

# Quinean holism, analyticity, and diachronic rational norms

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**Abstract** I argue that Quinean naturalists' holism-based arguments against analyticity and apriority are more difficult to resist than is generally supposed, for two reasons. First, although opponents of naturalism sometimes dismiss these arguments on the grounds that the holistic premises on which they depend are unacceptably radical, it turns out that the sort of holism required by these arguments is actually quite minimal. And second, although it's true, as Grice and Strawson pointed out long ago, that these arguments can succeed only if there isn't any principled criterion for meaning change, such a criterion turns out to be hard to come by. David Chalmers has recently argued that such a criterion *must* exist, since the norms governing belief revision are subject to obvious exceptions that can be explained only by appeal to meaning change. But this, I argue, is incorrect: if choices about how to use language are themselves rationally assessable (as naturalists can and should take them to be), then there are no such exceptions to be explained. To show that this is so, I formulate a new kind of coherence norm that may be useful for reasoning formally about the relationship between meaning and evidence.

**Keywords** A priori · Chalmers · Conditionalization · Epistemology · Naturalism

## 1 Introduction

Quinean naturalists have no truck with the analytic or the a priori, and one major reason is a conviction that those notions are incompatible with Quinean holism. The *locus classicus* for this conviction is Quine's own "Two Dogmas of Empiricism" (1951,

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pp. 38–40), where he gives the following anti-analyticity argument: given the truth of the Duhem thesis (also known as the Quine–Duhem thesis),<sup>1</sup> according to which the statements in our system of beliefs “face the tribunal of sense experience not individually but only as a corporate body”, it turns out that, when a contrary experience occasions a change in our system of beliefs, “there is much latitude of choice as to what statements to re-evaluate” on the basis of that experience, in which case

it becomes folly to seek a boundary between synthetic statements, which hold contingently on experience, and analytic statements which hold come what may. Any statement can be held true come what may, if we make drastic enough adjustments elsewhere in the system. ...Conversely, by the same token, no statement is immune to revision.

This argument should be familiar. The idea, roughly, is that a sentence that’s analytic, since it’s true no matter what the world is like, is going to be one that we’re required to accept no matter what we experience, and a sentence that’s synthetic, since its truth value depends on what the world is like, is going to be one that we’re required to reject in the light of certain courses of experience. But on a holistic picture, no sentence can have either such status: when an experience is at odds with our system of beliefs, it’s (in some sense to be specified) open to us to give up any of those beliefs—even, for instance, beliefs in the laws of logic—in order to resolve the conflict. And by the same token, it’s open to us to insist on keeping any of those beliefs, since there will always be another way of revising our system of beliefs that will resolve the conflict. So, given holism, no sentence is *either* analytic *or* synthetic. Call this the *argument from holism*.

A similar argument against the (indefeasible) a priori<sup>2</sup> is available: since, on a holistic epistemology, there can be no class of sentences that have a special epistemic status, there’s no reason in principle to deny that we might be induced, in the face of some bizarre course of experience, to give up even those beliefs that we currently take to be most secure, such as our beliefs in logical laws. Call this the *argument from universal susceptibility*. This argument isn’t explicit in “Two Dogmas”—Quine barely

<sup>1</sup> In the original version of “Two Dogmas”, Quine doesn’t cite Duhem in connection with this thesis, but in the reprint in *From a Logical Point of View* (1953), he adds a footnote explaining that a defense of the thesis appears in Duhem 1906/1954. Quine makes clear in subsequent work (see, e.g., his 1975, p. 313) that he takes his holism to be at least roughly equivalent to Duhem’s thesis.

<sup>2</sup> Though naturalists deny the possibility of a priori justification grounded in pure rational insight, they aren’t hostile to every sort of defeasible apriority. Quine’s basic epistemological stance, after all, is that each of us is a “sailor adrift on Neurath’s boat” (1981, p. 72): all we can do is start wherever we are and make repairs as we go along. So the idea that we might be unjustified in starting with the beliefs we do can, for Quine, only be a confusion (cf. Harman’s conservatism, according to which “you start where you are” and “rationality or reasonableness then consists in trying to make improvements in your view” (1995, p. 189). That said, naturalists *are* hostile to *indefeasible* apriority (see, e.g., Bergström 2014), and this is the notion I’ll be discussing here. (In fact, the dispute between naturalists and their opponents is subtler than this. As Peacocke (2005, pp. 747–748) notes, those on both sides can agree that any belief can be defeated via evidence that the thinker has made some sort of reasoning mistake in identifying grounds for that belief—that is, every sentence exhibits “defeasibility of identification”. For example, I may be rationally required to give up a mathematical belief if an eminent mathematician tells me, incorrectly, that what I’ve identified as a proof of some claim isn’t a genuine proof. But naturalists, unlike many of their opponents, also take every belief to exhibit a kind of defeasibility *besides* defeasibility of identification).

mentions the a priori at all in that paper—but it’s widely thought to be implicit (see, e.g., [BonJour 1998](#); [O’Grady 1999](#); [Putnam 1976/1983](#); [Sober 2000](#)).<sup>3</sup>

Anti-Quinean responses to these arguments tend to proceed in one of two ways. The first is obvious: reject holism. [Sober \(2000\)](#) pursues this strategy. After all, the Quinean arguments rest squarely on Quine’s holistic premises—if those premises aren’t plausible, the arguments have no force whatsoever. Furthermore, holism is (or at any rate is generally taken to be) quite a radical doctrine. So it’s not surprising that opponents of Quinean naturalism have found this strategy attractive.

There’s more to say about the second common strategy, which is to point out that holism, true or not, doesn’t by itself entail Quine’s conclusions: it’s well known that the success of the Quinean arguments hinges also on antecedent doubt about the legitimacy of appeals to sentential meaning. After all, if it’s granted that a sentence has a determinate meaning, then the fact that we can give that sentence up tells us neither that it isn’t analytic nor that it isn’t a priori, since we can give up even an analytic or a priori sentence as long as we change what that sentence means. [Grice and Strawson \(1956, p. 157\)](#) press this point in their classic response to “Two Dogmas”, explaining that we can accept both analyticity and holism as long as we can appeal to “the distinction between that kind of giving up which consists in merely admitting falsity, and that kind of giving up which involves changing or dropping a concept or set of concepts”.

This, of course, isn’t news to Quine.<sup>4</sup> He addresses the notion of meaning in the first part of “Two Dogmas” and concludes that it can’t really be made sense of—it’s a member of a circle of (supposedly) obscure notions none of which can be understood except in terms of the others. And this conclusion puts him in the position, in the course of giving his argument from holism, to ask, rhetorically, what difference there is “in principle” between a shift whereby we give up “the logical law of the excluded middle as a means of simplifying quantum mechanics...and the shift whereby Kepler superseded Ptolemy, or Einstein Newton, or Darwin Aristotle” (1951, p. 40): since revision of a logical law is a paradigm case of meaning change and the other shifts are paradigm cases of scientific discovery, this question can have the intended rhetorical force only if the notion of meaning—and with it the notion of meaning change—has already been called into question, in which case Grice and Strawson’s distinction between the two kinds of giving up can’t be drawn in a principled way.<sup>5</sup>

<sup>3</sup> I’m inclined to doubt that this argument is even implicit in Quine’s paper. After all, he’s an empiricist talking to other empiricists—all parties to the discussion share the presupposition that the only way for a sentence to be a priori is for it to be analytic. So if he really has shown that there are no analytic sentences, there’s no need for a separate argument against apriority. Still, regardless of whether Quine actually intends to advance this argument, his epistemological stance provides us with the resources to reconstruct it, as I explain below.

<sup>4</sup> Carnap, as far back as his *Logical Syntax of Language*—which [Quine \(1970, p. xxiii\)](#) “read...page by page as it issued from Ina Carnap’s typewriter”—endorses precisely the view put forward by Grice and Strawson, embracing the Duhem thesis and noting that experience may induce us to “alter the language to such an extent that [a previously analytic sentence] is no longer analytic” (1934/1937, p. 319).

<sup>5</sup> As [Ebbs \(2016\)](#) points out, this aspect of the argumentative structure of “Two Dogmas” sometimes goes unacknowledged. Grice and Strawson themselves, for example, treat the argument from holism as evaluable independently of the circularity argument in the first part of Quine’s paper, as do [Russell \(2008\)](#) and [Juhl and Loomis \(2010\)](#). (Chalmers, too, frames his discussion as though he takes these two arguments to be

Grice and Strawson, for their part, don't take Quine to have shown that the notion of meaning should be abandoned, but neither do they try to explain that notion in a way that Quine would find satisfactory. They're content instead to insist that Quine's standards are too strict, that the notion of meaning is, by reasonable standards, entirely unproblematic. And contemporary opponents of Quinean naturalism tend to take this same line (see, e.g., [BonJour 1998](#), Sect. 3.3).

Whether Quine's standards are really too strict is a difficult question, and not one I'm going to try to answer here. But I want to point out that, even if the opponents of Quinean naturalism are right to take the notion of meaning to be unproblematic—and I'm inclined to think they are—their mere insistence that this is the case isn't going to be at all persuasive to anyone who *shares* Quine's standards. And by the same token, Quinean naturalists can't hope to convince their opponents that the notion of meaning is unintelligible by appeal to standards of intelligibility those opponents reject as too strict. The result is a kind of philosophical deadlock: proponents of each view take the opposing view to be fundamentally misguided, despite the fact that they can produce no non-question-begging reason for thinking so. And this state of affairs is, I submit, profoundly unsatisfying. One hopes there's some way forward here.

This is where Chalmers comes in. His ambitious project in *Constructing the World* (2012) requires appeal to the a priori, and so, in order to shore up the foundations of that project, he tries to respond to Quine's arguments on grounds that Quinean naturalists can accept. In particular, he tries to show that anyone who endorses a certain kind of diachronic constraint on epistemic rationality—and Quinean naturalists *do* tend to endorse constraints of the relevant kind—is thereby committed both to a notion of meaning and to the existence of a priori truths.<sup>6</sup> This is a novel argumentative strategy, and one that seems like it could give us a way to break the deadlock: Chalmers's arguments, if successful, would give Quinean naturalists themselves some reason to reject Quine's conclusions. This would be significant forward movement in the debates over analyticity and apriority.

