Why Be Rational?

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What is it to be in a rational doxastic state? According to probabilism, it is for one's credence function to be a probability function.

A probability function, on one standard way of spelling out the details,[1] is a function q from sentences to real numbers, subject to certain "coherence conditions". Here is one of several equivalent formulations of those conditions:

C1: $q(A) = 1$ if $\models A$,

$q(A) = 0$ if $A \models \bot$;

C2: $q(A) \leq q(B)$ if $A \models B$;

C3: $q(A) + q(B) = q(\ulcorner A \vee B \urcorner) + q(\ulcorner A \wedge B \urcorner)$.

One might think of C1 and C2 as capturing the view that one can only be in a rational doxastic state if one's credence function "respects" logical consequence. And one can think of C3 as constraining the behavior of certain logical symbols: "$\wedge$" and "$\vee$".

In stating the coherence conditions, it is standard to interpret "$\models$" as the *classical* consequence relation. But why should rationality be tied to classical logic? Consider, for example, the point of view of an intuitionist who is happy to endorse C1–C3 but would wish insist that "$\models$" be interpreted as *intuitionistic* consequence. Is there anything a classicist could do to persuade her otherwise?

[1]See, for instance, Earman 1992

1 Dutch Books and Accuracy Dominance

If a probabilist wants to argue that rationality ought to be tied to classical logic, there are two standard strategies she might be tempted to employ. The first is to argue that unless the subject's credence function satisfies C1–C3, classically interpreted, it is *vulnerable to a Dutch Book*: there will be a series of bets such that (i) each bet is favorable by the lights of the subject's credence function,[2] but (ii) the bets together guarantee a loss. The second strategy is to argue that unless the subject's credence function satisfies C1–C3, classically interpreted, it will be *accuracy dominated*: there will be a rival credence function that is guaranteed to be closer to the truth by the subject's own lights.[3]

Unfortunately, neither of these strategies is likely to be helpful when it comes to the project of persuading a non-classical logician to endorse a classical interpretation of the coherence axioms. For both strategies rely on the idea that a subject who violates C1–C3, classically interpreted, is *guaranteed* a bad outcome, and it is not clear that proponents of a non-classical logic would be happy with the classicist's conception of a guarantee.

The best way to see the point is to look more closely at the classicist's arguments for Dutch Book vulnerability and accuracy dominance.[4] One starts by letting a "world" be a function that assigns a truth-value to each sentence in the domain of the subject's credence function. Next, one introduces a couple of definitions, for X a set of worlds:

- A credence function c is Dutch-Bookable *with respect to* X if there is a series of bets such that: (i) each bet is favorable by the lights of c, but (ii) the bets together yield at net loss at each world in X.

[2]Here's what it means for a bet to be favorable by the lights of a credence function. Say that a *ticket* on sentence A has a value of 1 if A is true and 0 otherwise. Say that a *bet* on A costing x is a ticket on A which could be held by the subject in exchange for a good of value x. For a bet on a A costing x to be favorable by the lights credence function c is for it to be the case $c(A) > x$.

[3]Credence function d is *closer to the truth* than credence function c at world w if $\sum_{A \in L} (S(d(A), |A|_w)) < \sum_{A \in L} (S(c(A), |A|_w))$, where L is the language on which c and d are defined, $|A|_w$ is A's truth value at w, and S is, e.g. the Brier scoring function.

[4]My discussion follows Pettigrew's (forthcoming).

- A credence function c is accuracy dominated *with respect to* X if there is a credence function d such that d is closer to the truth than c at every world in X.

Finally, one proves the following two results,[5] where $\mathcal{C}$ is the set of worlds with classically consistent assignments of truth value:[6]

Classical Coherence 1: A credence function is Dutch-Bookable with respect to $\mathcal{C}$ if and only if it fails to satisfy C1–C3 when "$\models$" is interpreted classically.

Classical Coherence 2: A credence function is accuracy dominated with respect to $\mathcal{C}$ if and only if it fails to satisfy C1–C3 when "$\models$" is interpreted classically.

Notice, however, that the intuitionist would complain that Dutch-Bookability with respect to *classically* consistent worlds, and accuracy dominance with respect to *classically* consistent worlds, is no guarantee of Dutch-Bookability *simpliciter*, or accuracy dominance *simpliciter*. More carefully: the intuitionist would note that the classicist is ignoring worlds that are intuitionistically but not classically consistent, and she would insist we won't have shown that a subject is *guaranteed* a bad outcome until we've shown that there is a bad outcome at every intuitionistically consistent world.

