

Assertion and the Future

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Abstract

It is disputed what norm, if any, governs assertion. This article addresses this question by looking at assertions of future contingents. Many philosophers think that assertions of future contingents are problematic, indeed systematically infelicitous, in large part because they think that future contingents are not truth apt. This article shows that this view is not borne out by our practice of asserting future contingents and, moreover, that this practice suggests that assertions of future contingents are governed by the Knowledge Norm of assertion.

Keywords

future contingents, bivalence, truth, norms of assertion, knowledge norm of assertion

1. Introduction

It is intuitive that the future is open and the past is closed, that the future is unsettled and the past is settled.¹ For instance, while it is unsettled now whether the Swiss Alps will melt away within a century, it is settled that there used to be dodos. While it is unsettled now whether there will be a third world war, it is settled now that there was a first. Reflections on the open future have generated considerable debate about the semantics of future contingents: statements about the open future that are neither necessary nor impossible.² Much of this debate turns on the question of whether future contingents satisfy the principle of Bivalence.

Bivalence: Every proposition p is either true or false.

According to a number of philosophers, future contingents are nonbivalent: if it is unsettled whether p , then it is neither true nor false that p . Those who reject Bivalence for future contingents similarly reject FCT:³

Future Contingent Truth (FCT): Some contingent statements about the future are true.

Let us call those who think that the openness of the future is incompatible with FCT “FCT-incompatibilists” and those who think that the openness of the future is compatible with FCT “FCT-compatibilists.”

FCT-incompatibilists typically hold that the rejection of FCT is a consequence of our pretheoretic intuition that the future is open. This gives rise to a puzzle. We seem to frequently assert future contingents: Amanda tells you now that she will go running later, the weather forecaster announces that it will snow in Stockholm tomorrow, or the climate scientist reports

1 We will use “settled” and “unsettled” as synonymous with “closed” and “open,” respectively.

2 Notice that not all contingent statements about the future are unsettled: “I will die someday” is a contingent, future-tensed sentence, but the proposition that it expresses is intuitively settled. In this paper, we restrict our attention to that subclass of future contingents that concern the open or unsettled future.

3 Note that some philosophers accept Bivalence for future contingents but reject FCT. See section 3.

that the temperature will increase by at least 2°C by the end of the century. Moreover, according to many prominent accounts of the nature of assertion, there is a constitutive connection between assertion and truth. For instance, Frege held that an assertion is an outward sign of a judgment, where a judgment involves recognizing the truth of a proposition (1918, 356). Similarly, Dummett held that assertion, like belief, aims at truth (1973, 320), and many hold that assertion is constituted by some kind of truth norm or a norm that entails a truth norm such as:

Truth Norm: You ought to: assert that p only if p is true.⁴

The trouble is that if assertion is constitutively connected to truth, and if our pretheoretic intuition that the future is open requires a rejection of FCT, we should never regard assertions of future contingents to be felicitous. Since we do seem to regard assertions of some future contingents as felicitous, this suggests our pretheoretic intuition that the future is open does not entail that FCT is false.⁵

There are two basic strategies an FCT-incompatibilist might adopt in order to respond to this puzzle. First, she might reject the view that assertion is constitutively connected with truth. Second, she might argue that utterances of future contingents are not assertions after all, but some other sort of speech act. We will consider, and reject, both strategies. We will further argue that FCT, together with the view that assertion is constitutively connected to truth, is required to account for the data: our practice of making what appear to be felicitous assertions about the future.⁶ Indeed, as will become clear in the second part of the paper, we will argue that FCT, together with the Knowledge Norm of assertion, best accounts for this data:

Knowledge Norm: You ought to: assert that p only if you know that p .

In section 2, we will sketch several accounts of assertion and delineate the class of accounts of assertion that will play a central role in this paper. In section 3, we will discuss different ways in which the notion that the future is open can be understood. In section 4, we defend FCT together with the Knowledge Norm as the best explanation of our assertoric practice. In section 5, we consider the view that utterances of future contingents are not really assertions. We conclude in section 6 by stressing the incompatibility of FCT-incompatibilism with our assertoric practices.

2. Assertion

Roughly, an assertion is an utterance whose purpose is to make a statement as to how things are, that is where the asserted proposition is represented as true. Beyond this, there is widespread disagreement over what assertion fundamentally is. We can begin by distinguishing between two general approaches to assertion: the attitude-theoretic approach and the norm-theoretic

4 As is commonly done, we assume for all the assertion norms referred to here that “ought” takes wide scope over the conditional. (See, e.g., Williamson 2000.)

5 Some FCT-incompatibilists (such as John MacFarlane 2008, 2014, discussed in section 2.2.2) do not intend to capture the pretheoretic intuition that the future is open, but instead aim to give a semantics for future contingents that fits a favored metaphysical or physical theory. The data from our communicative practice involving future contingents do not show these FCT-incompatibilists to be mistaken. Nevertheless, if assertion is governed by the Truth Norm, then these theoretically motivated FCT-incompatibilists are committed to advocating a wholesale revision of our assertoric practice.

6 In our (2014) paper we argue for the weaker claim that our practices of assertion of future contingents vindicates Bivalence for future contingents. Many of the considerations in favour of this claim are brought to bear in our defense of FCT.

approach to assertion. Those who adopt the attitude approach stress the connection between assertion and some related attitude or psychological state. For instance, some proponents of the attitude approach hold that to assert *p* is to express the belief that *p*, or the justified belief that *p*, or the knowledge that *p*.⁷ Others hold that to assert that *p* is to present *p* as true⁸ or that to assert that *p* is to commit to the truth or justification of *p*.⁹ It is worth stressing that all of these accounts of assertion involve a connection to truth, since to believe that *p* is to hold *p* true.

According to the norm-theoretic approach to assertion, what it is for an utterance to be an assertion is for it to be governed by a norm that determines the conditions under which an assertion is felicitous. For instance, if assertion is constituted by the Truth Norm, then an assertion that *p* is felicitous only if *p* is true. Though we can evaluate assertions with respect to, for example, moral norms, norms of etiquette, or rational norms, the constitutive norm of assertion is special in that it is essential to what makes an assertion the sort of speech act that it is, such that violating it always entails making an infelicitous assertion. Since attitude-theoretic accounts of assertion also involve a close connection with truth, many of the points that we make here carry over, *mutatis mutandis*, to attitude-theoretic accounts of assertion. However, for simplicity of exposition, we will assume the norm-theoretic approach to assertion here.