Unfortunately, arguments like Chalmers's ultimately *cannot* succeed: here I show that if Quineans take language choice to itself be subject to rational norms—which they can and should do, for independent reasons—then they can endorse the relevant diachronic epistemic constraints while rejecting both the notion of meaning and the existence of a priori truths. So friends of the analytic and the a priori, if they want to pursue the strategy of giving Quinean naturalists reason to accept a notion of meaning and so to reject Quine's conclusions, are in need of a different approach.

What about the other strategy, that of resisting Quine's conclusions by rejecting holism altogether? Here, too, Quine's opponents are in a worse position than is usually

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Footnote 5 continued

independent, though the substance of his response to the argument from holism suggests otherwise: he tries to "flesh out a principled distinction" between cases where meaning changes and cases where it doesn't and so to "make inroads into the Quinean circle" (2012, pp. 204, 225.) But again, given Quine's knowledge of Carnap's own holism as presented in *Logical Syntax*, this way of understanding the arguments of "Two Dogmas" can't be right: Quine can't have thought that the Duhem thesis alone entails that there's no analytic–synthetic distinction.

<sup>6</sup> Chalmers's argument appears both in Chap. 5 of *Constructing the World* and in his 2011a. I'll be referring to the former work.

thought. Holism, as I mentioned above, is generally taken to be a radical doctrine, which is why friends of the analytic and the a priori feel comfortable rejecting it. But I show here that Quine's holistic premises have been widely misunderstood: correctly interpreted, they aren't so radical at all. In fact, these premises are quite minimal, so much so that rejecting them seems like a hopeless strategy.

These, then, are my two tasks in this paper: provide a novel interpretation of the Quinean arguments, showing that the holism on which they rely is far less radical than is generally supposed, and show that Chalmers's arguments can't give Quineans reason to accept the notion of meaning or the existence of a priori truths. If my conclusions are correct, then Quine's opponents are in a weaker position than is usually thought: their only real hope for responding effectively to the arguments from holism and universal susceptibility is to give Quineans reason to accept the notion of meaning, and they must do so in some way other than that suggested by Chalmers.

I begin by discussing Quine's holism, since some of what I say here will be relevant to my evaluation of Chalmers's arguments.

## 2 Holism and Quinean epistemology

Quinean naturalists' epistemological stance is in certain respects highly unorthodox, but we can start to get a handle on it by thinking about how, exactly, the argument from holism is to be understood. We begin by examining the two corollaries of Quine's holism from which it's supposed to follow that there are no determinately analytic sentences:

**Holding-true** Any statement can be held true come what may, if we make drastic enough adjustments elsewhere in the system.

**Revisability** Conversely, by the same token, no statement is immune to revision.

It's not immediately obvious what these theses come to, but on the usual way of interpreting them, they're epistemological claims about what a thinker can rationally believe in the face of various bodies of evidence. Putnam (1976/1983), for instance, interprets Quine this way, as do [BonJour](#) (1998), [Sober](#) (2000), and [Russell](#) (2008).<sup>7</sup>

Chalmers, too, interprets Quine this way: on his view, the picture Quine is endorsing is one on which "any statement can be *rationally* held true come what may" and "no statement is immune to *rational* revision" (2012, p. 201). And Chalmers goes on to consider two different ways of reading *that* picture,

a pragmatist reading... stressing the freedom to adjust ancillary hypotheses as one chooses, [and] an empiricist reading, stressing the role of unexpected evidence in driving us to revise our beliefs. Roughly, where the pragmatist reading turns on the claim that one *may* accept or reject certain statements, the empiricist reading turns on the claim that one *should* (or perhaps that one would). (2012, p. 215fn)

<sup>7</sup> [Ebbs](#) (2016) also notes that this is the standard interpretation, though he doesn't endorse it. But his own interpretation is similar in certain respects to what I below call the empiricist reading, and like that reading, it can be ruled out on the grounds that it requires us to pretend that Quine doesn't endorse Holding-true.

In other words: on the pragmatist reading, Quine's view is that, for any sentence and any body of evidence, a thinker faced with that evidence is rationally *permitted* both to accept that sentence and to reject that sentence (though not at the same time, of course), and on the empiricist reading, Quine's view is that, for any sentence, there's some body of evidence such that a thinker faced with that evidence is rationally *required* to reject that sentence.

Given the assumption that Holding-true and Revisability are indeed claims about what can rationally be believed, these two readings seem to be the only ones available. The problem, though, is that it's wholly implausible that either of these readings gets at precisely what Quine has in mind.

On the empiricist reading, after all, the conjunction of Holding-true and Revisability is incoherent: if every sentence is such that we're rationally required to reject it in the face of some body of evidence, then it certainly isn't the case that every sentence is such that we can rationally continue believing it come what may.<sup>8</sup> And charity demands that we not interpret Quine in such a way that his two crucial claims turn out to be straightforwardly inconsistent.

The pragmatist reading isn't much better. On this reading, the argument from holism depends on an epistemological doctrine according to which, for any body of evidence whatsoever, the set of systems of beliefs compatible with ideal rationality given that evidence is large enough that, for any sentence whatsoever, the set contains at least one system on which that sentence is accepted and at least one system on which it's rejected. And that means Quine is committed to a view of rationality on which it's never the case that, given some body of evidence, any particular hypothesis is any better off, from the point of view of rationality, than its alternatives. This is a radically permissive view, one that Quine can't expect to be shared by any of his interlocutors, and yet, if the pragmatist reading is correct, he takes it on board casually and without argument.<sup>9</sup> On this reading, then, it's not even clear who Quine takes his audience to be.

<sup>8</sup> Those who endorse the empiricist reading tend to ignore Holding-true altogether and so to interpret Quine here as giving what I've called the argument from universal susceptibility: if every sentence is such that we're rationally required to reject it in the face of some body of evidence, then no sentence is (indefeasibly) a priori. But Quine includes Holding-true as a premise in his argument—any interpretation on which it's not part of his view is to be rejected on textual grounds. (It's worth noting that Chalmers himself endorses the pragmatist reading as an interpretation of Quine's own text. But the empiricist reading, he says, "has been more influential among later Quineans" (2012, p. 215fn).)

<sup>9</sup> Chalmers, for his part, tries to make sense of what Quine is doing by attributing to him a general skepticism about rationality—he says that Quine in "Epistemology Naturalized" (1969) argues for "a sort of skepticism about norms of rationality" and that there's a "deep linkage" between that skepticism and Quine's holism (2012, pp. 221–222). If this reading of "Epistemology Naturalized" were correct, it would go some way toward making the pragmatist reading of the argument from holism plausible: it would make sense for Quine to have a radically permissive conception of epistemology if he thought there weren't any rational norms at all. But Quine has repudiated this reading of "Epistemology Naturalized" on more than one occasion. Here's one example:

[My traditionalist critics] are wrong in protesting that the normative element, so characteristic of epistemology, goes by the board. Insofar as theoretical epistemology gets naturalized into a chapter of theoretical science, so normative epistemology gets naturalized into a chapter of engineering: the technology of anticipating sensory stimulation. (1992, p. 20)

Quine's epistemology is indeed radical in certain respects, but he's not a skeptic about rational norms.

Now, given Quine's reputation for radicalism, it's tempting to set aside plausibility concerns when interpreting his work. But those of us interested in resisting his conclusions need to be careful not to make things too easy for ourselves: if we interpret his arguments as relying on outlandish claims when more moderate interpretations are available, we run the risk of misinterpreting those arguments and so permitting ourselves to be unjustifiably dismissive of them. And that risk is especially serious in this case, for Quine routinely treats certain hypotheses as rationally better off, given the evidence, than their alternatives. Indeed, he even takes a moment in "Two Dogmas", in the course of explaining his holism, to offer the following clarification: "I do, qu lay physicist, believe in physical objects and not in Homer's gods; and I consider it a scientific error to believe otherwise" (1951, p. 41).<sup>10</sup> So he's committed to an epistemological view that's incompatible with the one required by the pragmatist reading. On this reading, then, Quine's epistemology is more than radical; it's straightforwardly inconsistent. And again, charity demands that we avoid interpreting him in such a way that his views turn out to be straightforwardly inconsistent.

Neither the empiricist reading nor the pragmatist reading, then, is acceptable. And since those are the only two readings available on the assumption that Holding-true and Revisability are claims about what can rationally be believed, that assumption must be mistaken.<sup>11</sup> The question, then, is how we *should* understand those claims.

We find our answer, I think, by keeping in mind that Quine takes his holistic doctrine to be equivalent to the Duhem thesis.<sup>12</sup> That thesis, after all, is in the first instance a thesis about *refutation*: it says that, since a given hypothesis has empirical consequences only when conjoined with a whole system of auxiliary hypotheses, it's impossible to use "experimental contradiction" to (conclusively) falsify any single hypothesis (see [Duhem 1906/1954](#), Sect. II.VI.2). What it tells us, in other words, is just that experi-

<sup>10</sup> He continues:

But in point of epistemological footing the physical objects and the gods differ only in degree and not in kind. Both sorts of entities enter our conception only as cultural posits. The myth of physical objects is epistemologically superior to most in that it has proved more efficacious than other myths as a device for working a manageable structure into the flux of experience. (1951, p. 41)

This passage invites an interpretation on which Quine takes physical objects to be mere fictions, to be accepted on purely pragmatic grounds. But that interpretation is to be resisted. He clarifies his understanding of the epistemological significance of posits in "Posits and Reality" (1960/1966, p. 238):

Having noted that man has no evidence for the existence of bodies beyond the fact that their assumption helps him organize experience, we should have done well, instead of disclaiming evidence for the existence of bodies, to conclude: such, then, at bottom, is what evidence is.

Though physical objects, on Quine's view, are to be accepted on pragmatic grounds, they aren't thereby fictions—the relevant pragmatic grounds, for Quine, *are* epistemic grounds. For further discussion of Quine's epistemological pragmatism, see Sect. 4.

<sup>11</sup> This is confirmed in Quine and Ullian's *Web of Belief*, where they offer the following clarification of Holding-true: "Just about any hypothesis...can be held unrefuted no matter what, by making enough adjustments in other beliefs—*though sometimes doing so requires madness*" (1978, p. 79, my emphasis). It's clear here that Holding-true, whatever sort of claim it turns out to be, must be consistent with the claim that, in the face of some bodies of evidence, the only *rational* thing to do is to give up a particular hypothesis.