[5]These two results, along with Intuitionistic Coherence 1 and 2, are immediate consequences of three general theorems. The first is (Paris 2001, Theorem 5), which builds on (Choquet 1953) and is helpfully described in (Williams 2016). It entails that whenever "$\models$" is interpreted as $\models_{\mathcal{S}}$ (where $\mathcal{S}$ is a set of worlds and $A \models_{\mathcal{S}} B$ iff no world in $\mathcal{S}$ assigns a designated value to A but not B), C1–C3 constitute a sound and complete axiomatization of the set of assignments in the convex hull of $\mathcal{S}$, provided only that the following two conditions obtain for each $w \in \mathcal{S}$: (i) $(|A|_w = 1 \wedge |B|_w = 1) \leftrightarrow |A \wedge B|_w = 1$, and (ii) $(|A|_w = 1 \vee |B|_w = 1) \leftrightarrow |A \vee B|_w = 1$,where $\ulcorner |\phi|_w \urcorner$ is short for $\ulcorner w(\phi) \urcorner$ and 1 is the designated truth-value. (Note that the sets $\mathcal{C}$ and $\mathcal{I}$ from the main text both satisfy these conditions.)

The second theorem is due to de Finetti (1970) and helpfully described in (Pettigrew forthcoming). It entails that a credence function is Dutch-Bookable with respect to $\mathcal{S}$ iff it is not in the convex hull of $\mathcal{S}$. The third theorem is proved in general form in (Predd et al. 2009), building on de Finetti's insights, and helpfully described in (Pettigrew forthcoming). It entails that a credence function is accuracy dominated with respect to $\mathcal{S}$ iff it is not in the convex hull of $\mathcal{S}$. (For illuminating discussion of the intimate relationship between the second and third results, see Williams (2012).)

[6]An assignment is classically consistent if it corresponds to the assignments of truth-value of a (Tarskian) model. Accordingly, in the special case of a propositional language, an assignment is consistent iff it respects the standard truth tables.

Accordingly, the intuitionisit thinks the subject won't count as Dutch-Bookable *simpliciter*, or accuracy dominated *simpliciter*, unless she is Dutch-Bookable, or accuracy dominated, *with respect to the set $\mathcal{I}$ of intuitionistically consistent worlds*.[7] And, as it turns out, one can prove the intuitionistic analogues of Classical Coherence 1 and 2:

Intuitionistic Coherence 1: A credence function is Dutch-Bookable with respect to $\mathcal{I}$ if and only if it fails to satisfy C1–C3 when "$\models$" is interpreted intuitionistically.

Intuitionistic Coherence 2: A credence function is accuracy dominated with respect to $\mathcal{I}$ if and only if it fails to satisfy C1–C3 when "$\models$" is interpreted intuitionistically.

It is worth emphasizing, moreover, that intuitionism is not an isolated special case. Analogous results hold for a broad range of logics. (See footnote 5 for details.)

We have been considering a classicist who hopes to convince an intuitionist to endorse classical constraints on doxastic rationality. The classicist's argument is based on the idea that someone who fails to endorse C1–C3, classically interpreted, is *guaranteed* a bad outcome. But we have seen that the classicist lacks an understanding of "guaranteed" that is both *neutral* and *substantive* with respect to the present context. More specifically, the classicist's argument relies on the assumption that an outcome counts as "guaranteed" just in case it obtains at every classically consistent world. Such an understanding of "guaranteed" is substantive in that it allows the classicist to show that non-classical credence functions "guarantee" a bad outcome, but it fails to be neutral in that it would be rejected as question-begging by the intuitionist (and by proponents of other non-classical logics).

2 Logical Consequence

Does the classicist have a way forward? Can she give an argument for classicist constraints on rationality that is both neutral and substantive?

[7] For present purposes, we think of the truth values as "designated" and "undesignated", rather than "true" and "false". An assignment is then said to be intuitionistically consistent if the sentences that receive "designated" as their truth-value are precisely those that are "forced" at some node of some Kripke tree.

Here is a different strategy the classicist might follow. She might start by remaining neutral on the question of whether "$\models$", as it occurs in C1–C3, expresses classical or intuitionistic consequence. She might then offer an independent argument for the view that logical consequence is, in fact, classical consequence.

What might such an argument might look like? Following Tarski (1936), much contemporary discussion of logical consequence is centered around the idea that the validity of a logical entailment is guaranteed by the "logical form" of the relevant sentences. In the special case of logical truth—i.e. logical consequence of the empty set of premises—the idea might be made spelled out as follows:[8]

> TARSKI'S CONSTRAINT
>
> A sentence is logically true just in case its truth is guaranteed by its compositional structure together with the meaning of its logical vocabulary.