It is worth pointing out that in adopting the norm-theoretic approach to assertion, we do not assume that the norms of assertion are genuinely normative, in the way that, say, moral norms are genuinely normative. As Hattiangadi (2007) argues, there is a distinction to be drawn between norm relativity and normativity, where “norm relativity” means “having to do with norms or standards,” while “normativity” is understood as concerning what one ought to do, may do, or has reason to do. Thus, even if some practice is constituted by norms, there is a further question whether one ought to, may, or has reason to do what the norms require one to do, in specific situations or in general. The same goes for assertion: according to a norm-theoretic account of assertion, assertion is constituted by norms, but this does not entail that these norms are normative in the strong sense that one ought to, may, or has a normative reason to do what the norm requires. It is a further question whether norms of assertion are genuinely normative, and this is not a question on which we will take a stand here.

The constitutive norm of assertion—whatever it turns out to be—can be taken to play two crucial roles in communication. First, it helps explain why speakers make certain judgments of felicity or infelicity about given assertions. Thus, if one hears an assertion of a proposition that one takes (implicitly or explicitly) not to satisfy the norm, one will judge it to be infelicitous. Second, it helps explain hearers’ interpretative judgments about what is said by an assertion. Sometimes, when one judges that an assertion would be infelicitous if interpreted literally, one will reinterpret its content so that the assertion satisfies the norm, in order to preserve the felicity of the assertion.

These two roles of the norm of assertion are modeled after Grice (1989), who takes conversation to be governed by a general Cooperative Principle:

Cooperative Principle: Make your conversational contribution what is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.

7 See Max Black (1952) and Donald Davidson (1984, 268) for the connection between assertion and belief. See Williamson (2000) for epistemic accounts of assertions.

8 Michael Dummett (1973).

9 This “commitment view” goes back to C. S. Peirce (1934, 547) and was notably picked up by Robert Brandom (1994), who thinks that part of what it is to assert *p* is to commit to justifying *p*.

In this setting, the Cooperative Principle establishes the expectation that speakers aim to satisfy certain communicative maxims: if a speaker appears to flout the Cooperative Principle in uttering a sentence, the hearer will consider that utterance to be an inappropriate contribution to the conversation. If the hearer assumes that the speaker is cooperative, then in cases where the speaker utters a sentence that is infelicitous if taken literally, the hearer tries to reinterpret the content of the assertion so that it comes out as an appropriate contribution to the conversation. These are cases of indirect assertion, or implicature.

For instance, the Truth Norm might explain why speakers judge assertions to be felicitous only if they are true, and it also might explain why hearers reinterpret assertions that are literally false as saying something true. For instance, suppose that Becca asserts:

(1) The glass is full.

Suppose also that there is a small space between the top of the liquid in Becca's glass and the top of the glass. It follows that what (1) literally says is false. Nevertheless, most people will take Becca to have said something true. The reason is that we treat Becca as a cooperative speaker, aiming to convey information in accordance with the norm of assertion, and that she too knows that it is obviously false that the glass is literally full (and knows that her audience knows that, and that she is unlikely to mislead them). Thus, we work back from the assumption that her assertion is felicitous, to the conclusion that she could not have meant that the glass is literally full; she must have meant that the glass is full enough.

As we have indicated, there are competing takes on assertion. The Truth Norm captures the intuition that assertion constitutively aims at truth. It can be used as a demarcation criterion: we can distinguish between norms that entail the Truth Norm and those that do not.¹⁰ On one side of the line, we have norms that do not entail that an assertion is felicitous only if it is true. Here are some examples:

Belief Norm: You ought to: assert that p only if you believe that p .¹¹

Justified Belief Norm: You ought to: assert that p only if you are justified in believing p .¹²

Justification Norm: You ought to: assert that p only if you have proper justification for p .¹³

On the other side of the line, we have norms that entail that an assertion is felicitous only if it is true.¹⁴ Here are some examples, one of which, the Knowledge Norm, is the norm we will end up arguing for, and the other is a hypothetical competitor:

10 See Matthew Weiner (2005) for a recent defense of the Truth Norm.

11 See Kent Bach and Robert Harnish (1979) for a classic defense of the Belief Norm.

12 See Igor Douven (2006, 2009), who holds that rational belief is the norm of assertion.

13 This label is really an umbrella term to refer to norms that contain an epistemic component but no commitment to truth. For particular instances, see Jonathan Kvanvig (2009, 2011) who defends a "Justified Belief Norm of Assertion" and see also Jennifer Lackey (2007) who defends a "Reasonable to Believe Norm of Assertion."

14 Note that the wide scope formulation of the norms does not uncontroversially permit entailment from the knowledge norm, say, to the truth norm. If the assertion norms are wide scope, in order to derive the truth norm from the knowledge norm, it would be necessary to accept some detachment principle such as the principle that $O(p \rightarrow q) \ \& \ q \rightarrow r$, then $O(p \rightarrow r)$, which is controversial in deontic logic. This minor difficulty can be overcome. The knowledge norm and the truth norm are related in the following way: necessarily, if one satisfies the knowledge norm, it follows that one satisfies the truth norm. Though we will continue to adopt the standard practice of talking as if the knowledge norm entails the truth norm, what we mean is that satisfaction of the knowledge norm entails satisfaction of the truth norm.

Knowledge Norm: You ought to: assert that *p* only if you know that *p*.

Justified True Belief Norm: You ought to: assert that *p* only if *p* is true and you justifiably believe that *p*.

There are also hybrid views that combine norm-theoretic and attitude-theoretic accounts of assertion. For instance, John MacFarlane has recently proposed combining a kind of truth norm with an account of assertion as a commitment, which in turn gives rise to a norm that enjoins retracting assertions that turn out to be false later, or in another context.¹⁵ The backdrop for MacFarlane’s combination of a truth norm and a commitment to retraction is his relativism about truth, according to which the truth of an assertion is always evaluated at both an utterance context and an assessment context, and according to which propositions can vary in truth value with respect to the assessment context. This is why an assertion can “turn out to be false later or in another context.” We can paraphrase his two norms roughly as follows (see MacFarlane 2014, 127 and 108).

Accuracy: You ought to: assert that *p* (at a context of utterance *CU* and a context of evaluation *CA*) only if *p* is true when considered at both *CU* and *CA*.

Retraction Rule: You ought to: retract, at *CA*, an (unretracted) assertion that *p* made at *CU* only if *p* is not true when considered at both *CU* and *CA*.

This closes our brief survey of the candidate norms of assertion and of the role a norm might play in communication. We now turn to a consideration of what it might mean to say that the future is open.