<sup>12</sup> This is a bit of a simplification. Quine's holism, as he well knows, is broader in scope than Duhem's, and there are some differences of emphasis as well. See [Vuillemin \(1986\)](#) and Quine's (1986) reply.



mental results can never be *inconsistent* with a single hypothesis. And this, notice, is a fairly minimal claim about the relationship of deductive logic to scientific inquiry, not a radical claim about rationality. (After all, whether experimental results can *confirm* or *disconfirm* a single hypothesis is a question about which the thesis tells us nothing at all.<sup>13</sup>)

The Duhem thesis, then, is a thesis, not directly about rationality, but about the logical structure of our systems of beliefs. So if we take seriously Quine's claim that his doctrine is equivalent to that thesis, we're led to the conclusion that what Quine is committed to is primarily a logico-structural doctrine that there will always be many ways to revise a system of beliefs in order to maintain consistency with experience, not an epistemological doctrine about what can rationally be believed.<sup>14</sup> Understood in this light, Holding-true is just the claim that any sentence can *consistently* be held true come what may, and Revisability is just the claim that any sentence can *consistently* be given up in the face of any body of evidence.

Careful examination of Quine's characterization of holism in Sect. 6 of "Two Dogmas" suggests that this interpretation is correct. His primary concern seems to be not with rationality—epistemological notions such as confirmation and disconfirmation, discussed in some detail elsewhere in the paper, are conspicuously absent from his discussion here—but with the purely deductive notions of implication and falsification: he emphasizes repeatedly that his view is one on which what occasions a change in our system of beliefs is always a "conflict with experience" or a "contrary" or "recalcitrant" experience that there are various ways to "accommodate" (1951, pp. 39, 40, 43). And this focus on the deductive is even more explicit in some of his later work. In "On Empirically Equivalent Systems of the World", for instance, he characterizes his holism as the doctrine that "scientific statements are not separately vulnerable to adverse observations, because it is only jointly as a theory that they *imply* their observable *consequences*" (1975, p. 313, my emphasis).<sup>15</sup> This interpretation, then, has substantial textual support.

It's also a charitable interpretation, in that it gets Quine the conclusion he wants without saddling him with outlandish radicalism or blatant inconsistency; Holding-true and Revisability are on this interpretation exceedingly plausible.<sup>16</sup> In fact, friends of sentential meaning, if they think we have the power to change the meanings of

<sup>13</sup> Duhem's own view is that experimental results *can* confirm and disconfirm single hypotheses. He says that, when we're deciding how to revise a system of hypotheses in the face of experimental contradiction, "Pure logic is not the only rule for our judgments; certain opinions which do not fall under the hammer of the principle of contradiction are in any case perfectly unreasonable" (1906/1954, Sect. II.VI.10). That is, although a body of evidence can never be inconsistent with a given hypothesis, it is possible for a body of evidence to render the hypothesis *unreasonable*.

<sup>14</sup> Lakatos (1978, p. 97) distinguishes between a weaker version of the Duhem thesis, which "only denies the possibility of a *disproof* of any *separate* component of a theoretical system", and a stronger one, which "excludes any *rational* selection rule among the alternatives", and he attributes the weaker thesis to Duhem and the stronger one to Quine. What I'm arguing here is that this is a misinterpretation of Quine: as far as his argument from holism is concerned, he, like Duhem, is committed only to the weaker thesis.

<sup>15</sup> For a fuller presentation of Quine's mature holistic doctrine, see Chap. 1 of his *Pursuit of Truth* (1992).

<sup>16</sup> Duhem's logical point—that a single hypothesis has empirical consequences only when conjoined with a system of auxiliary hypotheses—is widely taken to be obviously correct by contemporary philosophers of science.



our expressions, should take these theses to be *truisms*: after all, we can consistently give up even a logically true sentence like “Unicorns exist or don’t exist” by changing its meaning so that what it says is (for instance) that unicorns exist *and* don’t exist.<sup>17</sup>

Now, for friends of sentential meaning, these truisms are no threat to analyticity: although any sentence can consistently be revised, an analytic sentence can’t consistently be revised *without meaning change*, and although any sentence can consistently be held true come what may, a synthetic sentence can’t consistently be held true come what may *without meaning change*. But in the context of Quine’s argument from holism, we can’t rely on this “without meaning change” clause. As I suggested in my introductory remarks, the argument from holism isn’t independent of the circularity argument in the first part of “Two Dogmas”, and one of the upshots of that argument is that the legitimacy of meaning and other intensional notions is in question. What Quine is exploring in his discussion of holism, then, is whether we can use the notion of revisability to make sense of these intensional notions (analyticity in the first instance, but the others by extension, since they’re all interdefinable). And in this context, the fact that we can make sense of analyticity if we already have the intensional notion of meaning change just isn’t probative—what we need is a way of using revisability to make sense of analyticity *without* relying on other intensional notions. So the notion of meaning change is unavailable, which means all that’s left is the bare fact: any sentence can consistently be *either* held true come what may *or* revised in the face of evidence. And that’s why analyticity is under threat: unless a notion of meaning change is already available, there’s no way to use facts about revisability to distinguish analytic sentences from synthetic ones. In short, the hope was that immunity to revision might allow us to characterize analyticity and so might help us break into our circle of poorly understood notions, but it turns out that it can’t do so—to characterize analyticity in terms of immunity to revision, we’d need to be able to appeal to a well-understood notion of meaning, which means we’d already need to have broken into that circle.

Quine, on this interpretation, is in a relatively strong dialectical position: given the truistic character of Holding-true and Revisability, trying to deny these holistic

<sup>17</sup> For this reason, Grünbaum (1962, p. 20) considers roughly the interpretation I’m defending and dismisses it on the grounds that it would turn the Duhem thesis into a “thoroughly unenlightening truism”, and certain of my teachers and colleagues have expressed similar reservations in conversation with me. But Quine’s response to Grünbaum is telling:

I would say that the thesis as I have used it *is* probably trivial. I haven’t advanced it as an interesting thesis as such. ... I am not concerned even to avoid the trivial extreme of sustaining a law by changing a meaning; for the cleavage between meaning and fact is part of what, in such contexts, I am questioning. (1976, p. 132)

It appears, then, that the Duhem thesis, as employed by Quine, *should* be understood as a truism. (See Becker 2001 for further discussion of this point.)

One further point: textual analysis aside, Holding-true and Revisability are *premises* of the argument from holism, which means their truistic character is not a cost but a benefit. So I’m not sure what to make of the impulse to reject the proposed interpretation on the grounds that it makes these claims trivial—to do so, after all, is to reject it on the grounds that it makes Quine’s argument *too strong*.

premises isn't a good strategy for resisting the argument from holism. And that means friends of the analytic, to break the deadlock here, need to give Quineans reason to think that there *is* a principled distinction to be drawn between cases in which meaning changes over time and case in which it remains constant. So they need to show that there's reason to reject Quine's skepticism about sentential meaning.

This, then, is in my view how the argument from holism should be understood. Notice, though, that nothing in this argument gives Quine the resources to mount anything like the argument from universal susceptibility: Holding-true and Revisability, if they're merely claims about what can consistently be believed, can't by themselves tell us whether *epistemic rationality* ever demands that we give up a particular sentence in the face of evidence, which means they can't by themselves tell us whether there are any indefeasible sentences. So if there's any way to advance the argument from universal susceptibility (and so to make a case against apriority) on Quinean grounds, it must be by appeal to some aspect of Quine's epistemological stance not captured by those theses.

What's needed, to be precise, is some Quinean rationale for accepting the following principle:

**Defeasibility** For any thinker and any sentence, there's some body of evidence in the face of which that thinker can't rationally believe that sentence.<sup>18</sup>

And though Quine doesn't explicitly discuss this principle anywhere in "Two Dogmas", his epistemological stance does make such a rationale available. That stance, after all, isn't exhausted by the Duhem thesis—Quine, as I've suggested, is committed to the view that two systems, even if each of them is *consistent* with some body of evidence, need not be equally good responses to that evidence from the point of view of *rationality*. So he needs to explain on what basis one system is to be chosen over another. And that basis, he suggests in "Two Dogmas" and states explicitly in "Posits and Reality" (1960/1966), is given by certain theoretical desiderata: simplicity, familiarity (i.e., continuity with previous systems), predictive scope, and fecundity (i.e., ability to be extended to cover additional phenomena). Our goal, on Quine's view, is to adopt systems that (on balance) exhibit these properties to as great a degree as possible, for such systems are generally easier to work with with and so are more useful for organizing our experience of the world. And though these reasons for preferring one system over another are primarily practical reasons, Quine's pragmatism allows him to maintain that they're *also* epistemic reasons: "[The desiderata under discussion] are what count for the molecular doctrine or any, and we can hope for no surer touchstone of reality" (1960/1966, p. 241). So these theoretical desiderata, according to Quine, can provide epistemic grounds for preferring one system of beliefs over another, even when both systems are consistent with a given body of evidence. And if that's right, then it's possible, given the set of all systems of beliefs consistent with a body of evidence, to use the desiderata to generate a partial ranking of systems and so

<sup>18</sup> Note that Revisability, on the empiricist reading, is equivalent to this principle. The empiricist reading, though inaccurate as an interpretation of Quine's argument from holism in "Two Dogmas", is perfectly acceptable as a distillation of the naturalist case against the a priori.

to determine which ones are epistemically better than the rest.<sup>19</sup> This fact is the basis of the Quinean case for Defeasibility.

What's crucial is that the desiderata are desiderata for whole systems, not for individual sentences. So no sentence is exempt from investigation: if, for some body of evidence, none of the systems of beliefs picked out as best by the desiderata includes some sentence *S*, then *S* is to be given up in the face of that evidence, even if *S* is (for instance) a statement of a logical law. This suggests that every sentence is defeasible—for a sentence to be indefeasible, after all, it would need to be the case that, for any body of evidence whatsoever, at least one of the systems of beliefs picked out as best by the desiderata includes that sentence. And given the holistic character of the desiderata, there's no reason to suppose that any sentence is special in this way. It's principally on these grounds that Quinean naturalists (see, e.g., Devitt 2005; Harman 1996) tend to accept Defeasibility.

But the case for Defeasibility, as I've just presented it, is less than conclusive: on a Quinean epistemological view, we have no principled reason to suppose that there are any indefeasible sentences, but it doesn't follow that there definitely are none. Some *S* may happen to be such that, for any body of evidence whatsoever, each of the systems of beliefs picked out as best by Quine's desiderata includes *S*, in which case *S* is indefeasible. One way to strengthen the case for Defeasibility, then, is to identify sentences that are *prima facie* plausible candidates for indefeasibility and then dream up bodies of evidence in the face of which thinkers would be rationally required to reject those sentences. (Harman makes extensive use of this technique in, e.g., his 2001.) This sort of consideration of individual cases can't conclusively establish Defeasibility—any conclusive proof of that thesis would, for obvious reasons, be self-defeating—but it does provide additional reason to accept the principle.