Let us assume that TARSKI'S CONSTRAINT is a neutral characterization of logical truth—something that both the classicist and the intuitionist could agree to. Is TARSKI'S CONSTRAINT also substantive? For example, could it be used to settle the question whether $\ulcorner\phi \vee \neg\phi\urcorner$ is a logical truth, for arbitrary ϕ?

As in the previous section, the crux of the matter is whether the classicist has a way of cashing out "guaranteed" that is neutral enough not to beg the question against the intuitionist while being substantive enough to make progress in her debate with the intuitionist. The standard approach would be to follow Tarski in formalizing "S's truth is guaranteed by compositional structure and logical meanings" as "S is true at every model", with different Tarskian models representing different way in which a sentence might be made true while keeping its compositional structure and logical meanings fixed (Etchemendy 1990).

[8]More generally, one might suggest that A is a logical consequence of the sentences in Γ just in case the meaning of the logical vocabulary together with the compositional structure of sentences in $\{A\} \cup \Gamma$ is enough to guaranteed that if every sentence in Γ is true then so is A. Here I will restrict my attention to logical truth in an effort to ease the exposition.

On this approach, classical logic is fully vindicated. Consider the case of $\ulcorner\phi \vee \neg\phi\urcorner$. The standard semantic clauses for $\vee$ and $\neg$ entail:[9]

($\star$) $\ulcorner\phi \vee \neg\phi\urcorner$ is true at model m iff: either ϕ is true at m or it is not the case that ψ is true at m.

This gives the classicist an easy argument for the conclusion that $\ulcorner\phi \vee \neg\phi\urcorner$ is a logical truth. She can simply point out that the right-hand-side of ($\star$) is a (classical) tautology, and use classical logic prove from ($\star$) that $\ulcorner\phi \vee \neg\phi\urcorner$ is true at model m for arbitrary m.

Needless to say, an intuitionist would not be impressed by the easy argument. She would insist that the classicist has begged the question by assuming classical logic in the metatheory, since excluded middle is not intuitionistically valid. Fortunately, the classicist can do better. She can give an *intuitionistic* proof of the right-hand-side of ($\star$). In fact, she can give an intuitionistic proof that an arbitrary first-order formula is true at every Tarskian model just in case it is derivable in classical logic (Krivine 1996).[10]

It is not clear, however, that this result constitutes a neutral vindication of classical logic. For the intuitionist might complain that the use of Tarskian models begs the question, by building in classical assumptions from the start. She might then suggest replacing models by *Kripke Trees* and go on to observe that one can prove—both classically and intuitionistically—that an arbitrary first-order formula is true ("forced") at every node of every Kripke tree just in case it is derivable in intuitionistic logic.[11]

No progress has been made. We have considered a classicist who hopes to use TARSKI'S

[9]These are the clauses:

- $\ulcorner\psi \vee \theta\urcorner$ is true at model m iff: either ψ is true at m or θ is true at m;
- $\ulcorner\neg\psi\urcorner$ is true at model m iff: it is not the case that ψ is true at m.

[10]Krivine's result relies on a slight modification of Tarski's framework: one must add a model on which every sentence is true. But, of course, this is a modification that the classicist would find unobjectionable, since she thinks that a sentence is be true in every standard model just in case it is true in every standard model and the new one. For useful discussion, see Berardi & Valentini 2004.

[11]The observation that Kripke's (1965) classical completeness proof can be reproduced in an intuitionistic metatheory is due to Veldman 1976 and relies on a slight modification of Kripke's original construction. For illuminating discussion of formal and philosophical aspects of intuitionistic semantics, see Fine 2014.

CONSTRAINT to convince the intuitionist to adopt classical logic. Her argument is based on Tarski's idea that "S's truth is guaranteed by compositional structure and logical meanings" might be formalized as "S is true at every model". Such a proposal is substantive in that it settles the debate in favor of the classicist, but it fails to be neutral in that it would be rejected by the intuitionist as question-begging. And the intuitionist's alternative proposal—which substitutes Kripke trees for models—fares no better: it settles the debate in favor of the intuitionist but would be rejected by the classicist as question-begging.

3 Primitivism

My main objective in this paper is to discuss I a view I shall refer to as *Epistemic Primitivism*—roughly speaking, the view that we lack an understanding of doxastic rationality that is neutral enough not to beg the question against sensible interlocutors but also substantive enough to advance the project of identifying meaningful constraints on doxastic rationality.

I hope that our two case studies—the failed effort to defend classical constraints on rationality by appeal to Dutch-bookability and accuracy dominance, and the failed effort to defend classical logic by appeal to TARSKI'S CONSTRAINT—might give you a sense of the sorts of ways in which a conception of rationality might succeed in being suitably substantive only by failing to be sufficiently neutral. (It goes without saying that our case studies fall short of establishing primitivism. I don't have a conclusive argument for primitivism and won't attempt to give one here. Instead, my focus will be on clarifying the view and drawing out some of its consequences.)