3. The Open Future

As we have indicated in the Introduction, it is intuitive to think that the future is open or unsettled. But what does this mean, more exactly?¹⁶ We will distinguish between those accounts of the openness of the future that are compatible with FCT (FCT-compatibilism) and those that are not (FCT-incompatibilism) and illustrate the distinction with specific examples.

3.1. FCT-Incompatibilism

3.1.1. *Semantic Approach*

When Aristotle discusses the open future in *De Interpretatione*, he presents the problem posed by future contingents as a challenge to Bivalence, a solution to which then consists of either a reasoned defense or a reasoned rejection of the principle. Aristotle settles for its rejection:

Clearly, then, it is not necessary that of every affirmation and opposite negation one should be true and the other false. For what holds for things that are does not hold for

¹⁵ We have not so far relativized our candidate norms of assertion to contexts: no relativization to context was required beyond that needed to determine the content of assertions containing context-sensitive expressions—that is, beyond MacFarlane’s context of utterance.

¹⁶ Here we do not survey all possible metaphysical accounts of openness. For more thorough discussions, in particular of the so-called “thin red line” account and supervaluationism, see Øhrstrøm and Hasle (2015). See also Torre (2011) and Stojanovic (2014).

things that are not but may possibly be or not be; with these it is as we have said.
(Aristotle 1984, 30)

The Aristotelian take on future contingents has given rise to a tradition according to which the common intuition that the future is open is interpreted as the intuition that future contingent statements are nonbivalent: to say that the future is open at some time t is to say that there are some propositions about the future relative to t that are neither true nor false at t .¹⁷ Since the nonbivalence of future contingents entails that FCT is false, this understanding of the open future intuition is straightforwardly incompatible with FCT.

While some think of the problem of future contingents as a tragic choice between Bivalence and openness, others may argue that both can be kept if we adopt a kind of error theory, according to which all future contingents are false.¹⁸ Of course, error theory is also a form of FCT-incompatibilism, so it can be treated alongside FCT-incompatibilist views that, unlike it, reject Bivalence.

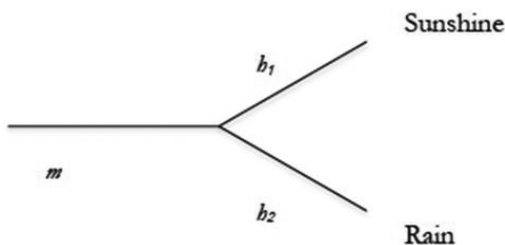
Another way to understand the intuition that the future is open is more directly rooted in metaphysics. The thought is that if the future is open, it is metaphysically indeterminate in the present how the future will unfold. The metaphysical indeterminacy of the future is generally taken to entail that Bivalence fails for future contingents and hence that FCT is false. If it is now metaphysically indeterminate whether the glaciers in the Swiss Alps will melt in the future, there is currently no fact of the matter whether the glaciers will melt, so it is now neither true nor false that the glaciers will melt in the future. In this case, rejection of FCT is in the first instance a consequence of a certain metaphysical understanding of openness.

3.1.2. *The Branch Theory of Time*

John MacFarlane has recently suggested that the best way to capture the intuition that the future is open is by reference to an eternalist picture of time, according to which past, present, and future times exist. On his view, times are also branching: time is like a rootless tree with multiple branching future histories, which are ontologically on a par. According to Branch Theory, it is now indeterminate which future branch is the future branch of the actual world. To get a better grip on Branch Theory, suppose that m is Monday, and Alice asserts (2) at m :

(2) It will be sunny in London tomorrow.

Figure 1. *Branch Theory of Time*



¹⁷ See, for instance, Diekemper (2004), MacFarlane (2003), and Markosian (1995) for discussion. This definition is adapted from Markosian (1995). Note, however, that Markosian's purpose is not to defend nonbivalence on the basis of this stipulative definition.

¹⁸ Patrick Todd (2016) essentially characterizes the debate over future contingents as a debate concerning Bivalence. He argues that contrary to common wisdom it is possible to keep both Bivalence and the open future by arguing that all future contingents are false.

In Figure 1, the direction of time goes from left to right; m is a moment through which both h_1 and h_2 pass, and it is assumed to be sunny on Tuesday on h_1 but not on h_2 .¹⁹

What does this picture mean for assertions of future contingents? According to MacFarlane, the proposition that it will be sunny in London tomorrow is neither true nor false at m , because for it to be true at m that it will be sunny in London on Tuesday is for it to be true on all histories that pass through m , and whereas it is true on h_1 , it is not true on h_2 (MacFarlane 2003, 2008). Thus, MacFarlane defends an FCT-incompatibilist view.

Though MacFarlane's take on Branch Theory involves the rejection of Bivalence, Barnes and Cameron (2009, 2011) claim that while every proposition satisfies Bivalence, it is indeterminate which truth value future contingents have. On their view, for every point in time in the actual world, there is a set of possible worlds that represents the way the future of the world might be, consistent with its past up to that point in time. They call this set {Futures} and they treat the worlds in {Futures} as precisifications of the present state of the actual world; though it is determinate that one of the worlds in {Futures} will be actualized, it is indeterminate which of them will. So, on their view, if Alice asserts (2) today, and if it is sunny in London tomorrow at some worlds in {Futures} but not at others, then what Alice says is not determinately true and not determinately false. Since for them all of the worlds in {Futures} are maximal and classical, at each world, every proposition is either true or false. Hence, today, it is determinately true that what Alice says is either true or false, because it is determinately true that one of the worlds in {Futures} will be actualized. However, it is not determinately true that what she says is true nor is it determinately false that what he says is false. Clearly, their view makes openness incompatible with FCT. If we take future contingent statements to be those that are true in some but not all of the worlds in {Futures}, no future contingent statement can be true.

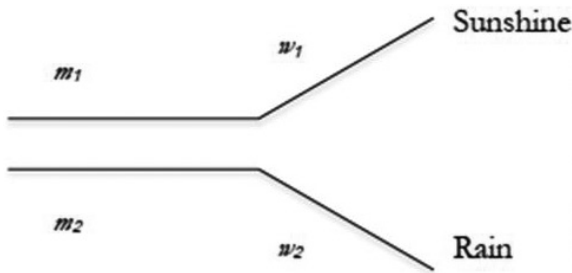
3.2. FCT-Compatibilism

3.2.1. *Counterfactual Dependence*

We have looked at a metaphysical account of openness that treats the future as metaphysically indeterminate. But there are alternative metaphysical accounts of openness that do not do so, and hence need reject neither Bivalence nor FCT. For instance, according to Lewis, the openness of the future is understood in terms of counterfactual dependence: the future is open in the sense that the future counterfactually depends on the present and the past; the past is closed in the sense that the it does not counterfactually depend on the present or the future (see Lewis 1987). According to Lewis, the future is open because there are multiple different ways the world could turn out to be in the future that are compatible with how it actually has been in the past and the present.