The point, in any event, is that there do seem to be good Quinean reasons for accepting Defeasibility.<sup>20</sup> So friends of the *a priori*, to break the deadlock here, need to show Quinean naturalists that there's reason to reject this principle.

### 3 The diachronic rationality argument(s)

As I've suggested, Quine's opponents' best hope for responding to the argument from holism is to give Quinean naturalists reason to accept a notion of meaning change, and their best hope for responding to the argument from universal susceptibility is to give Quinean naturalists reason to reject Defeasibility. Chalmers tries to do both by appeal

<sup>19</sup> There need not be a unique best system of beliefs here. Since the different desiderata will often pull in different directions, a balance must be struck, and how to strike this balance is (to some degree) up to the individual thinker.

<sup>20</sup> Or at least for declining to accept its negation. And for the purposes of the argument from universal susceptibility, this is all that's really necessary. Quineans' primary objection to *a priori*, after all, is methodological: since we can't *guarantee* that our justification for believing any particular sentence will remain undisturbed in the face of new evidence, there aren't any sentences such that we can be sure *now* that we won't be required to reject them later. So, on the Quinean view, we have no reason for taking any of our beliefs to be wholly secure; we should be open to considering rejection of any sentence whatsoever. And we can be open in this way as long as we don't *deny* Defeasibility. Hill (2013) and Ebbs (2016) each make essentially this point.

to diachronic epistemic norms. His own presentation, though, is complicated by his reliance on a misinterpretation (so I've argued) of the Quinean position: in taking the argument from holism to be an epistemological argument, he runs it together with the argument from universal susceptibility, and so he takes himself to be giving one response to a single argument rather than two separate responses to two distinct arguments. Here I try to tease apart the considerations relevant to the argument from holism from those relevant to the argument from universal susceptibility and so to reconstruct Chalmers's arguments based on what I take to be essential in his discussion.

First some preliminaries. The diachronic norm Chalmers chooses to work with is a sentential version of the Bayesian conditionalization principle:  $cr_2(S)$  and  $cr_1(S | E)$  should be equal, where  $cr_1(*)$  specifies a thinker's credal state at  $t_1$ ,  $cr_2(*)$  specifies the thinker's credal state at  $t_2$ ,  $S$  is any sentence, and  $E$  is an evidence sentence specifying the total evidence acquired between  $t_1$  and  $t_2$ .<sup>21</sup> The use of a probabilistic framework isn't particularly important—Chalmers could run his arguments with any epistemic norm that requires there to be a match between one's beliefs on supposing one has acquired a particular body of evidence and one's later beliefs on actually acquiring that evidence.<sup>22</sup> What *is* important, though, is that the norm is stated in terms of sentences rather than propositions—since Chalmers's point is to show that anyone who accepts diachronic norms of the relevant sort is thereby committed to contested intensional notions (primarily meaning and meaning change, but derivatively synonymy, proposition, etc.), it wouldn't do to appeal directly to any such notion at the outset.

<sup>21</sup> He could also have used Jeffrey's (1965) generalization of the conditionalization principle, which allows for updating even when one is less than certain that one has acquired some body of evidence. But the standard Bayesian norm is easier to work with.

<sup>22</sup> Some naturalist responses to Chalmers proceed by denying that there can be any generally applicable norm of this kind, on the grounds that rational thinkers can't in general be expected to know, in advance of actually undergoing a particular course of experience, what the right response to that experience will be. Schroeter's (2014, building on work in, e.g., her 2006) response is of roughly this sort, as are Neta's (2014) and Rupert's (2016). I don't have the space here to do justice to these responses, but I do want to say something about why I think Chalmers can resist them.

As Chalmers (2014) points out in his reply to Schroeter and Neta, each of them discusses several purportedly problematic cases, but never in these discussions do they give any reason to deny the following (overwhelmingly plausible) claim: that a thinker who's merely supposing that she has some evidence can in principle engage in the same sort of reasoning that a thinker who actually has the evidence can, and with the same justification. And if that's right, then it's unclear why these cases are supposed to be problematic in the first place. (Schroeter thinks this sort of hypothetical reasoning doesn't in general issue in judgments of the right kind—she claims that supposition is a kind of fictional role-playing and that what it justifies, in the first instance, are just metalinguistic judgments about the language of a hypothetical thinker. But it seems clear that this is false, at least if what's in question is the kind of suppositional reasoning that's associated with conditional credences.)

Naturalists can respond that what's really problematic here is the claim that thinkers are always *rationaly required* to have the relevant suppositional beliefs. This is Rupert's strategy: he points out that, as a matter of fact, we humans aren't in general able to predict the effects of experience—we just don't have the imaginative capacity. So we can be rationally required to make such predictions only if rationality is highly idealized. (Chalmers's use of a Bayesian framework is another clue that the notion of rationality he's working with is an idealized one.) And this idealized notion of rationality, Rupert says, isn't one that naturalists will be inclined to endorse. But even if this is right, the idealized notion of rationality is at least coherent, and Chalmers's diachronic rationality arguments require only that a coherent notion of this kind is available. (Here naturalists may respond that a notion of apriority associated with this sort of idealized rationality is of little theoretical interest. I'm inclined to disagree, but idealization in epistemology is a huge topic a full discussion of which would take us far outside the scope of this paper.)

The use of sentences, though, seems—*prima facie*, at least—like it could complicate Chalmers’s treatment of evidence; his appeal to evidence sentences to specify the evidence acquired by thinkers raises questions about whether he’s presupposing, illegitimately, that the correspondence between those sentences and the bodies of evidence they specify is guaranteed to remain constant over time. But Chalmers is, I think, correct to note that there’s not really a problem here:

Learning  $E$  does not typically involve the *sentence*  $E$  at all. ...So there is no use of  $E$  at  $t_2$  that needs to be aligned with the use of  $E$  at  $t_1$ . At best we need to require that  $E$  as used at  $t_1$  correctly applies to the evidence acquired at  $t_2$ . (2012, p. 220)

The point is that, at  $t_2$ , the evidence *sentence* is irrelevant. The point of the conditionalization constraint, after all, is just to ensure that thinkers’ initial conditional beliefs on *supposing* that they have particular evidence match their later beliefs on *accepting* that they have that very same evidence, and so our conditionalization principle is going to be available as long as we

have a grip on what it is for a subject to accept or suppose that certain evidence obtains. With this much granted, we can simply stipulate that for our purposes, the conditional credences  $cr(S | E)$  relevant at  $t_1$  are credences in  $S$  conditional on the evidence that is actually obtained at  $t_2$ . (2012, p. 221).

So if appeals to thinkers’ abilities to accept and suppose they have particular bodies of evidence are legitimate, there’s no problem with stating our conditionalization principle in terms of evidence sentences.

And such appeals, unlike appeals to propositions and other contested notions, *are* legitimate in the present context, for Quineans will allow that we can make sense of the relevant notions here—after all, revising one’s beliefs in the face of evidence involves accepting that one has obtained that evidence, and experimental design in science requires thinkers to reason suppositionally about the different ways in which various bodies of evidence would induce them to revise their beliefs. So, as I work through Chalmers’s diachronic rationality arguments for analyticity and apriority, I’ll follow him in using a conditionalization principle that appeals to evidence sentences.

On to the arguments themselves. First up is the argument for analyticity, whose critical premise is that the sentential conditionalization principle, as stated, isn’t exceptionless. According to Chalmers, a thinker can count as epistemically rational even if  $cr_2(S) \neq cr_1(S | E)$ , since

it remains possible that [the thinker’s] credences in relevant *propositions* obey conditionalization, but that his credences in associated sentences do not, because the association between sentences and propositions changes over time. (2012, p. 213)

The idea is that a thinker who violates sentential conditionalization isn’t necessarily guilty of any epistemic transgression—after all, there are cases where  $S$  is associated with an entirely different proposition at  $t_2$  than it is at  $t_1$ , and in such cases, it’s hard to see why one’s attitude toward  $S$  at  $t_2$  should be at all constrained by one’s attitude toward  $S$  at  $t_1$ .

Now, it would be rather unsurprising if this sort of change in association could occur in cases where  $S$  contained an indexical expression (or exhibited some other sort of context-sensitivity). But according to Chalmers, it can occur even in cases where  $S$  is eternal. And in *these* cases, the change in association can be due only to a shift in  $S$ 's meaning. So Quineans, in order to account for cases of this sort, must allow that some notion of meaning is intelligible.

Quineans would of course take issue with Chalmers's description of the phenomenon here, since it proceeds by appeal to propositions. But that appeal isn't essential. What's important is just the idea itself: that there might be cases in which violations of sentential conditionalization are epistemically rational even when the relevant sentences are eternal. If such cases are possible, then Quineans need to explain how, and the only available explanation is that the meanings of the relevant sentences can change over time.<sup>23</sup> And that means Quineans are committed to a notion of meaning that can play a role in epistemological explanation.

Consider, for example, Chalmers's case in which a thinker, Fred, has a high  $cr_1(B)$ , where  $B$  is the sentence "All bachelors are untidy," and then, between  $t_1$  and  $t_2$ , acquires evidence of the existence of a 25-year-old man who's both unmarried and tidy, specified by the evidence sentence  $E$ . Rather than give up his belief in  $B$ , Fred denies that the man is really a bachelor, claiming that only men over 30 count as bachelors. So his  $cr_2(B)$ , like his  $cr_1(B)$ , is high. Suppose, though, that Fred, at  $t_1$ , counted *all* unmarried men as bachelors and so had a low conditional credence  $cr_1(B | E)$ . Then he has violated sentential conditionalization, but we can suppose, says Chalmers, that he is nevertheless fully epistemically rational. And the only way for Fred to be rational here is for the meaning of  $B$  to have changed.

What we have, then, is a sufficient condition for meaning change: if, for some fully epistemically rational thinker and some eternal sentence  $S$ ,  $cr_2(S) \neq cr_1(S | E)$ ,

<sup>23</sup> On certain views, there's another possible explanation: a thinker can rationally violate conditionalization by resetting her priors. If more than one set of priors is rationally permissible, and if there's no ban on switching from one set to another, then this is a possibility that needs to be taken into account. And it's relatively clear, given naturalists' epistemological commitments, that they *should* think more than one set of priors is rationally permissible. (Ebbs's response to Chalmers, for instance, appears to rely on the idea of resetting priors: on his view, rational violations of sentential conditionalization are possible simply because "changing our confirmational commitments whenever we judge it useful to do so" is not irrational (2014, 702).)