The best way of getting clear on what primitivism amounts to is to start with an analogy. While playing chess, your opponent asks "Why do bishops move diagonally?". Without additional context, it's hard to know what to make of such a question. Perhaps your opponent is wondering about the history of chess—she'd like to know how it came about that early chess players came to associate certain pieces with diagonal movements. Or perhaps she's wondering whether one could improve chess by changing the ways in which bishops are allowed to move. Or maybe she takes herself to be playing a different game with pieces called "bishops" and is surprised that you're insisting on the rules of chess. Let us suppose, however, that your opponent explicitly rejects such interpretations, rephrasing her question as follows: what is it about chess that makes it the case that "bishops move diagonally" counts as a rule?

It's not clear how one could give a useful answer to that question. Perhaps the best one can do is say something like: "That bishops move diagonally is *constitutive* of chess: part of *what it is* for a game to count as a game of chess is for it to involve pieces that are only allowed to move diagonally; those are the pieces we call 'bishops' when playing chess."

Now contrast this case with a different one. Your interlocutor asks: "What is it about being a black hole that makes it the case that Sagittarius A* is a black hole?". Now it easy to come up with a useful answer: "to be a black hole is to be a region of spacetime where gravity is too strong for electromagnetic radiation to escape, and Sagittarius A* happens to be such a region." The key difference is that in the black hole example we have an understanding of what it is to count as a black hole that is *independent* of whether Sagittarius A* counts as a black hole, and we can rely on that understanding to give an informative answer to our interlocutor's question. In the chess example, on the other hand, we lack an understanding of what it is to count as a game of chess that is independent of whether "bishops move diagonally" counts as a rule of chess. So it's hard to give our interlocutor a useful answer.

The primitivist thinks that asking "Why are there classical constraints on rationality?" is more like asking "Why do bishops move diagonally?" than asking "Why is Sagittarius A* a black hole?". Consider, for example, a primitivist who is also a probabilist and a classicist. She will think that part of *what it is* for a doxastic state to count as rational is for it to satisfy a classical interpretation of C1–C3 and therefore think that it's hard to give an informative answer to "Why are there classical constraints on rationality?".

Why couldn't she give an answer along the following lines: "To be doxastically rational is to make the best use one's evidence, and the best use of one's evidence turns out to be constrained by C1–C3, classically interpreted." She could, but she would insist that such an answer is not as informative as it seems, on the grounds that she lacks an understanding of "best use of one's evidence" that is independent of classical probabilism.

How about the following answer instead: "To be rational is, in part, to be immune from Dutch books, and C1–C3, classically interpreted, turn out to be just the constraints we need to guarantee immunity from Dutch books." Again, our primitivist would take such an answer to be less informative than it seems. For—unlike an astronomer who takes herself to have an understanding of what it is to count as a black hole that is independent of the question whether Sagittarius A* is a black hole—our primitivist does not take herself to have an understanding of what it is to count as doxastically rational that is independent of her views on whether guaranteed immunity from Dutch books is best captured by a classical interpretation of C1–C3.

More specifically, our primitivist thinks that the following three claims are roughly equivalent to one another, and that none of them couldn't be justified on the basis of the others without circularity:

- One's credence function guarantees immunity from Dutch-books if and only if it satisfies C1–C3, classically interpreted.
- The notion of a guarantee, as it appears above, should be spelled out classically.
- Rationality is subject to classical constraints.

So, although she thinks that there is an important link between rationality, guaranteed immunity from Dutch books, and classical logic, she doesn't think that Dutch books can be used to *justify* the view that doxastic rationality is subject to classical constraints. Instead, she thinks that the satisfaction of classical constraints is *constitutive* of rationality, in much the way that satisfying the rule that rooks don't move diagonally is constitutive of chess.

4 Primitivism and the endorsement of epistemic norms

We have been considering the point of view of a primitivist who is also a probabilist and a classicist. But there might be other kinds of primitivists. For example, one might articulate a view like the one we have just considered except that intuitionistic logic replaces classical logic throughout. What should a primitivist make of the debate between different forms of primitivism?

The primitivist would deny that different forms of primitivism are rival articulations of an independently given conception of rationality, since she thinks that no interesting notion of doxastic rationality can be suitably independent of each rival. She would claim instead that what marks a set of doxastic principles as an account of rationality is that they are *endorsed* as epistemic norms: as constraints on the doxastic state of arbitrary subjects in arbitrary contexts.[12]

An immediate consequence of this view is that there are no limits to how bizarre a family of doxastic principles can be without thereby failing to count as an account of rationality, by the lights of a theorist who endorses those principles as epistemic norms. Consider, for example, a theorist who endorses the following as an epistemic norm:

Happiness Constraint Believe whatever would make you happy.

