about what the evidence supports or what the evidence is, which generates higher-order uncertainty, arises naturally in a variety of situations from peer-disagreement and positive self-illusion to skeptical scenarios and inexact knowledge. Impermissivists might suggest that what appears to be a range of reasonable epistemic standards is in fact rational uncertainty about the single required set of epistemic standards. If you should be uncertain about what the uniquely required set of epistemic standards is, you should be uncertain what the uniquely required credence function is and therefore sometimes higher-order uncertain about what to believe. My suggestion to the impermissivist who is comfortable with higher-order uncertainty is to maintain that there's always a single privileged partition with respect to which you should apply the principle of indifference, but just like the uniquely required set of epistemic standards, you should (at least sometimes) be uncertain which one it is.[36] In

[35]This example is one in which you're uncertain about what your evidence supports. For discussion, see for instance Elga (2005), Christensen (2010a), Schechter (2013), Horowitz (2014), Lasonen-Aarnio (2014), Schoenfield (2015), and Neta (2019). There are also cases of uncertainty about evidence. If there are instances in which either p isn't part of your evidence but your evidence supports that p is part of your evidence, or p is part of your evidence, but your evidence supports that p isn't part of your evidence, then it will also be rational for you to be higher-order uncertain. See especially Christensen (2010b), Elga (2013), Williamson (2014), Salow (2018), Dorst (2019), and Greco (2019).

[36]What is giving rise to higher-order uncertainty here? One idea that the privileged partition is the most 'natural' one and that you should be uncertain whether your evidence supports thinking that length is more natural than area, or area is more natural than length. Another is that one of length or area is more 'explanatorily basic' than the other, and the privileged partition is determined by the more explanatorily basic one, but you should be uncertain whether your evidence supports thinking that length or area is

the mystery square example, you should be uncertain between LENGTH-SYMMETRY and AREA-SYMMETRY. If in fact the area-partition is the privileged partition, you should be $\frac{1}{4}$ confident that the area of the square is between 0 and 1 square inch and, equivalently, that its length is between 0 and 1 inch. However, supposing that your evidence equally supports thinking that the privileged partition is the length-partition, you should only be $\frac{1}{2}$ confident that it's rational to be $\frac{1}{4}$ confident.

Impermissivists should understand the problem of multiple partitions as a similar kind of 'problem' to the challenge of explaining why, despite appearances, there's a single rationally required set of epistemic standards. What is essential for the impermissivist is that evidential symmetry is partition independent, whether that is explained by indeterminacy or higher-order uncertainty, and you're required to distribute your credences uniformly with respect to the privileged partition. Difficulties of answering the question of what the single uniquely privileged partition is, for the impermissivist, no more of a challenge than answering the question of why, despite appearances, there's one rational credence function given any body of evidence.

7 No Indifference to Indifference

Rational credences are subject to various constraints. Examples of these constraints – all of which are, to varying degrees, contested – include that rational credences form a probability function, update by conditionalization, obey certain reflection principles, and are countably additive. This paper defends that they should respect evidential symmetry. The principle of indifference is a requirement of rationality.

The principle of indifference has a long and rich history, though it is now thought to be deeply problematic. The central objection to INDIFFERENCE is the problem of multiple partitions: Depending on how a set of possibilities is divided, it seems that applying indifference reasoning sometimes requires you to have incompatible credences in equivalent propositions. But the proper response to the problem of multiple parti-

more explanatorily basic. See especially Huemer (2009).

tions is not to reject INDIFFERENCE. The alleged problem is not specific to the principle of indifference, as analogous problems, familiar to both permissivists and impermissivists, arise in concerning UNIQUENESS. Since both permissivists and impermissivists can adequately answer the problem of multiple partitions by modeling responses based on their respective reasons for accepting or rejecting UNIQUENESS, the problem of multiple partitions is not a problem for either and therefore is not a decisive objection to INDIFFERENCE.

There may be a lingering sense of dissatisfaction: For even if you're required to be indifferent between evidentially symmetric propositions, it's unclear how you should act on your credences without knowing how to determine whether your partition is reasonable or is the one supplied by the relevant context (in the permissivism case) or knowing how to accommodate indeterminacy or higher-order uncertainty (in the impermissivism case). But while these are pressing difficulties, they concern what the proper decision theory is for permissivists and impermissivists, not whether the principle of indifference is a requirement of rationality. Rationality requires you to distribute your credences uniformly among evidentially symmetric propositions.

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