Chalmers does discuss the possibility of resetting priors, claiming that "as long as we have a conceptual distinction between cases in which beliefs are revised by this process and cases in which they are not", there's no problem for his argument—we can just stipulate that violations of conditionalization we're interested in are those that *don't* involve resetting priors (2012, p. 223). But I think a stronger response is available: there are powerful Quinean reasons to *avoid* resetting priors. After all, even if more than one set of priors is rationally permissible, switching from one set to another amounts to arbitrarily engaging in wholesale revision of one's system of beliefs, and this sort of arbitrary revision is exactly the sort of thing that the desideratum of familiarity is intended to rule out. So Quineans should deny that thinkers can rationally violate conditionalization by resetting priors. (Ebbs suggests that evidence can give us pragmatic reason to reset our priors, but it's hard to see how to square this claim with Quine's epistemological pragmatism. After all, if evidence can provide pragmatic grounds for changing our beliefs, and if these pragmatic grounds aren't separable from epistemic grounds, then a set of priors, if it's rational, will build in proper responses to these pragmatic grounds. So we won't have to reset our priors in order to do what we have pragmatic reason to do.)

where  $E$  specifies the total evidence acquired between  $t_1$  and  $t_2$ , then the meaning of  $S$  has changed between  $t_1$  and  $t_2$ .

This, notice, isn't a necessary condition for meaning change. It may be that the thinker's credences happen to satisfy sentential conditionalization even though the meaning of  $S$  has changed.<sup>24</sup> But that's not a problem. Chalmers's goal here, after all, isn't to *define* the notion of meaning. It's just to give something like a Quinean indispensability argument. The point is to show that we *need* the notion of meaning in order to explain what's going on in cases in which the sufficient condition is met, which means that, as long as there are indeed such cases, the diachronic rationality argument for analyticity can do its work.

So, in sum: if it's right that there can be epistemically rational violations of sentential conditionalization for eternal sentences, then Quinean naturalists are committed to a notion of meaning that can play a role in epistemological explanation. And in that case, naturalists must concede that analyticity is at least intelligible, since it can be defined in terms of such a notion.<sup>25</sup>

Now for the argument for apriority, which begins with the following observation: if some sentence  $S$  is such that the only way for a thinker to give it up is by violating sentential conditionalization—if, that is, the thinker's  $cr(S | E)$  is high for every evidence sentence  $E$ —then  $S$  is exempt from defeat by evidence, which means we have a counterexample to Defeasibility.<sup>26</sup> It follows that Quinean naturalists, if they want to maintain Defeasibility and so to deny that there are any a priori truths, must insist that there's no such  $S$ . That is, they must insist that, if a thinker is rational, then for any sentence  $S$ , there's some  $E$  such that the thinker's  $cr(S | E)$  is low.

The question is whether this claim is one Quinean naturalists can legitimately insist on. Chalmers thinks not—he gives a formal argument intended to show, on Bayesian grounds, that it ought to be rejected. But we can set that formal argument aside for the

<sup>24</sup> Here's a simple example: if the word EQUILATERAL has its usual meaning at  $t_1$  but undergoes meaning change and so, at  $t_2$ , is synonymous with EQUIANGULAR, and if  $S$  is the sentence "In Euclidean geometry, all equilateral triangles are equiangular", then  $cr_1(S | E) = 1$  (where  $E$  specifies the evidence acquired between  $t_1$  and  $t_2$ ), and  $cr_2(S) = 1$ . In this case, then,  $cr_2(S) = cr_1(S | E)$  despite the fact that the meaning of  $S$  has changed.

<sup>25</sup> Naturalists might insist here that all truths are synthetic, but that's not what Quine himself claims. The arguments in "Two Dogmas" are intended to establish, not merely that no sentences are analytic, but that the notion of analyticity is unprincipled.

<sup>26</sup> Strictly speaking, this is guaranteed to be true only if the language in which the thinker's evidence sentences are stated is rich enough that, for any body of evidence, there's an evidence sentence that specifies it. Otherwise, there may be a body of evidence such that no sentence specifies it and such that the thinker is required to reject  $S$  in the face of it, in which case  $S$  is defeasible despite the fact that  $cr(S | E)$  is high for every evidence sentence  $E$ . But we can grant, at least for the sake of argument, that the language here *is* rich enough to make the necessary evidence sentences available. After all, even if a body of evidence isn't specified by any sentence, thinkers, in order to take it on board, must be able to take some attitude toward it. In particular, they must be able to accept that it obtains. And so, again, as long as we allow that they can also *suppose* that it obtains—though this supposition won't take the form of a supposition that any particular sentence is true—we can make sense of a norm requiring that thinkers' beliefs on accepting that it obtains match their beliefs on supposing it obtains. And we can, if we like, state the diachronic rationality arguments in terms of *that* norm rather than in terms of the sentential conditionalization principle. So the richness of the language turns out to be immaterial—appeal to evidence sentences, though convenient, isn't strictly necessary for our purposes here.



moment. (I return to it in Sect. 5.) What's important for now is just that Quineans, if they want to maintain their view, *can't* reject the claim; if they did, they'd be forced to concede that there are a priori truths.

It seems clear at this point that the diachronic rationality arguments can show at least the following: first, that if there can be epistemically rational violations of sentential conditionalization for eternal sentences, then the notion of analyticity is intelligible; and second, that if there are sentences that can't rationally be given up except by violating sentential conditionalization, then there are a priori sentences. It's necessary, then, to work out what Quinean naturalists should say about the antecedents of those two conditionals. I discuss these antecedents in turn.

#### 4 Rational violations of sentential conditionalization?

Again, the diachronic rationality argument for analyticity depends on the claim that it's possible for an epistemically rational thinker to violate our sentential conditionalization principle even in cases where  $S$  is an eternal sentence. And according to Chalmers (2012, p. 218), it's clear that this claim is true; there's "a constitutive link between rational inference and conceptual constancy" such that diachronic norms like our sentential conditionalization principle are subject to obvious exceptions that can only be accounted for by appeal to meaning change. What I want to suggest in reply, though, is that there's a reasonable conception of the relationship between rationality and language—a conception that theorists with Quinean leanings should accept anyway, for independent reasons—on which the claim is false: our sentential conditionalization principle is *not* subject to exceptions in the relevant cases. And since the entire point of the diachronic rationality argument for analyticity is that a notion of meaning change is needed to *explain* these exceptions, the argument fails if there aren't any exceptions to be explained.

My discussion, then, proceeds as follows. First, I assume for the sake of argument that sentences *do* have meanings and that these meanings can change over time. Then, taking that assumption as given, I argue that, plausibly, there are rational norms governing whether and how meaning is to be changed in the face of evidence. I then show that, if there are norms of this kind, then on a reasonable view—a view that those of a Quinean bent have independent reason to accept—these norms must be taken into account even when a thinker is merely reasoning *suppositionally* about how to respond to a particular body of evidence. And if that's right, then meaning change, when it's rational, is going to be reflected in a thinker's conditional credences, which means that it's not going to be the source of exceptions to our sentential conditionalization principle. Finally, I explain why this result allows Quineans to maintain their skepticism about sentential meaning despite the fact that we've appealed to sentential meaning in order to arrive at it.

So: consider again the case of Fred, who continues to have a high credence in  $B$  after acquiring evidence specified by  $E$ , despite the fact that his  $cr_1(B | E)$  was low. If we take as given the assumption that sentences do indeed have meanings and that what meaning a sentence has can change over time, we can suppose that, in Fred's case,  $B$  has undergone such a shift: it expresses one proposition before the evidence is

acquired and a different one afterward. The question I want to ask, then, is whether this sort of meaning change is in any way rationally constrained. That is, does Fred have the right to make sentences such as  $B$  mean whatever he likes, or can he be faulted for choices he makes about the meanings of expressions of his language?

If we assume that thinkers like Fred *can't* be faulted for their choices about the meanings of their expressions, we can conclude that this case is indeed an exception to our sentential conditionalization principle: since Fred can rationally change the meaning of  $B$  in whatever way he likes between  $t_1$  and  $t_2$ , he can be ideally rational despite the fact that  $cr_2(B) \neq cr_1(B \mid E)$ . I suggest, though, that this assumption is false, and false whether we regard  $B$  as a sentence of a communal language or as a sentence of Fred's idiolect. That it's false in the former case is fairly obvious—if the language is communal, then Fred, presumably, must do his best to use  $B$  as those in his linguistic community use it, which means that whether he's rational to have  $B$  mean something different than it did before depends on what evidence he has about its use among the other members of his community.<sup>27</sup> But even in the latter case, where  $B$  is a sentence of Fred's idiolect, it's plausible that there are constraints on what sorts of changes in meaning are permissible. If, for instance, Fred holds on to  $B$  because he has arbitrarily changed its meaning so that it comes to express some radically different proposition, such as the proposition that  $1 + 1 = 2$  or the proposition that Jupiter is larger than Mercury, then surely he's made *some* sort of mistake. (What I'm relying on here is just an intuitive judgment, but it's also possible to give a Quinean rationale for this claim. A thinker who arbitrarily changes the meaning of an expression will need to adjust her attitudes toward various sentences as a result, and this sort of arbitrary adjustment can be ruled out due to the familiarity desideratum.) And if that's right, then there are rational norms governing meaning change.

To anticipate an objection: opponents of Quinean naturalism might insist here that, insofar as there are rational norms governing meaning change, they're norms of *practical* rationality and so are entirely irrelevant in the present context—whatever pragmatic norms there are, the fact remains that there aren't any *epistemic* rational norms governing meaning change. And if that's right, then Fred can be fully *epistemically* rational despite violating sentential conditionalization, which is all that the diachronic rationality argument for analyticity requires.

This objection, though, is compelling only on the assumption that there's a bright line between practical and epistemic rationality such that any norm, if it's a pragmatic norm, thereby *isn't* an epistemic norm. And Quinean naturalists will (and should) deny that there's any such line. After all, to assume that there's such a line is to assume that epistemological pragmatism is false, and Quine, as I've suggested, is an epistemological pragmatist: his view, recall, is that the grounds for choosing among systems of beliefs are given by the practical desiderata discussed in Sect. 2. In fact, much of his point in arguing against the analytic–synthetic distinction is to show, *contra*

<sup>27</sup> This description of the situation may not be quite apt. Strictly speaking, if the language is communal, then it's not even *possible* for Fred to have  $B$  mean what he likes. The meaning of  $B$  is just determined by patterns of use in Fred's linguistic community, and so  $B$  means what it means regardless of how Fred chooses to use it. Still, though, how he uses it is going to be determined in part by his *beliefs* about what it means, and there are, of course, rational constraints on those beliefs. So changes in how he uses  $B$  are rationally constrained, which is what's important for our purposes here.