A sensible primitivist—by which I mean: "a primitivist whose account of rationality bears a family resemblance to those of people I regard as peers"—would immediately reject the Happiness Constraint as an epistemic norm. But she would also insist that there are no neutral grounds for arguing against it.

Couldn't one argue against the Happiness Constraint by insisting that our doxastic state is only rational if it aims for the truth? Not necessarily. For a proponent of the happiness

[12]It is worth keeping in mind that a doxastic principle might be a conditional; for instance "if you are logically omniscient, your credence function satisfies C1–C3, classically interpreted". If a theorist were to set forth such a principle is set forth as a principle of rationality, by recommending it as a constraint on the doxastic state of arbitrary subjects in arbitrary contexts, it would only impose non-trivial constraints on the doxastic states of subjects who are logically omniscient.

constraint could well insist that believing whatever would make you happiest *is* a guide to the truth. I once met such a person. When I complained that making one happy was no guide to the truth, she replied "Wouldn't it make you happy if it was?"

5 Deciding which norms to accept

Primitivism doesn't take a stand on the question of whether there is an objective fact of the matter about the requirements of doxastic rationality. For although primitivists think that to accept an account of rationality is to endorse the relevant doxastic principles as epistemic norms, there is nothing about the view that settles the question of whether some doxastic principles are objectively worthy of endorsement.[13]

Regardless of where a primitivist stands on the question of objectivity, she must somehow come to a decision about which doxastic principles to endorse as epistemic norms. How might she go about making that decision?

To simplify the discussion, I will focus on a familiar case: a primitivist who is is committed to C1–C3, but is unsure whether to interpret the axioms classically or intuitionistically.

The classical interpretation of C1–C3 restricts the subject's credence function to a greater degree than its intuitionistic counterpart. For instance, C1, classically interpreted, fixes the credence of $\ulcorner \phi \vee \neg\phi \urcorner$ at 1, but C1, intuitionistically interpreted, allows it to take any value. And C2, classically interpreted, imposes the constraint that the credences of ϕ and $\ulcorner \neg\neg\phi \urcorner$ be equal, but C2, intuitionistically interpreted, imposes only the weaker constraint that $\ulcorner \neg\neg\phi \urcorner$ not be assigned a smaller credence than ϕ.

Each interpretation of C1–C3 comes with advantages and disadvantages. The classical

[13] A primitivist who thinks there is no objective fact of the matter about which doxastic principles are objectively worthy of endorsement might wish to endorse a form of epistemic expressivism of the sort defended in Field 2009. This can be done by accepting a few additional assumptions: (i) claims concerning the requirements of doxastic rationality can nonetheless be assessed to be true or false from the perspective of a system of epistemic norms, (ii) a subject will normally assess rationality claims from the perspective the system of epistemic norms she herself adopts, and (iii) a subject recommends epistemic norms to others by asserting rationality claims that are true with respect to those norms.

interpretation delivers the advantage of a powerful deductive system, which is well-suited to much of contemporary mathematics. The intuitionistic interpretation, in contrast, demands that proofs be constructive, which turns out to be a significant limitation, since constructive proofs are not always available and when they are available they can be much lengthier than their non-constructive counterparts. On the other hand, the classical interpretation of C1–C3 limits one's explanatory resources in a way that the intuitionistic interpretation does not. Suppose, for example, that one wishes to defuse a paradox, in which seemingly plausible premises lead to a seemingly absurd conclusion via a seemingly compelling chain of reasoning. Because the intuitionistic intepretation of C1–C3 imposes weaker constraints one one's credence, it deivers a wider range of options for assigning credences to the sentences involved in the paradox, and therefore with a wider range of options for explaining the phenomenon responsible for the paradox. By moving to a classical interpretation of C1–C3, one reduces one's range of admissible credal distributions, and therefore one's explanatory possibilities.

Suppose one values truth and the absence of falsehood, and nothing else. How might one adjudicate between these complementary pairs of advantages and disadvantages?

If you ask a classical logician, she will say that the decision is clear: one should favor the classical interpretation of C1–C3. For the classicist thinks that—as long as one starts from true premises—the extra deductive power of classical logic will lead to an increase in the truths one is able to prove with no risk of falsehood. And she thinks that the supposed increase in explanatory power of the intuitionistic approach is illusory. For she thinks that the intuitionist's additional credence distributions are all absurd, and therefore that using them in explanations guarantees that one will be landed in falsehood.