Figure 2: Counterfactual Dependence

¹⁹ MacFarlane (2014) represents Branch Theory as involving worlds that overlap in the past and present, but diverge in the future. For simplicity, we follow his characterization from 2003.



In Figure 2, w_1 and w_2 are metaphysically possible worlds, which are duplicates of one another from the past to the point at which the arrows diverge; w_1 contains moment m_1 , and w_2 contains a counterpart moment, m_2 . Suppose Alice asserts (2) at m_1 . She is in w_1 where it is sunny in London on the day after her assertion, so what Alice asserted in (2) is true. If Alice had been in w_2 , however, (2) would have been false since it is not sunny in London on the day after her assertion in w_2 . Thus, Bivalence and FCT come out true.

3.2.2. Agent Centered Approaches

Another FCT-compatibilist way to account for our intuition that the future is open involves thinking that intuitions of openness have first and foremost to do with states of the agents who make assertions of future contingents, hence the label “agent centered” (borrowed from Torre 2011, n4).

One way to articulate this thought is in epistemological terms. The future is open in that we do not know how it will unfold or we lack adequate justification as to which direction the future will take. We could account for the asymmetry between the past and the future in terms of the fact that we know or are in a position to know much more about the future than we know or are in a position to know about the past. Of course, the accounts of openness considered previously in semantic/logical and metaphysical terms would have epistemological consequences. But here we are considering the proposal that openness is a purely epistemic phenomenon.

Another agent centered way to articulate the intuition that the future is open would be by appealing to free will and moral responsibility. Intuitions about openness and intuitions about free will are related, as many think that free will requires the future to be open. We may also consider that our intuitions about free will underpin those that the future is open. Perhaps our intuitions that we can do otherwise than we actually do, that we have a genuine choice over which action to undertake or that we have control over our actions, which are all in some way related to the idea of free will, in fact underpin, and thus explain, our intuition that the future is open.²⁰ Thus, it may be that our intuitions that the future is open are agent centered and rooted in our understanding of ourselves as free agents.

4. FCT and Assertions of Future Contingents

Our starting point in evaluating FCT will be pragmatic data: in particular, our intuitive judgments concerning the felicity and infelicity of assertions of future contingents. These data are theoretically neutral in the sense that they presuppose neither FCT nor its rejection. However, we think that the data reveal that we are intuitively committed to FCT. We will show that the best explanation of these data not only requires the Truth Norm, but ultimately has to be

²⁰ The locus classicus for this kind of view is van Inwagen (1983).

given in terms of the Knowledge Norm. Thus, FCT-incompatibilists will either have to explain away our pragmatic judgments about assertions of future contingents or defend norms of assertion that do not even entail the Truth Norm and thus are far too weak.²¹ To show this, we will first start with considerations about the truth of assertions of future contingents, explain how the Truth Norm marks a threshold, and then move on to show how the correct norm for future contingents also requires an epistemic component.

Most of the time, we are willing to accept sincere, flat-out assertions of future contingents as felicitous. Consider the following cases. First, suppose that Addy is ready to go out for a run, but she is waiting for the babysitter, who is due to arrive in 10 minutes. Her babysitter has never before been late. Although, as all mothers know, any number of factors could interfere to cause delay, she has no positive reason to think that any such interference will occur. Addy says:

(3) I will go running in 10 minutes.²²

Second, suppose that Barbara is a Fellow of the Royal Meteorological Society, with a degree in Environmental Science, who works as a weather presenter for the BBC. Her record for predicting the weather one day in advance is very good, though of course, she is aware that it is possible that the weather will change in an unpredictable way. After checking her data carefully, she goes on the air and asserts:

(4) It will be sunny in Madrid tomorrow.

Under the circumstances just described, it seems natural to regard the assertions of (3) and (4) as felicitous. Yet, despite judging (3) to be felicitous, we think that the future is open rather than closed with respect to Addy's running in 10 minutes. That is, we think that the future might be different in this respect: even if it is now true that she will go for a run in 10 minutes, this is contingent—it is metaphysically possible that she won't go for a run in 10 minutes. Similarly, though we judge (4) to be felicitous, we do not think that the future is closed with respect to the weather in Madrid—everyone knows how sensitive weather systems are to change. Even if it is now true that it will be sunny in Madrid tomorrow, this is contingent—it is metaphysically possible that it will not be sunny, and however much evidence Barbara may have for the truth of what she says, it is neither fixed nor certain that it will be sunny in Madrid on the day after the day of her utterance. Yet we regard Barbara's assertion as felicitous.

FCT-incompatibilists might point out that we very often hedge our statements about the open future and prefer not to make flat-out assertions. For instance, we more often say "I think that it will be sunny tomorrow" or "It is likely to be sunny tomorrow" than "It will be sunny tomorrow." Perhaps we hedge because we judge future contingents to be nonbivalent or incapable of having truth values. Though it is true that we often hedge, the fact that we sometimes make flat-out assertions about the open future, and that we sometimes judge these assertions to be felicitous, is sufficient for our purposes. The phenomenon of hedging would only count against FCT if we were never willing to make flat-out assertions of future contingents, or if we were only willing to make flat-out assertions of future contingents in those cases where we regard the future to be settled (as in "I will die someday"). However, the aforementioned cases are examples of flat-out assertions that we would judge to be felicitous and yet where we judge the future to be open in relevant respects.

21 This section substantially derives from our (2014) paper.

22 We are assuming that this is not an expression of intention, but a straight assertion. If that is difficult to imagine, suppose instead that Clara says, of Addy, "she will go running in 10 minutes."