Carnap (1950), that matters of fact can't in principle be disentangled from one's choice of language, which means he has to deny that factual questions and questions about what language to use are to be answered on different grounds. So, since questions about what language to use are to be answered on pragmatic grounds, he has to insist that the epistemic grounds on which factual questions are to be answered can't in principle be disentangled from pragmatic ones. Here's how "Two Dogmas" ends:

Carnap, Lewis, and others take a pragmatic stand on the question of choosing between language forms, scientific frameworks; but their pragmatism leaves off at the imagined boundary between the analytic and the synthetic. In repudiating such a boundary I espouse a more thorough pragmatism. Each man is given a scientific heritage plus a continuing barrage of sensory stimulation; and the considerations which guide him in warping his scientific heritage to fit his continuing sensory promptings are, where rational, pragmatic. (1951, p. 43)

The Quinean view, then, is that epistemology itself is shot through with practical considerations and that there's a deep connection between that fact and the nonexistence of a principled analytic–synthetic distinction. So the objection under discussion, which relies on the assumption that epistemological pragmatism is false, begs one of the central questions at issue here and so is not compelling in the present context—the goal, remember, is to give Quineans themselves reason to abandon their views, and their opponents can't hope to do that by appealing to assumptions they reject.

Back to the main thread: if, as I've suggested, meaning change is rationally constrained, then given a thinker's body of evidence, there are facts of the matter about what the expressions of that thinker's language ought to mean. In the case of Fred, for example, it's plausible that the evidence specified by  $E$ —evidence of the existence of a 25-year-old man who's unmarried and tidy—isn't sufficient to rationally motivate a change in the meaning of  $B$ , in which case Fred, who has changed the meaning of  $B$  on the basis of that evidence, has been less than ideally rational. But whether that's the right verdict doesn't matter here. What's important is just that there are some facts of the matter about what Fred, having acquired the evidence specified by  $E$ , should mean by  $B$ .<sup>28</sup>

And if there are facts of the matter about what a thinker's sentence  $S$  ought to mean in a given situation, then those facts play a role in determining how confident the thinker should be in  $S$ . In particular, the credence the thinker ought to have in  $S$  can be expressed a function of two things: what proposition  $S$  ought to express and what credence the thinker should have in that proposition.

This can be represented formally. Suppose that, for some thinker's sentence  $S$ , there are  $n$  propositions  $p_1, \dots, p_n$  that are candidates for being expressed by  $S$ , and let  $exp(S, p, E)$  be the following function:

<sup>28</sup> Incidentally, Chalmers agrees that there are facts of the matter about what sentences ought to mean in particular situations. He suggests in *Constructing the World* that "conceptual evolution...is constant and ongoing, driven by various practical purposes" (2012, p. 231), and he claims in his "Verbal Disputes" that "there are important normative questions about what expressions *ought* to mean," questions whose answers "depend on our purposes and values" (2011b, p. 542). Chalmers, though, isn't an epistemological pragmatist: for him, the practical considerations governing language choice aren't epistemic.

$$\text{exp}(S, p, E) = \begin{cases} 1, & \text{if } S, \text{ on the evidence specified by } E, \text{ ought to express } p \\ 0, & \text{otherwise} \end{cases}$$

Furthermore, let  $cr(*)$  specify the thinker’s credal state at time  $t$ , and let  $E_t$  be an evidence sentence specifying the total evidence the thinker has at  $t$ . Then, if the thinker is fully rational,  $cr(*)$  satisfies the following constraint:

$$cr(S) = \sum_{i=1}^n \text{exp}(S, p_i, E_t) \times cr(p_i) \tag{Constraint 1}$$

The degree of belief a thinker should have in a sentence  $S$ , then, is equal to the degree of belief she should have in the proposition that ought to be expressed by  $S$ .<sup>29</sup>

And something similar is true of the thinker’s *suppositional* beliefs: the degree of belief the thinker should have in an eternal sentence  $S$  on supposing she has some evidence is the same as the degree of belief she should have in  $p$  on supposing she has that same evidence, where  $p$  is the proposition  $S$  ought to express.<sup>30</sup> But this raises a question. What proposition  $S$  ought to express, remember, is determined in part

<sup>29</sup> Here I’m relying on a few simplifying assumptions, each of which could be relaxed at the cost of significantly complicating the presentation of my argument. First, I’m assuming that the thinker, in taking an attitude toward  $S$ , ought to take a definite stand about what proposition  $S$  expresses. If that’s not right—if the thinker instead ought to let uncertainty about  $S$ ’s meaning have an effect on the attitude she takes toward  $S$ —then our constraint will be a bit different:

$$cr(S) = \sum_{i=1}^n cr(\text{Exp}(S, p_i)) \times cr(p_i)$$

where  $\text{Exp}(S, p)$  is the proposition that  $S$  expresses  $p$ .

Second, I’m assuming that, for any given body of evidence, there will be a unique best assignment of propositions to sentences—it’s only on this assumption that it makes sense to talk about *the* proposition that ought to be expressed by  $S$ . If this assumption is false—if it’s possible for a body of evidence to make permissible more than one meaning assignment—then, again, our constraint will be a bit different. Let  $asn(A, S, p)$  be the following function:

$$\text{asn}(A, S, p) = \begin{cases} 1, & \text{if assignment } A \text{ assigns proposition } p \text{ to sentence } S \\ 0, & \text{otherwise} \end{cases}$$

Then  $cr(*)$ , if our thinker is fully rational, will satisfy the following constraint:

$$\text{For some } A \text{ permissible on evidence } E_t, cr(S) = \sum_{i=1}^n \text{asn}(A, S, p_i) \times cr(p_i)$$

Notice, though, that, in general, the thinker’s evidence will include evidence about what meaning assignments she has used in the past. Arbitrary changes in meaning assignment, like the arbitrary resetting of priors discussed in footnote 23, can be ruled out due to the familiarity desideratum. So, even on a permissive view of the relationship between evidence and meaning assignment, *most* bodies of evidence will place strict limits on what meaning assignments are permissible.

At any rate, for my purposes here it doesn’t matter which of these constraints we use, so I’m using the simplest one.

<sup>30</sup> Note the restriction to eternal sentences. The interaction between conditionalization and indexicality gives rise to lots of problems, none of which is relevant here.

by the thinker’s evidence. But what evidence is relevant in the case of the thinker’s suppositional beliefs? That is, when the thinker is reasoning suppositionally about  $S$ , should she, in deciding what  $S$  is going to mean, take into account only the evidence she *actually* has, or should she also take into account the evidence she’s *supposing* she has?

We can translate this question back into our formal framework. As before, let  $cr(*)$  specify the thinker’s credal state at time  $t$ , and let  $E_t$  specify the evidence she actually has at  $t$ . Then a conditional-credence analog of Constraint 1 can be filled out in either of the following ways:

$$cr(S | E) = \sum_{i=1}^n exp(S, p_i, E_t) \times cr(p_i | E) \tag{Constraint 2a}$$

$$cr(S | E) = \sum_{i=1}^n exp(S, p_i, E_t \wedge E) \times cr(p_i | E) \tag{Constraint 2b}$$

The thinker, to count as fully rational, must satisfy one of these constraints.<sup>31</sup> The question is which one. (And this isn’t a question for which there’s an agreed-upon answer. Bayesians generally either think in terms of propositions rather than sentences

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<sup>31</sup> As above, if either of my simplifying assumptions is false, things are a bit different. If uncertainty about  $S$ ’s meaning ought to have an effect on the thinker’s attitude toward  $S$ , the candidate constraints are the following:

$$cr(S | E) = \sum_{i=1}^n cr(\text{Exp}(S, p_i)) \times cr(p_i | E)$$

$$cr(S | E) = \sum_{i=1}^n cr(\text{Exp}(S, p_i) | E) \times cr(p_i | E)$$

If bodies of evidence don’t always pick out unique best meaning assignments, things get more complicated. In that case, these are the candidates:

$$\text{For some } A \text{ permissible on evidence } E_t, cr(S | E) = \sum_{i=1}^n asn(A, S, p_i) \times cr(p_i | E)$$

$$\text{For some } A \text{ permissible on evidence } E_t \wedge E, cr(S | E) = \sum_{i=1}^n asn(A, S, p_i) \times cr(p_i | E)$$

But we must remember that the thinker’s future total evidence will include evidence about her present suppositional judgments. So, if the thinker actually goes on to acquire total new evidence specified by  $E$ , we can be sure that  $E$  includes evidence about what meaning assignment she used in arriving at these suppositional judgments. The question, then, is whether she’s required, on actually acquiring the evidence, to abide by that suppositional meaning assignment.

If the first candidate constraint is correct, it’s relatively clear that she isn’t so required—after all, the evidence she used in choosing that meaning assignment is not the same as the evidence she now has. But if the second candidate constraint is correct, it’s plausible that she *is* so required, since she has strong pragmatic reasons to remain faithful to her previous suppositional assignments. Some of these reasons arise from the familiarity desideratum, and others arise from standard Bayesian concerns such as the avoidance of Dutch books.

or assume that meanings remain stable over time; as far as I know, our question here isn't one that has ever been asked in the context of Bayesian epistemology.)

I think there's a strong case to be made for Constraint 2b. After all, suppositional reasoning, on a plausible view, is just reasoning about how to respond to hypothetical bodies of evidence,<sup>32</sup> and we've established that sometimes the right response to a body of evidence is to change the meanings of one's expressions. So it seems reasonable to expect that rational thinkers, when engaging in suppositional reasoning, will take into account facts about what their sentences ought to mean in the face of the evidence they're supposing they have—that is, that rational thinkers will satisfy Constraint 2b.