Of course, an intuitionistic logician would argue just as vehemently that the subject should favor of the intuitionistic interpretation of C1–C3. She would insist that the classicist's increase in deductive power comes with corresponding risk of falsehood, since she takes non-constructive proofs to be fallacious. And she would insist that classical restrictions on one's credence function rule out genuine explanatory possibilities and therefore limit our ability to get to the truth.

Is there not a *neutral* perspective from which the problem could be adjudicated? One might hold out hope for such a perspective if one thinks that we have a conception of rationality that is neutral enough to be acceptable to both classicists and intuitionists while being substantive enough to allow one to make progress on the question of whether to interpret C1–C3 classically or intuitionistically. But that is precisely what the primitivist denies.

As a result, the primitivist is forced to assess the issue by relying on considerations that she takes to be non-neutral. One option is for her to start out by assuming classicism, or by assuming intuitionism, and then use that assumption to get the corresponding result about how to interpret C1–C3. But she is then left with the question of how to choose her initial assumption.

A better methodology, it seems to me, is to see one's choice of a conception of rationality as continuous with the practical project of finding effective ways of navigating the world in pursuit of one's goals. On this approach, one chooses between the classical and intuitionistic interpretation of C1–C3 on the basis of *theoretical fruitfulness*. More specifically, one proceeds by giving various systems a try and getting a feel for whether they deliver an understanding of the world that is satisfying by one's own lights: an understanding that allows one to make enough progress on theoretical questions one takes to be important without getting too bogged down with questions one takes to be pointless.

It goes without saying that what a subject counts as "enough progress", "important questions", "too bogged down", and "pointless" will depend heavily on her practical goals. But this doesn't mean that our primitivist must neglect her pursuit of truth and the absence of falsehood. For the theories a subject counts as true will usually wax and wane with the theories she takes to deliver a satisfying understanding of the world. Suppose, for example, that our primitivist is studying a particular paradox. She starts out as a classicist, convinced that any treatment of the paradox that relies on a non-classical assignment of credences will thereby be false. But after giving various non-classical frameworks a try, she finds herself unexpectedly satisfied by an intuitionistic treatment of the paradox. This leads her to revise her conception of rationality by replacing her classical epistimic norms with intuitionistic analogues, and it leads her to revise her initial view that non-classical treatments of the paradox must be false. As a result, an outcome that depends on on the subject's practical goals—her coming to believe that intuitionism leads to fruitful theorizing—gives rise to a change in her views about which theories enjoy the properties she values independently of her practical goals: truth and the absence of falsehood.

6 Why be rational?

In the preceding section I argued that for a primitivist picture on which one's account of rationality is closely tied to one's practical goals, without thereby being divorced from one's pursuit of epistemic virtues like truth and the absence of falsehood. This resulting picture allows the primitivist to give a clear answer to the question that heads this section:

> Why be rational?
>
> To be doxastically rational—given my admittedly non-neutral understanding of rationality—is to adopt the very epistemic norms that I, in fact, adopt.
>
> And why adopt those particular norms? Because I regard them as my best hope for achieving truth and avoiding falsehood.
>
> And why is that? Because these norms do better than any alternative I can think of in achieving a good balance between two competing considerations: (1) allowing me to make enough progress on enough of the theoretical questions I take to be important; and (2) not committing me to too many lines of inquiry that I take to be pointless—all of this as judged by my own admittedly non-

> neutral standards of "good balance", "enough", "progress", "important", "too many", and "pointless". As a result, I regard the resulting body of theory as more likely to deliver truths, and less likely to land me in falsehoods, than any alternative I can think of.[14]

Accordingly, the primitivist thinks that answering "why be rational?" is a bit like answering "why play the game you are currently playing?". In both cases, she thinks that the answer is inextricably linked to one's practical goals. But, in both cases, she takes the answer to be unmysterious.

There is certainly something disappointing about the resulting proposal. It goes agains the Cartesian hope that doxastic rationality might serve as a neutral foundation for a purely theoretical enterprise. But the primitivist thinks that the Cartesian project is bankrupt. She thinks the only way of a set of epistemic norms can constitute a substantive foundation for one's theorizing is for them to fail to be neutral. This means that we have to no choice but to rely on our own perspective in deciding which norms to adopt, and our practical goals play an important role in shaping that perspective.

7 Beyond logic

My discussion of primitivism has been focused on probabilism, which treats C1–C3 as a constraint on doxastic rationality. C1–C3 are purely logical constraints: they depend only on the compositional structure of the relevant sentences together with the meaning of their logical vocabulary. This raises the question of whether rationality imposes any non-logical constraints on one's credence function.