FCT-incompatibilists might respond by arguing that assertion is governed by a norm that does not entail the Truth Norm, such as the Belief Norm or the Justified Belief Norm. So our intuitions about the felicity of the assertions in (3) and (4) do not in fact support FCT. However, these weaker norms are not plausible in general, and certainly not in relation to future contingents. Suppose, once again, that Addy sincerely asserts (3), believing at the time of assertion that she will indeed go running in 10 minutes, but then changes her mind right before she was due to run and hunkers down on the sofa instead. The view that assertion is governed by the Belief Norm predicts that we will judge Addy's assertion to be felicitous, not just at the time of the assertion, but even after the event, when it turned out to have been false. Yet this prediction is not borne out. It would be perfectly natural to challenge Addy's assertion of (3) when we find her lounging on the sofa instead of running.²³ Similar difficulties arise for the Justified Belief Norm and Justification Norm. Suppose, for instance, that Barbara the meteorologist has a justified belief that it will be sunny in Madrid tomorrow as she asserts (4). Once again, we are likely to judge that her assertion was infelicitous if tomorrow brings rain to Madrid, however justified she is or takes herself to be. In both cases, the criticisms of the assertion as infelicitous are warranted by the fact that what was stated in (3) and (4) was not true. This suggests that felicitous assertion requires truth.

In response, it might be argued that our intuitions in certain cases speak in favor of norms that do not entail the Truth Norm. For instance, Lackey (2007) asks us to imagine an envatted brain who asserts, on the basis of sensory experience, that it is raining outside.²⁴ Even if it is not the case that it is raining outside, Lackey suggests that we intuitively view this assertion as felicitous, because the envatted brain has done no wrong in making the assertion, she is just unlucky.²⁵ However, we can explain these cases by making a distinction between our intuitions of felicity and infelicity, and our normative judgments more generally—such as our judgments about what is right, wrong, obligatory, responsible, blameworthy, or praiseworthy. Recall the distinction between norm relativity and normativity: to say that assertion is constituted by a norm N does not entail that one ought to do what N requires, nor that one has done wrong if one does not do as N requires. Thus, the intuition that the envatted brain has done no wrong in asserting that it is raining outside does not constitute evidence that her assertion was felicitous, nor that it is not constituted by a norm of truth or a stronger norm. On our view, the envatted brain's assertion is infelicitous, in much the same way that Barbara's assertion is infelicitous (in the case just envisaged in which it is raining in Madrid), though neither the envatted brain nor Barbara has done wrong.²⁶

If assertion is constituted by a norm that entails the Truth Norm, it follows that we take the propositions stated in assertions of (3) and (4) to be true. But if we also regard the future as unsettled in the relevant respects, then it follows that we do not in general take the openness of the future to imply that future contingents are not true. Thus, FCT-incompatibilists make false predictions about our intuitive pragmatic judgments.

Of course, there are situations in which we regard assertions of future contingents to be infelicitous because of a lack of justification. For example, if Alice asserts (2) with no evidence, we are inclined to regard her assertion as infelicitous. Similarly, the following assertions look infelicitous if they are made (say) on December 31, 2019:

23 See Stojanovic (2014, 39–40) for a similar point.

24 Note that Lackey's argument is not made in the context of assertions of future contingents and her target is mainly the Knowledge Norm of Assertion.

25 It is a contentious matter how we think of assertions made by envatted brains, and whether we think that they constitute (systematic) violations of the relevant norm of assertion. Arguably, intuitions about such *recherché* cases lack the probative value of intuitions about ordinary cases. We will not press this line of objection here.

26 See, for instance, DeRose (2002) and Weiner (2005).

- (5) It will be sunny in London on March 3, 3014.
- (6) There will be a fourth world war.

FCT-incompatibilists may suggest a possible explanation of why we regard such assertions as infelicitous—because they are neither true nor false. But this explanation of why we regard these assertions as infelicitous is not borne out by the data. If this were the reason why we regard these assertions to be infelicitous, then it would be natural to give that reason when challenging the assertion. Yet the most natural way to challenge (6) would be to say one of the following:

- (7) Are you sure? There might not be a fourth world war.
- (8) You don't know that there will be a fourth world war.

In contrast, it would be distinctly odd to challenge (6) by saying the following:

- (9) It is neither true nor false that there will be a fourth world war.

(9) is just an odd thing to say in English. Only a philosopher would say (9)—indeed, only a FCT-incompatibilist. But if it followed from our judgment that the future is open that future contingents are nonbivalent, or even if nonbivalence were merely offered as an explanation for those judgments, we would expect (9) to sound more natural.

Perhaps, one might think, the “neither true nor false” locution sounds odd here, but that we would find it natural to say that a future contingent is not true, and to say that it is not false. However, in the present context, this cannot be the correct explanation of the oddity, because it makes no sense to challenge an assertion of (6) by saying the following:

- (10) It is not false that there will be a fourth world war.

It hardly seems like a challenge to say that an assertion is not false—indeed, (10) is compatible with (6). In contrast, (11) sounds like a more natural challenge:

- (11) It is not true that there will be a fourth world war.

However, if one were to challenge an assertion of (6) by asserting (11), one would lay oneself open to the following challenges:

- (12) Are you sure? It might be true that there will be a fourth world war.
- (13) You don't know that it is not true that there will be a fourth world war.

The reason for this seems to be that in asserting (11), the speaker commits herself to knowing, or at least justifiably truly believing, that there will not be a fourth world war. Assuming that our current epistemic situation is insufficient to justify a belief one way or the other, then the challenge in (11) would be on as shaky epistemic ground as the assertion of (6).

It seems that FCT-incompatibilists cannot explain the data concerning the felicity and infelicity of assertions of future contingents, and challenges to them. Our view is that the best explanation of this data is that not only must the norm of assertion entail that an assertion is felicitous only if it is true, it must also contain an epistemic component, as is strongly suggested by the challenge data. In (12), the challenger claims that the speaker is not in a position to rule out the alternative epistemic possibility in which there is no fourth world war, and again in (13) the challenger points to lack of knowledge or justification on the part of the speaker. Furthermore, the infelicity of the challenge in (11) can be explained by the assumption that the speaker of (11) is,

by hypothesis, in the same poor epistemic situation as the speaker of the assertion she is challenging. This suggests that the correct norm of assertion must be either the Knowledge Norm or Justified True Belief Norm. In the case of the felicitous assertions of (10) and (11), the explanation of our judgment is that we regard them to be true, and regard the speaker to be in a position to know or at least have a justified true belief in the proposition asserted. In contrast, in the cases of infelicitous assertion, such as (12) and (13), we regard the speaker to be in a poor epistemic situation, whether or not the proposition asserted is true.

Which of these two norms offers the best account of assertion? On our view, it is the Knowledge Norm. Now, one might not feel at ease with the Knowledge Norm for future contingents: one might want to say that although some future contingents are assertible, because one's justification for them is strong enough, no future contingent is really knowable. So one might think it more fitting to adopt a weaker norm of assertion in terms of justified true belief.