Here's a concrete example. The meaning I now assign to the sentence "All vixens are foxes" is (as far as I know) its standard English meaning, and so I accept that sentence as true (indeed, as analytic). But I take it that, if several thousand English speakers were to assert "It's not the case that all vixens are foxes" in my presence, I'd have very good evidence that my use of "All vixens are foxes" didn't correspond to its use among the other members of my linguistic community, and so I'd be required to change what I meant by that sentence in a way that allowed me to reject it. And if suppositional reasoning is just reasoning about how to respond to hypothetical bodies of evidence, it would be strange, to say the least, if I were required to reject a sentence on *actually* acquiring some evidence but required to accept that very same sentence on *supposing* I'd acquired that very same evidence. So it's plausible that, now, when I merely suppose that several thousand English speakers have asserted "It's not the case that all vixens are foxes" in my presence, I should, on this supposition, reject the sentence "All vixens are foxes". But I can reject the sentence in this way only if my supposition has an effect on what meaning I assign to the sentence. So Constraint 2b, not Constraint 2a, must be the right constraint here.

This isn't conclusive, of course—readers are free to reject the conception of suppositional reasoning on which I'm relying. But for my purposes here, we don't need to show conclusively that Constraint 2b is the right constraint; it's enough that there's a *reasonable* picture on which it's the right constraint. All that's required for my argument here is that Quineans can *reasonably* endorse the following claim: on the assumption that there's such a thing as sentential meaning, thinkers must satisfy satisfy Constraint 2b in order to count as fully rational.

Actually, though, something a bit stronger is true: Quineans, given their other commitments, *should* endorse this claim. After all, if Constraint 2a were the right constraint, thinkers who were engaged in suppositional reasoning would be required to cleanly separate the evidential considerations guiding their choice of language from the considerations guiding their beliefs about matters of fact—they'd be required to take into account the latter considerations, but not the former, in arriving at their suppositional beliefs. But on the Quinean view, this sort of clean separation is *impossible*: as I've said, that view is one on which questions of fact can't in principle be disentangled from questions of language choice. So Quineans are committed to the claim that, on the assumption that there's such a thing as sentential meaning, Constraint 2b, not Constraint 2a, is the right constraint.

<sup>32</sup> Chalmers himself endorses roughly this conception of suppositional reasoning: "In cases of supposition, we take [a sentence] to be true and we reason just as if it were true" (2014, p. 685).

Here's why all this is important: if Constraint 2b is the right constraint, then meaning change, if properly responsive to evidence, will always be reflected in a rational thinker's conditional credences. And if that's right, then it turns out that there can be no rational violations of sentential conditionalization for eternal sentences. After all, rationality requires that, for any eternal proposition  $p$ ,  $cr_2(p) = cr_1(p | E)$ , where  $E$  specifies the total evidence acquired between  $t_1$  and  $t_2$ . And in addition, the thinker's total evidence at  $t_2$  is just the thinker's total evidence at  $t_1$  plus the evidence acquired between  $t_1$  and  $t_2$ , which means  $exp(S, p, E_2) = exp(S, p, E_1 \wedge E)$ , where  $E_1$  specifies the thinker's total evidence at  $t_1$  and  $E_2$  specifies the thinker's total evidence at  $t_2$ . And from these two facts it follows, given Constraint 1 and Constraint 2b, that ideal rationality requires that  $cr_2(S) = cr_1(S | E)$ .

For illustration, we can return again to the case of Fred, who changes the meaning of his sentence  $B$ , "All bachelors are untidy", in order to maintain a high credence in that sentence after acquiring evidence of the existence of a 25-year-old man who's both unmarried and tidy. Given Fred's evidence, this change in meaning is either rationally permitted or not. If not, then Fred has failed to be fully rational, which means the case isn't a counterexample to our sentential conditionalization principle. But if so—if changing the meaning of  $B$  is in fact the right thing for Fred to do in this situation—then Fred, if he's rational, can recognize this fact even *before* he acquires the evidence. That is, he's aware at  $t_1$  that, were he to acquire the evidence in question, the right response would be to change the meaning of  $B$  in a way that allowed him to continue having a high credence in  $B$ . His initial conditional credence  $cr_1(B | E)$ , then, reflects that knowledge and so is *high*: he judges, on the supposition that he has the relevant evidence, that  $B$  is true. So although the meaning of  $B$  changes between  $t_1$  and  $t_2$ ,  $cr_2(B) = cr_1(B | E)$ . Fred hasn't violated sentential conditionalization after all.

On the picture I've sketched, then, our sentential conditionalization principle is *not* subject to counterexamples in cases of meaning change—all violations of sentential conditionalization for eternal sentences are irrational. So the diachronic rationality argument for analyticity fails: its point, after all, is that a notion of meaning change is needed in order to explain certain exceptions to sentential conditionalization, but I've just shown that there's a reasonable picture on which there are no such exceptions to be explained.

Of course, we've been operating under the assumption that there are such things as sentential meanings, and I've appealed to them freely in sketching this picture. But that assumption was merely granted for the sake of argument; Quineans are free to reject it. The result here, stated in Quinean terms, is this: even if there *were* such things as sentential meanings, there would, plausibly, be no exceptions to sentential conditionalization. So Chalmers's claim—that there obviously exist such exceptions and that they can only be accounted for by appeal to meaning change—is false.

Here's another way of seeing what's going on here. On the assumption that there are sentential meanings, reasoning about whether a sentence  $S$  is true is a two-step process: the thinker decides what proposition  $S$  is going to express and then takes an attitude toward that proposition by reasoning about the facts of the world. But the picture I've sketched is one on these two steps are closely connected—what Constraint 1 and Constraint 2b say, after all, is that, whether the thinker is reasoning suppositionally



or not, she should take into account the very same body of evidence when performing the first step that she does when performing the second. The two steps, then, are always performed together: for any body of evidence, the thinker performs both steps and arrives at a degree of belief in  $S$ . In the end, then, the thinker's attitudes toward the sentences of her language can be modeled by a sentential credence function, without any reference to meanings or propositions. And given that fact, Quineans are free to insist that, in reality, what the thinker is doing can't be broken down into distinct steps at all—the thinker just considers her evidence and arrives at some degree of belief in  $S$ .

And this is just the sort of picture Quineans will want to accept: their view, again, is that questions of language choice can't in principle be disentangled from questions of fact, so they're committed already to a view on which there can't be two distinct steps here. (In addition, since each sentential credence function corresponds to lots of different pairings of meaning assignment and propositional credence function, there's no way to determine just from someone's attitudes toward sentences what meanings they assign to those sentences. This sort of indeterminacy is just more grist for the Quinean mill.) From a Quinean perspective, then, this sort of picture is well motivated.

The upshot is that Quineans can, without appeal to a notion of meaning, deny that there are rational violations of sentential conditionalization for eternal sentences, which means the diachronic rationality argument for analyticity doesn't show that Quineans are committed to the notions of meaning and meaning change. So that argument fails.

I turn now to the diachronic rationality argument for apriority.

## 5 Proof that there are indefeasible sentences?

Recall that Quineans' denial of the existence of a priori truths is motivated by the argument from universal susceptibility, which says that, given their epistemological stance, there's reason to accept Defeasibility. But as we've seen, if  $S$  is a sentence such that rationality requires that  $cr(S | E)$  be high for every evidence sentence  $E$ , then  $S$  is a counterexample to Defeasibility. So if it's possible to show that there's any such sentence, then the diachronic rationality argument for apriority can give Quineans reason to concede that there are a priori truths.

The question is whether we can show that there *is* such a sentence, and Chalmers (2012, p. 216) sketches a formal argument intended to show that there is. As it turns out, though, this argument isn't compelling in the present context: it relies on a conception of entailment that's plainly inconsistent with Quinean epistemological commitments, which means it begs the question against the Quinean position. So what I want to do here is present a filled-out version of the argument and then explain why it doesn't have any force against Quine's view.

Let  $D$ , then, be some long sentence giving an evidentially complete specification of some epistemically possible centered world, in the following sense:  $D$  fully specifies what evidence is had by the thinker on which the world is centered. Furthermore, let  $S$  be some ordinary sentence that can be known to be true based on the evidence

specified by  $D$ . Then the material conditional  $\lceil D \supset S \rceil$ , according to Chalmers, can be shown to be indefeasible, as follows.

*Proof* Let  $cr(*)$  be a fully rational credence function, and let  $E$  be any evidence sentence. Then  $E$  is either true or false in the world specified by  $D$ , which means that either  $E$  or  $\lceil \neg E \rceil$  is true in that world. And what this comes to, since  $E$  is an evidence sentence, is that, in the world specified by  $D$ , the relevant thinker either does or doesn't have the evidence specified by  $E$ . Furthermore,  $D$  is an evidentially complete specification of that world, so it can tell us what evidence the thinker does and doesn't have. That is,  $D$  can tell us whether  $E$  or  $\lceil \neg E \rceil$  is true in the world it specifies. So

(1)  $D$  entails either  $E$  or  $\lceil \neg E \rceil$

The argument, then, proceeds by cases. Suppose first that  $D$  entails  $\lceil \neg E \rceil$ . Then  $E$  entails  $\lceil \neg D \rceil$ , so  $cr(\lceil \neg D \rceil \mid E) = 1$ . Furthermore, since  $\lceil \neg D \rceil$  entails  $\lceil D \supset S \rceil$ ,  $cr(\lceil D \supset S \rceil \mid E) = 1$  as well. So  $cr(\lceil D \supset S \rceil \mid E)$  is high. Discharging our supposition, then, we have:

(2) If  $D$  entails  $\lceil \neg E \rceil$ , then  $cr(\lceil D \supset S \rceil \mid E)$  is high

Suppose instead, then, that  $D$  entails  $E$ . Then  $\lceil E \wedge D \rceil$  is equivalent to  $D$ , in which case  $cr(\lceil D \supset S \rceil \mid \lceil E \wedge D \rceil) = cr(\lceil D \supset S \rceil \mid D)$ . And since it's a theorem of probability theory that  $cr(\lceil D \supset S \rceil \mid E)$  is between  $cr(\lceil D \supset S \rceil \mid \lceil E \wedge D \rceil)$  and  $cr(\lceil D \supset S \rceil \mid \lceil E \wedge \neg D \rceil)$ , we can conclude via substitution that  $cr(\lceil D \supset S \rceil \mid E)$  is between  $cr(\lceil D \supset S \rceil \mid D)$  and  $cr(\lceil D \supset S \rceil \mid \lceil E \wedge \neg D \rceil)$ . Now, since  $\lceil \neg D \rceil$  entails  $\lceil D \supset S \rceil$ ,