Bayesian objectivists think that it does: they think that doxastic rationality imposes requirements on one's initial credence function beyond that go beyond C1–C3. On an

[14] If our primitivist thinks some epistemic norms are objectively correct, she will be left with some unfinished business. She will have to explain why adopting the objectively correct epistemic norms turn out to be an effective aid to our practical pursuits. But this isn't just a challenge for primitivists. It's a challenge for anyone who thinks that adopting the objectively correct epistemic norms is an effective aid to one's practical pursuits.

extreme version of objectivism, there is only one initial credence function that is rationally permissible. I will not attempt to argue for or against objectivism here. Instead, I will offer some reasons for thinking that one ought to be a primitivist about objectivism. I will suggest, in other words, that it's hard to see how an objectivist could identify substantive rationality constraints on the subject's initial credence function while remaining neutral enough not to beg the question against her opponents.

As before, I will focus my attention on a few case studies. I harbor no ambitions of establishing primitivism. The goal is just to give you a sense of the sorts of considerations that might lead one to take the view seriously.

An initial observation is that every credence function regards itself as optimal, along two important dimensions. First, every credence function takes itself to be *decision-theoretically* optimal by taking itself to give the subject maximally prudent advice.[15] Second, every credence function takes itself to be *alethically* optimal, by taking itself to be maximally accurate, assuming standard measures of accuracy.[16]

This suggests a difficulty for an objectivist who hopes to give a neutral argument for the conclusion that a particular credence function is the "objectively mandated" initial credence function. For against the background of which credence function is one to assess the objectivist's argument? If one works with any credence function other than the one the objectivist recommends, one will take the objectivist's suggestion to be suboptimal.

Perhaps the objectivist thinks that one needn't presuppose any particular credence function to assess her arguments: she thinks they can be assessed from a more or less neutral perspective. Perhaps she has an argument that requires no more than a few intuitively compelling epistemological principles (together with, e.g. a classical interpretation of C1–C3).

Unfortunately, it's hard to identify principles that are substantive enough for the objec-

[15]This is because it sees the options that it itself takes to have highest expected value (and therefore recommends) as having at least as much expected value as the options that any rival credence function takes to have highest expected value (and therefore recommends).

[16]In fact, it is sometimes presupposed that an accuracy measure is only acceptable if it is "proper", and thereby delivers this result.

tivist to make progress while remaining neutral enough to be common ground. I'll illustrate the point with two well-known examples: symmetry principles and induction principles.

Start with symmetry principles (Sober 2015, ch. 2). Let E be the conjunction of: (i) "there is an urn containing some balls", (ii) "a ball was drawn from the urn", (iii) "each ball in the urn is either red or blue". Let R be "the ball that was drawn is red". What should one's initial credence in R given E be? Our objectivist might wish to answer "$1/2$", by appeal to a principle of symmetry. For instance, she might start with the observation that there are only two hypotheses about the color of the ball—red and blue—and argue that the hypotheses should be assigned equal credence, on the grounds that we have "no reason" to prefer one over the other.

Now consider a slight variation of the case. Let E' be the conjunction of (i) and (ii) above, together with (iii'): "each ball in the urn is red, light blue, or dark blue" (where "light blue" abbreviates "blue and reflecting wavelengths of more than 485 nm" and "dark blue" abbreviates "blue and not reflecting wavelengths of more than 485 nm"). What should one's initial credence in R given E' be? Were the objectivist to appeal to considerations of symmetry once more, she would presumably answer "$1/3$", on the grounds that we have three hypotheses about the color of the ball—red, light blue and dark blue—and that our Cartesian perspective affords us "no reason" to prefer one of these hypotheses over the rest. Notice, however, that the equivalence of E and E' is a *logical truth*, assuming classical logic. So no credence function satisfying C1–C3, classically interpreted, can deliver both $c(R|E) = 1/2$ and $c(R|E') = 1/3$.

Next consider induction principles (Comesaña 2020, §3.7). Let E be "1000 emeralds have been examined as of today, and they are all green", let G be "the next emerald to be examined will be green" and B be "the next emerald to be examined will be blue". Our objectivist might wish to claim that one's initial credence in G given E should be higher than one's initial credence in B given E, by appeal to some sort of inductive principle. As it might be: "if sufficiently many instances of F have been G rather than H, you should expect further instances of F to be G rather than H". But Goodman (1955) famously identified a difficulty for such principles. Let "grue" abbreviate "green and examined by [current date and time], or blue and first examined after [current date and time]" and let "bleen" abbreviate the dual of "grue": "blue and examined by [current date and time], or green and first examined after [current date and time]". Should we conclude, on the basis of the objectivist's inductive principle, that we should expect the next examined emerald to be grue rather than bleen? Presumably not, since expecting the next examined emerald to be grue is incompatible with expecting it to be green.