We do not share this worry, as we think that the Knowledge Norm is well motivated by the data provided here. Notice further that a knowledge norm need not be so demanding. One could, for instance, appeal to standard contextualism about knowledge here (see Cohen 1986; DeRose 1991; Lewis 1996) and articulate a knowledge norm of assertion that is context sensitive—such that whether S knows that p depends on features of the salient context. In ordinary contexts, such as those described earlier regarding Addy and Barbara, a relatively low level of evidence is required for knowledge, and there is plenty of it. Hence, the contextualist would say that Addy and Barbara both know what they assert. In conjunction with a contextualist knowledge norm, it follows that both assertions are felicitous—which coheres with our pragmatic judgments.²⁷ Similarly, according to the subject-sensitive invariantist (e.g., Hawthorne 2004; Stanley 2005), the evidence required for knowledge depends on how high the stakes are: in low-stakes situations, the evidence required for knowledge is relatively low. In conjunction with such a view of knowledge, the Knowledge Norm is not too demanding, because it implies that both Addy and Barbara know what they assert, and hence, it correctly predicts that their assertions are judged to be felicitous.²⁸

Another way to make the Knowledge Norm less demanding is developed by Sandy Goldberg (2015, ch. 10), where the Knowledge Norm itself is context sensitive, rather than merely inheriting its context sensitivity from the context sensitivity of knowledge. Goldberg draws on the Gricean Cooperation Principle stated in section 2 in that the evidential standards in place in a given conversational exchange (context) depend on, to quote Grice once again, “the accepted purpose or direction of the talk exchange in which you are engaged.” That is, whether an assertion is felicitous depends in part on the sort of evidence that is expected in the relevant conversational exchange. Thus, while assertion “is governed by a context-sensitive (epistemic) norm whose default is knowledge” (2015, 275), there are circumstances in which “this default is overridden” (275), for instance “in the face of diminishing epistemic hopes” (259). One such context, which is Goldberg's focus, is systematic peer disagreement (e.g., in philosophy). Goldberg argues that in those contexts the practice of assertion is rational—so assertions can be felicitous—even though we do not have the sort of evidence that warrants knowledge. This is explained by the fact that it is understood by participants in the talk exchange (“epistemic groups”) that the evidential standards in place are lower than those for knowledge, so that it may still be appropriate to assert in this context.

27 Notice that if we go the standard contextualist route, we will have to articulate a Knowledge Norm, in a metalinguistic fashion:

Contextualist Knowledge Norm: You ought to: assert that p only if you satisfy “knows p” in your context. See Blome-Tillmann (2013) for a discussion of such contextualist knowledge norms and for a defense of the view that knowledge norms are compatible with contextualism.

28 Future contingent Gettier cases also speak in favor of the knowledge norm over the justified true belief norm.

Applied to assertions about the future, these proposals may be relied upon to claim that while we do not have knowledge of future contingents—we are making assertions about the future “in the face of diminishing epistemic hopes”—the practice of asserting about the future can be rationalized such that some assertions about the future are felicitous. This would be because it is largely understood by participants to this kind of talk exchange about the future—the relevant epistemic group—that the evidential standards have to be lower here than those for knowledge. Thus, on this account, while we hold the Knowledge Norm, Barbara and Addy’s assertions are felicitous—they are supported by enough evidence to afford felicity—but neither knows the facts she is asserting. As we have stressed before, our view is that the Knowledge Norm provides the best explanation of our practice of asserting future contingents, so we prefer to hold to an unqualified knowledge norm (that involves an unqualified conception of knowledge), but we hope to have made it clear that there are options for those who want to hold on to a knowledge norm but find the case of assertions of future contingents too recalcitrant.

We should also make it clear that while an appeal to an epistemic norm of assertion helps to explain the data, it does not follow that what it is for the future to be open is for it to be epistemically uncertain or unknown, as the epistemic account of the openness of the future states (see again section 3.2.2). All it commits us to is some form of FCT-compatibilism. One issue with the epistemic account of openness that was alluded to before is that a future event might feel unsettled while the past event might not, even though we have equal justification for both. Another issue is that we may judge assertions about the past to be infelicitous, even though we regard the past as settled. For example, in our current epistemic context, it would be infelicitous to assert:

(14) Caesar ate grapes on the day he crossed the Rubicon.

Here, the intuitive infelicity can be explained by our poor epistemic situation, together with an epistemic norm of assertion. Since (14) is intuitively settled, we cannot simply understand the intuition that the past is closed as the intuition that we are in a better position to know about the past.

Another interesting case, discussed by Ninan (2014) in a somewhat different context, goes as follows. Imagine that you are a personal chef for Ellen, a wealthy entrepreneur. You are making a new dish for her, based on your knowledge of what foods she generally likes, and as you are making the dish, you say to your friend:

(15) Ellen is going to love this dish.

After you finish preparing the dish, you leave Ellen’s house before she has returned from work, not to return for several days. The dish is to be reheated and served to Ellen after you have gone, and unbeknownst to you, Ellen does in fact love the dish. The next day, your friend asks you whether Ellen liked the dish. At this point, it seems that you are not in a position to assert:

(16) Ellen loved the dish.

This case is interesting because it seems to be one in which you can know something about the future, though when the relevant future event occurs, you know longer know what you previously knew. Moreover, we can assume that at the time of your assertion of (15), the future is open in relevant respects, while at the time of your assertion of (16) the past is closed in relevant respects. This adds further support to the view that our pragmatic intuitions do not

support a purely epistemic account of the openness of the future—there is a nonepistemic dimension to time unfolding.²⁹

The foregoing remarks suggest that our intuitive view that the future is open does not commit us to the view that future contingents are nonbivalent or cannot satisfy FCT. Indeed, our pragmatic judgments reveal that we frequently regard contingent statements concerning the open future to be true and justifiably so. When we do not regard assertions of future contingents to be felicitous, this is because, in these cases, we take the speaker to be in a poor epistemic situation with respect to the assertion in question, not because we take the proposition asserted to be not true. Thus, assuming a standard account of assertion, any substantive account of openness that preserves FCT seems to better capture our intuitive concept of openness than any account that entails a rejection of FCT. Indeed, any account of openness that rejects FCT seems to be forced to adopt an error theory about a wide range of pragmatic intuitions.