(3)  $cr(\lceil D \supset S \rceil \mid \lceil E \wedge \neg D \rceil) = 1$

So, via another substitution, we can conclude that  $cr(\lceil D \supset S \rceil \mid E)$  is between  $cr(\lceil D \supset S \rceil \mid D)$  and 1, or, equivalently, that  $cr(\lceil D \supset S \rceil \mid E) \geq cr(\lceil D \supset S \rceil \mid D)$ . And we can show that  $cr(\lceil D \supset S \rceil \mid D)$  is high. Note, first of all, that  $S$  entails  $\lceil D \supset S \rceil$ , which means that, if  $D$  is true, then  $S$  is true just in case  $\lceil D \supset S \rceil$  is true. So

(4)  $cr(\lceil D \supset S \rceil \mid D) = cr(S \mid D)$

In addition, since  $S$  can be known to be true based on the evidence specified by  $D$ ,

(5)  $cr(S \mid D)$  is high

So, from (4) and (5),

(6)  $cr(\lceil D \supset S \rceil \mid D)$  is high

Now, we've already concluded that  $cr(\lceil D \supset S \rceil \mid E) \geq cr(\lceil D \supset S \rceil \mid D)$ , which means we can infer from (6) that  $cr(\lceil D \supset S \rceil \mid E)$  is high as well. So, discharging our supposition, we have:

(7) If  $D$  entails  $E$ , then  $cr(\lceil D \supset S \rceil \mid E)$  is high

So, from (1), (2), and (7),

(8)  $cr(\ulcorner D \supset S \urcorner \mid E)$  is high

For any  $E$ , then,  $cr(\ulcorner D \supset S \urcorner \mid E)$  is high, which means a rational thinker who doesn't violate sentential conditionalization will believe  $\ulcorner D \supset S \urcorner$  no matter what evidence she acquires. So  $\ulcorner D \supset S \urcorner$  is indefeasible.  $\square$

There's a lot to discuss in this argument. But in the present context, certain of the argument's claims about what entails what are of particular interest—it turns out that these claims, as used in the argument, presuppose that Defeasibility is false and so beg the central question at issue here. These, then, are the claims I'll be discussing.

So: what's wrong with the way these claims are being used? The root of the problem is that certain of the argument's moves can be justified only by appeal to the following two assumptions about the nature of the entailment relation:

- (i) If  $S$  logically follows from some set  $\Gamma$  of sentences, then the sentences in  $\Gamma$  entail  $S$ .
- (ii) If the sentences in some set  $\Gamma$  entail  $S$ , then a fully rational thinker's credence in  $S$ , on supposing that the sentences in  $\Gamma$  are true, is 1.

Consider, for example, the reasoning leading to (2) above, in which we suppose that  $E$  is false in the world specified by  $D$  and, under that supposition, reach the conclusion that  $cr(\ulcorner D \supset S \urcorner \mid E) = 1$ . In the course of that reasoning, we make the following moves (among others): we infer, from the claim that  $E$  entails  $\ulcorner \neg D \urcorner$ , that  $cr(\ulcorner \neg D \urcorner \mid E) = 1$ ; and we state, without appeal to any previous claims, that  $\ulcorner \neg D \urcorner$  entails  $\ulcorner D \supset S \urcorner$ . The first of these moves plainly presupposes (ii)—if (ii) were false,  $E$ 's entailing  $\ulcorner \neg D \urcorner$  wouldn't be sufficient to guarantee that, for any rational thinker,  $cr(\ulcorner \neg D \urcorner \mid E) = 1$ .<sup>33</sup> And the second move just as plainly presupposes (i)—since we haven't appealed to any other claims, all we have to go on is the fact that  $\ulcorner D \supset S \urcorner$  logically follows from  $\ulcorner \neg D \urcorner$ , and this fact can be sufficient to guarantee that  $\ulcorner \neg D \urcorner$  entails  $\ulcorner D \supset S \urcorner$  only if (i) is true. So both (i) and (ii) must be assumed in order for the argument to work as it should.<sup>34</sup>

Now, (i) seems trivial: cases of following logically are the paradigm cases of entailment. So that assumption, taken alone, seems safe enough. The problem is what happens when it's combined with (ii)—we can show that from these two assumptions it follows more or less immediately that all logical theorems are exempt from defeat by evidence, in which case they're counterexamples to Defeasibility.

<sup>33</sup> Chalmers (2012, p. 216fn), it's worth noting, states explicitly that his argument relies on an understanding of entailment according to which, if  $A$  entails  $B$ , then rationality requires that  $cr(B \mid A) = 1$ . This, I take it, is equivalent to (ii): for the sentences in some set  $\Gamma$  to entail  $S$  is just for their conjunction to entail  $S$ , and a supposition that the sentences in  $\Gamma$  are true just amounts to a supposition that their conjunction is true. The only problem is that, since Chalmers specifies the content of the thinker's supposition via a single sentence, we need to employ the logical device of the empty conjunction in order for Chalmers's formulation to be able to deal with the degenerate case where  $S$  is entailed by the sentences in the *empty* set. But this is just an artifact of the decision to use conditional-on-a-sentence credences to formally represent what's going on in cases of suppositional reasoning. So, to avoid empty conjunctions, I'm using (ii) rather than Chalmers's version.

<sup>34</sup> And the examples I've mentioned aren't the only places where (i) and (ii) are presupposed. Examination reveals that it happens throughout the argument.

Here's how. Let  $L$  be any logical theorem. Then  $L$  logically follows from  $\emptyset$ , which means, by (i), that  $L$  is entailed by the sentences in  $\emptyset$ . So, by (ii), rationality requires that a thinker's degree of belief in  $L$ , on supposing that the sentences in  $\emptyset$  are true, is 1. But the beliefs a thinker has on supposing that the sentences in  $\emptyset$  are true are, of course, just her unconditional beliefs—to suppose that the sentences in  $\emptyset$  are true is not to suppose anything at all. So rationality requires that  $cr(L) = 1$ . And it's a familiar theorem of probability theory that it's not possible to move away from a credence of 1 via conditionalization. Rationality, then, requires that, for every evidence sentence  $E$ ,  $cr(L | E) = 1$ , which means  $L$  is exempt from defeat by evidence. So any logical theorem  $L$  is a counterexample to Defeasibility.

Quineans, then, in virtue of their acceptance of Defeasibility, are committed to rejecting either (i) or (ii). So, since (i) is a truism, they must reject (ii).

At this point a friend of the a priori may be tempted by the following line of thought: Isn't this just another result in Chalmers's favor? After all, (ii) seem just as truistic as (i) is—if it turns out that Quinean naturalism requires that we reject (ii), so much the worse for Quinean naturalism.

The problem with this reasoning is that (ii) is emphatically *not* a truism, for at least two reasons. First,  $S$  and  $\Gamma$ , as they appear in (ii), are a *sentence* and a set of *sentences*, respectively. This fact is crucial: whatever plausibility might be enjoyed by (ii)'s propositional analog, (ii) itself, as a claim about sentences, is far less plausible. Opponents of Quine will accept, after all, that it's possible for the meanings of our logical connectives to change in such a way that a sentence  $L$  that was formerly a logical theorem is no longer one. In particular, it's possible for meanings to change in such a way that  $L$  now expresses a proposition that ought to be rejected. So, if there's any body of evidence in the face of which a meaning change of this sort is rationally permissible, then, according to the picture introduced in Sect. 4, there's a rational credence function  $cr(*)$  such that  $cr(L | E)$  is low (where  $E$  specifies the relevant body of evidence). And in that case,  $cr(L) \neq 1$  despite the fact that  $L$  is entailed by the sentences in  $\emptyset$ , which means opponents of Quine should themselves reject (ii).

Second, and more importantly: questions of meaning aside, most Quineans explicitly accept that there can be bodies of evidence in the face of which the rational response is to change one's logic, for just the same reasons that they accept Defeasibility more generally. Haack (1974, p. 26), to take just one example, endorses a view

according to which logic is a theory, a theory on a par, except for its extreme generality, with other, 'scientific' theories; and according to which choice of logic, as of other theories, is to be made on the basis of an assessment of the economy, coherence and simplicity of the overall belief set.

On this view, even if a sentence  $L$  is a theorem of a thinker's current logic, there may be bodies of evidence in the face of which the thinker ought to change her logic and then reject that sentence. And if that's right, then, again,  $cr(L) \neq 1$  despite the fact that  $L$  is entailed by the sentences in  $\emptyset$ , which means (ii) is false.

To put the point more generally: Entailment is a relation that holds at a particular time, one that may very well (via change in logic) cease to hold at some future time. But according to (ii), the epistemological properties correlated with entailment *can't* cease to hold: it follows from (ii) that, if the sentences in  $\Gamma$  *now* entail  $S$ , then a fully

rational thinker's credence in  $S$ , on supposing that the sentences in  $\Gamma$  are true, is now *and will at all future times be* 1. So, if (ii) is correct, the entailments generated by a thinker's current logic have the power to impose severe restrictions on what the thinker's beliefs may be at all future times, no matter how much her logic changes in the interim. But then she can never have reason to change her logic in the first place: after all, there's presumably no point in changing her logic unless she judges that, as it stands, it commits her to the wrong things, and according to (ii) she can't rid herself of those commitments by changing her logic anyway. So, if changes in logic can ever be reasonable responses to evidence, (ii) is false.

Now, as I've suggested, Quinean naturalists, because of their holistic approach to belief revision, *do* think changing one's logic can be a reasonable response to evidence. Furthermore, this is not an unintended consequence of their view—it's a core commitment. So Quineans will (and should) reject (ii) on the grounds that it's plainly inconsistent with their epistemology. I conclude, then, that Chalmers's formal argument, in relying on (ii) without providing any reason for Quineans to accept it, begs the question against the Quinean position. As a result, that argument can't give Quineans reason to accept that there's any sentence  $S$  such that  $cr(S \mid E)$  is high for every  $E$ . So the diachronic rationality argument for apriority fails to show that Quineans should abandon Defeasibility and admit that there are a priori truths.

## 6 Conclusion

In the end, then, Quinean naturalists are in a relatively strong position. For one thing, the holistic premises on which their arguments rely turn out to be far more difficult to deny than has usually been supposed. And for another, Chalmers's diachronic rationality arguments don't establish the intended conclusions: Quineans can accept diachronic rational norms without thereby committing themselves either to the intelligibility of the notion of analyticity or to the existence of a priori truths. So we remain at the impasse I mentioned in my introductory remarks, with Quineans insisting that intensional notions are unintelligible and the rest of us insisting that Quineans' standards of intelligibility are too strict.

Might there be a way forward here? I remain hopeful. But Chalmers's strategy, for all its ingenuity, just does not seem to be workable. Another approach will be required.

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