The lesson of our examples is that judgments about the symmetry of a set of hypotheses, or about the inductive projectability of a property, presuppose a selection of "epistemically natural categories"—a family of categories that in some sense constitute an adequate basis for epistemological inquiry.[17] And it is not clear that our objectivist is in a position to give an account of the relevant notion of naturalness that is both substantive enough to impose meaningful constraints beyond C1–C3

Consider, for example, a pair of philosophers who disagree about the (epistemological) naturalness of "green": A thinks that "green" is a natural category; B thinks "grue" is a natural category. Is there a story to be told about what naturalness amounts to that is substantive enough to help A and B make progress on their disagreement and neutral enough to be common ground between them?

It is not at all clear. Consider, first, a story like "a natural category is a category that would be deemed natural by typical humans, in a pre-theoretic sense of 'natural' ". Such an account is unlikely to count as sufficiently neutral in the present context. For consider B's perspective. Would she to learn that typical humans take "green" to be more natural,

[17]Titelbaum (2010, 2011) makes a formal version of this point. He shows that Carnap's (1962) effort to constrain epistemic support by appeal to purely formal symmetry considerations is inevitably dependent on the particular selection of predicates one chooses to work with. As a result, Carnap's symmetry constraints can't really gain traction unless one is able to identify a family of "natural predicates" on which to base one's theory. And, again, it is not clear how one could go about selecting such a basis in a principled way, from a neutral perspective.

in the pre-theoretic sense, than "grue", she would not thereby conclude that "grue" fails to be natural in the epistemic sense. She would instead insist that the psychologies of typical humans fail to track genuine epistemic naturalness.

What about a story like "the natural categories are the categories that figure in our best theory of the world". There is no guarantee that the resulting criterion will turn out to be substantive. It all depends on whether A and B are able to agree on a suitable understandings of "best". Suppose, for example, that a "best theory" is taken to be one that delivers an optional combination of simplicity and strength (Lewis 1973, p. 73). Then it is not at all clear the our criterion will count as substantive. For A might count "green"-based theories as simpler than "grue"-based theories, and B might count "grue"-based theories as simpler than "green"-based theories.

Could our objectivist avoid such problems by appeal to fruitfulness? Consider, for example, a criterion like "the natural categories (for a given subject) are the categories that figure in the theory that is most successful in forwarding the subject's goals". This criterion may well turn out to be substantive enough to make progress on the the question of which categories count as natural (for a given subject) without begging the question against A or B. But it's not clear that it delivers an understanding of naturalness that is well suited to an account of doxastic rationality. For in endorsing a doxastic principle as a requirement of rationality, one is recommending the principle as a constraint on the doxastic states of arbitrary subjects in arbitrary contexts—and therefore independently of the subjects' goals.[18]

It goes without saying that I have not supplied an exhaustive list of avenues the objectivist might pursue. But I hope to have given you a sense of the sorts of considerations that might motivate primitivism about non-logical requirements on doxastic rationality.

[18]Wait! Didn't I argue in section 5 that one might adjudicate between rival conceptions of rationality by appeal to theoretical fruitfulness? How is this any different? The difference is that back in section 5 I was suggesting theoretical fruitfulness not as part of an account of rationality but as a mechanism whereby one might come to select an account of rationality. And, crucially, that mechanism was expected to deliver doxastic principles that the theorist would recommend to arbitrary subjects in arbitrary contexts. Here, in contrast, we are discussing an account of rationality that is built on an account of naturalness that is sensitive to the subject's aims.

8 Concluding Remarks

The aim of this paper has been decidedly modest: I offered a characterization of epistemic primitivism and explored some of its consequences.

Such modesty is borne from necessity. I would have very much liked to offer a compelling argument for primitivism, but I don't know how to do so. In fact, I don't even have a good sense of what a compelling argument would look like. On the other hand, I *do* have a good sense of what it would take to refute primitivism: it is enough to identify a plausible account of rationality that is both substantive enough to be interesting and neutral enough not to beg the question against reasonable opponents. I also think that a philosopher who tries and fails to articulate an anti-primitivist account of rationality should count as having some evidence for primitivism, however mild, and I can report that my own embrace of primitivism stems from my inability to articulate a respectable alternative.

Primitivism will seem disappointing to Cartesians, who hope for cognitive progress unsullied by any assumptions that a reasonable person might reject. But primitivism does offer some attractions to philosophers who are prepared to leave Cartesianism behind. Primitivism has the advantage of making the normativity of doxastic rationality no more mysterious than the normativity of the rules of chess. And primitivists have the advantage of exemplifying a certain kind of intellectual modesty, by recognizing that reasonableness comes in many different forms.

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