5. Are Assertions of Future Contingents Really Assertions?

One might think that assertions about the future are not to be taken at face value. Either their contents should not be taken at face value, or the fact that they are assertions should not be taken at face value. The rationale for an FCT-incompatibilist would be as follows. On the one hand, if assertions of future contingents have different contents than they seem to have, then some of them may be true and so asserting such contents might be compatible with the Truth Norm or indeed our preferred Knowledge Norm. On the other hand, if assertions of future contingents are not really assertions, that is, if they are different speech acts, then we may hold the Truth Norm, or the Knowledge Norm, and not worry about the case of future contingents. We consider the two options in turn.

5.1. Not Taking the Content at Face Value

On the first option, when we hear future contingent sentences uttered, we tend to reinterpret them to mean something weaker. This is picking up on the notion of hedging mentioned in section 4. Perhaps here we could invoke the Gricean explanatory mechanism sketched in section 2 in connection with the assertion of (1). The thought is that, on closer inspection, a flat out assertion of future contingent initially strikes us as infelicitous and so we systematically reinterpret it as an assertion of something weaker, which only strikes us as felicitous given the reinterpretation. For instance, we hear the assertion of (3) as expressing (17):

(17) It is likely that I will go running in 10 minutes.

If this is the explanation for why we find assertions of future contingents felicitous, by parity, we should naturally interpret Alice's assertion of (1) as expressing the proposition that:

(18) It is likely that it will be sunny in London tomorrow.

²⁹ It may be that the contextualist views just alluded to can help with this case. Consider, for instance, Goldberg's view (2015) that the Knowledge Norm has a contextual parameter. Suppose that we think that assertions about the future constitute cases of assertion "in the face of diminishing epistemic hopes" so that, while you do not know that Ellen will love the dish, your assertion of (15) is felicitous. The assertion in (16) is not made in the same context and so the Knowledge Norms is in place—not overridden. So in this context, (16) is not felicitous because your evidence that Ellen loved the dish is not sufficient for knowledge—just like your evidence that Ellen will love the dish was not sufficient for knowledge when you were asserting (16).

An FCT-incompatibilist might then suggest that we hear (1) as (18) and (3) as (17), respectively, because we initially regard those assertions as literally infelicitous. Such an FCT-incompatibilist would then be able to accept the Truth Norm.

This suggestion is not compelling, however. We can see this if we consider indirect reports. It is standard to test intuitions about what is said by an utterance against judgments of what would constitute a felicitous indirect report of what was said. For example, suppose that Cathy phones from San Diego and says:

(19) It is raining.

Suppose that her call is received in England. In this case, it would be natural to report Cathy's assertion indirectly by saying:

(20) Cathy said that it is raining in San Diego.

The reason why (20) seems like an accurate report of (19) is that (20) seems to capture what is said by (19). Now, it is worth noting that this sort of indirect report test has been criticized, because whereas there is only one literal semantic content of any sentence, there are many different ways in which to report what is said.³⁰ Be that as it may, a weaker inference can be made on the basis of indirect speech reports: it seems obvious that if an indirect speech report seems clearly infelicitous, then we can infer that it does not accurately capture what was said by the initial assertion.

It is only this weaker assumption that we need in order to show that the hypothesis under consideration is false. If the hypothesis were true, then (3) and (4) would be correctly reported by (21) and (22):

(21) Addy said that it is likely that she will go running in 10 minutes.

(22) Alice said that it is likely that it will be sunny in London tomorrow.

However, these do not seem to be accurate reports of what was said. In general, to say that it is likely that *p* seems to be to say something about the chance or the likelihood that *p*, whereas to flat-out assert that *p* seems to say nothing about likelihoods or chances. Hence, to report a flat-out assertion that *p* as saying that it is likely that *p* would be misleading. This holds equally in the case of assertions of future contingents. The hypothesis that future contingents are interpreted as expressing propositions concerning the likelihood of future events thus fails the weaker indirect report test, because we do not hear flat-out assertions of future contingents as expressing propositions about likelihood.³¹

5.2. Not Taking the Assertion at Face Value

A further suggestion in the same spirit is that utterances of future contingents are not assertions of a weaker content, but that they are speech acts other than assertion, and governed by weaker norms. Perhaps there is a *sui generis* speech act of prediction, which falls short of assertion. The upshot would be that utterances of future contingents would never be assertions, but predictions governed by a weaker norm, such as the following:

Prediction Norm: You ought to (predict that *p*) only if it is highly likely that *p*.

30 Cappelen and LePore (1997).

31 These remarks hold even if we consider other expressions for chances than "likely," which might be thought to be too weak, such as "very likely." The reported speech data suggest that any such strengthening would be inadequate.

If utterances of future contingents are governed by the Prediction Norm rather than the Truth Norm, then some may come out as felicitous even if they are not true, for likelihood does not imply truth. However, this theory presents some of the same sorts of difficulties as a theory according to which utterances of future contingent sentences are a kind of pretend or fictional assertion. For example, suppose that Vikram asserts:

(23) Harry Potter goes to Hogwarts School of Witchcraft and Wizardry.

Intuitively, Vikram's utterance of (23) is felicitous. However, though we judge his utterance of (23) to be felicitous, we do not take (23) to be true, because we do not think that Harry Potter exists. One way to explain our intuitions here, without abandoning the Truth Norm, is to say that we do not treat (23) as a genuine assertion, but as a quasi assertion, subject to a different norm. That is, suppose that a proposition is true* just in case it is true at a salient fictional possible world. Then, one might think that quasi assertions are governed by the following norm:

Quasi Assertion Norm: You ought to: quasi assert that p only if p is true*.

On this view, a quasi assertion of (23) is felicitous and states something true*. In contrast, a quasi-assertion of (24) is infelicitous and states something false*:

(24) Harry Potter goes to Lycée Français.

This view seems to capture our intuitions about fictional utterances—though both (23) and (24) would be either false or truth-valueless if asserted, because Harry Potter does not exist, a quasi assertion of (23) could be true*, whereas a quasi assertion of (24) could be false*, because (23) is true in the world of Harry Potter, whereas (24) is false in that world. Perhaps one might think that the same is true of future contingents, that the fact that we judge utterances of future contingents to be felicitous is not evidence that we judge them to be true, because we judge them to be quasi assertions that are felicitous only if they are true*. On this view, when we assess the felicity of quasi assertions of future contingents, we treat them as a kind of make-believe. Of course, the fictional world in this case could not be made salient by the writings of a particular author, as in the case of Harry Potter. However, one might instead think that the fictional future worlds are those that we regard to be highly likely, and that we assess the truth* of quasi assertions of future contingents in terms of truth at the highly likely worlds.

Both the suggestion that utterances of future contingents are predictions and that they are quasi assertions attempt to avoid the aforementioned problems by treating utterances of future contingents as a different kind of speech act, governed by a distinct norm from the norm governing assertion. If utterances of future contingents are not assertions, then perhaps they are not the sort of speech act whose felicity depends on whether they are true or false, let alone knowably so. This allows for judgments of felicity to come apart from judgments of truth.

However, no such account can be right, because future contingent sentences can be embedded with present tense constructions, as in the following:

(25) Ana just arrived and she will fix the pipe.

Is (25) an assertion or some other type of speech act? If it is an assertion, then the invention of an alternative speech act type for future contingents does not help avoid the foregoing objections. There are clearly contexts in which we would judge (25) to be a felicitous assertion, yet regard the future to be open with respect to whether Ana fixes the pipe. Since (25) is a conjunction, if we judge it to be a felicitous assertion, then we must judge both conjuncts to be true.

On the other hand, if we decide that (25) is not an assertion, but a quasi assertion, or a prediction, then other difficulties arise. In this case, the hypothesis is that either the Quasi Assertion Norm or the Prediction Norm governs utterances of future contingent sentences, while the standard account of assertions of past and present tensed sentences as governed by the Truth Norm is left in place. That is, since

(26) Ana just arrived.

is not a member of the disputed class of future contingent sentences, it is unproblematically governed by the Truth Norm or a stronger norm, and an assertion of (26) is infelicitous if not true. The trouble is that this view predicts that there are contexts in which an utterance of (25) would be judged to be felicitous, while an assertion of (26) would be judged to be infelicitous. For instance, suppose that it is not true that Ana has just arrived, and that it is likely that Ana will fix the pipe. Suppose further that Gail has sufficient evidence to believe that it is likely that Ana just arrived, but not sufficient evidence to believe that this is true. Under these circumstances, if an utterance of (25) is governed by the Prediction Norm, if Gail were to utter (25), her utterance would be felicitous, while her utterance of (26) would be infelicitous. Similarly, if an utterance of (23) need only be true* to be felicitous, whereas assertions of (24) need to be true to be felicitous, then there will be contexts in which an utterance of (23) is felicitous, whereas an assertion of (24) is not. This is counterintuitive.

We conclude that both strategies to not take assertions of future contingents at face value fail. Both their contents and the facts that they are assertions should be taken at face value. This means that the best explanation of the data is still a combination of FCT with the Knowledge Norm and crucially of FCT with a factive norm.

6. Concluding Remarks: FCT, the Knowledge Norm, and Openness

FCT, together with the Knowledge Norm, gives us an account of why we take some assertions of future contingents to be felicitous, while accommodating our intuitions of openness with respect to the future.

FCT-incompatibilists are at a dialectical disadvantage. They either have to explain away the pragmatic data or deny that we really make assertions about the future. As we have argued, neither option is attractive. In section 4 we argued that we indeed judge some assertions of future contingents to be felicitous and that this fact is best captured by a norm of assertion that entails the Truth Norm, in particular the Knowledge Norm. In section 5 we argued that assertions about the future have to be taken at face value, and not reinterpreted so that they are either not assertions or assertions whose contents are not straightforward future contingents.

With this in place, let us go back to our FCT-incompatibilist accounts of openness, such as those outlined in section 3.1. Those who adopt an error theory and claim that future contingents are false will have to go for a norm weaker than the Truth Norm if any assertion of the future is going to come out as felicitous. As we have argued in section 4, such norms are too weak. Those who claim that future contingents are neither true nor false, such as MacFarlane and indeed Aristotle, will also have to endorse a weaker norm than the Truth Norm. As we saw in section 2, MacFarlane provides an account of assertion in terms of Accuracy and Retraction Rule. Now, given Accuracy, and recalling Figure 1, an assertion of (2) is felicitous at CU only if it states a proposition that is true at every history (here h_1 and h_2) that passes through CU and CA. So, according to him, the assertion of (2) is infelicitous because only h_1 is a context of assessment in which it is sunny; h_2 is a context of assessment in which it is raining. Indeed, no

assertion of a future contingent satisfies Accuracy and so none is felicitous. If CA is at h_2 , given Retraction Rule, one will have to retract the assertion of (1) if challenged; and CA is at h_1 , one won't have to retract it. But either way an assertion of (2) is never going to be felicitous at m .

The data we offered also show that merely preserving Bivalence without declaring some propositions true (and some false), as Barnes and Cameron suggest, does not suffice. The pragmatic data reveal that we do not just take future contingents to be bivalent, but that in some cases at least, we take them to be true. If we merely didn't think that future contingents were bivalent, but that it is indeterminate which truth value they had, then we would take assertions of future contingents to be either felicitous or infelicitous depending on which truth value they turned out to have. But we do not; we take them to be true, at least in some cases, even though we take the future to be open in the relevant respects.

We thus have strong reasons to endorse an FCT-compatibilist account of openness, such as one of those outlined in section 3.2. The FCT-incompatibilist will claim that such accounts do not do justice to our intuitions that the future is open. In fact, such criticism has been explicitly directed against David Lewis's account and could easily be extended to other FCT-compatibilist accounts of the open future. For instance, MacFarlane argues that Lewis's account of openness in terms of counterfactual dependence is unsuccessful precisely because it preserves Bivalence (MacFarlane 2003, 326). However, this objection is question begging, unless we think that intuitively openness entails nonbivalence and even more so in light of the data we have provided. MacFarlane also suggests that Lewis's account does not capture "genuine openness" because Lewis does not accept that we simultaneously inhabit multiple actualities (MacFarlane 2003, 326). Similarly, Barnes and Cameron claim that it is a desideratum for any account of genuine openness to imply that there are actually now multiple possible ways our future could turn out to be (Barnes and Cameron 2011). However, this too seems to be question begging. Why is it not enough to capture the thought that there are now multiple possible ways our future could turn out to be? It is doubtful that the pressure to go for Barnes and Cameron's constraint on accounts of openness could come from vague, pretheoretic intuitions. It is just not plausible that the person on the Clapham Omnibus makes such fine metaphysical distinctions.

Insisting that our intuitions of openness must be captured by a failure of FCT is not just question begging but it is at odds with our assertoric practice. Thus, the problem remains for FCT-incompatibilists of how to make sense of assertions of future contingents. Our aim has been to spell out this problem and to provide an understanding of openness that paves the way for a solution to this problem.³²

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