

In Defense of Prior's 'Peircean' Tense Logic

Alan R. Rhoda
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1. Introduction

Suppose someone has just flipped a coin and that, at this moment, the world is perfectly indeterministic with respect to whether it lands heads or tails. Suppose further that a few moments later the coin lands heads. Was it true when the coin was flipped that it would land heads?

If you answered 'yes', then you are probably what Arthur Prior would call an 'Ockhamist,'¹ by which he meant someone who affirms the following thesis:

- (O) "For all p , if (it is the case that) p then it has always been the case that it would be the case that p ."²

(O) says that if at any time t it is true that p , then $\text{WILL}(p)$ was true at all times prior to t . In other words, $\text{IS}(p)$ implies $\text{WAS}(\text{WILL}(p))$.

If you answered 'no', then you are probably what Prior would call a 'Peircean.' As the Peircean sees it, (O) is false. The mere fact that a coin lands heads at a given time implies only that it was antecedently *possible* that it land heads, not that it *was going to* land heads. $\text{IS}(p)$ implies only $\text{WAS}(\text{Poss}(\text{WILL}(p)))$.

It's a safe bet that most philosophers today are Ockhamists. Frequently (O) is assumed without any discussion whatsoever,³ and when the Peircean alternative is discussed it usually receives a supposedly quick and decisive refutation.⁴ The popularity of Ockhamism isn't surprising. It is probably mandatory for anyone who wants to affirm both causal indeterminism and the existence of a complete, unchanging set of truths about the future,⁵ a group that includes most B-theorists and many, if not most, A-theorists.

Bucking the trend, I want to argue, with Prior, that the Peircean view is correct. After clarifying the issues (§2), I pose two problems for Ockhamism: (a) the *assertion problem* (§3-4), and (b) the *grounding problem* (§5).⁶ With respect to (a), I argue that Ockhamism cannot account for the assertibility of claims about the future. With respect to (b), I argue that A-theoretical versions of Ockhamism lack the ontological resources to ground truths about the future. Finally (§6), I refute the charge that the Peircean must be a fatalist or deny bivalence.

2. Clarifying the Debate

Philosophers like precision. It's what makes rigorous argumentation possible. Unfortunately, natural language is often not nearly precise enough for philosophical purposes, so we often have to regiment it, thereby developing a more precise *philosophical* language in the process. It's important, however, not to lose sight of the natural language moorings of our philosophical terms. To that end, let's look at the natural language roots of the future tense-operator WILL.

Obviously, WILL comes from "will," but it is easy to see that "will" can carry several different shades of meaning, not all of which are relevant. For example, "will" can carry an erotetic force

(i.e., express a desire that some state of affairs obtain), as when one asks imploringly, “Will you marry me?” Additionally, “will” can carry an illocutionary force (i.e., function as a performative), as when one says “I will pay you back,” thereby enacting a promise. Let’s set those uses aside. Our concern is with “will” in its *predictive* use of making claims about the future, and predictions need not carry any erotetic or illocutionary force at all.⁷

Used predictively, “will” points toward the future. It thereby carries what we might call *future temporal force*. In addition, its predictive use can carry a *causal force* of one degree or another. For example, sometimes it expresses a *deterministic* relation as in “If you let go of that rock, it *will* fall”—the implication being that there is no real possibility of things turning out otherwise. At other times “will” carries a lesser degree of causal force. If a mother warns her child, “Don’t go outside without your jacket or you will catch a cold,” we don’t take her to be saying that the outcome of a cold is causally inevitable, like the falling of a rock that is dropped, but only that it has a relatively high likelihood of coming to pass, i.e., that the outcome is more or less *probable*.

Now, to have a rigorous tense logic we need to pin down the causal force of “will.” The Ockhamist does this by defining a future tense-operator WILL that has *no* causal force at all. To predict that an event WILL occur, says the Ockhamist, is simply to say that it *does* occur in the future, nothing more. The Peircean, however, defines WILL so that its causal force is *maximal*. To predict that an event WILL occur, says the Peircean, is to say that it causally *must* occur. With this clarification in mind, let’s consider the first problem for Ockhamism.

3. The Assertion Problem

The principle of charity says that a person’s claims ought to be interpreted, if context allows, in a manner that best preserves the rational assertibility of those claims. Here I take a claim *p* to be rationally assertible for person *S* at time *t* if and only if *S*’s doxastic state at *t* is such that *p* seems to *S* to be more likely true than not. Thus, when *S* seems to make a claim that we have good reason to believe was not rationally assertible for him at the time, we don’t take his words at face value—he’s more likely lying, joking, acting, or what have you—unless, of course, context makes clear that’s what he really means. And since it’s not psychologically plausible for *S* to genuinely claim that *p* if *p* is not rationally assertible for him at the time, any reasons we may have to think that *S*’s claim is genuine and sincere are also reasons to think that he really does believe that *p* is *more likely* than *not-p*.

These observations suggest that *all* genuine predictions carry causal force. Indeed, they suggest that it must seem to the predictor that the outcome is *at least probable* in relation to the state of the world at the time he makes the prediction.⁸ Otherwise, the claim would not be rationally assertible for him, and hence not charitably construed as a genuine prediction.

For example, suppose someone playing roulette says before the wheel is spun, “The ball will land on 20.” Knowing the odds are 1 in 36, we would normally not construe that as claiming inevitability or even likelihood for the outcome. After all, if the gambler knows the odds, then she knows that it is likely that the ball will *not* land on twenty. So to claim that the ball *will* land on 20, or even that it *will probably* land on 20 would not be rationally assertible for her. If she nonetheless insists that the ball *will* land on 20, it would suggest that she knows, or thinks she knows, something we don’t that grounds her confidence—perhaps she believes the game is

rigged, or perhaps she has committed the gambler's fallacy and falsely believes that the ball is *due* to land on 20. In any case, absent indications that she really *believes* that the ball is likely to land on 20, we would not construe her statement as claiming this. Instead, we would apply the principle of charity and look for a plausible construal in the context that doesn't have her claiming something rationally unassertible for her. It is doubtful, then, that we should construe the utterance *as a prediction* at all. It may be more plausibly construed as autobiographical (“*I’m guessing* the ball lands on 20” or “*I hope* it lands on 20”) or as a performative (“I bet on 20”).

So genuinely predictive uses of “will”—as opposed to random guessing—carry not only future temporal force, but also sufficient causal force to imply that the predicted outcome is at least *probable*. Since we want a future tense-operator that fixes the causal force, we have to settle on a particular probability. The Peircean proposal, which assigns WILL determinative causal force (probability one), is the most natural expedient in this regard.⁹ In sum, then, the assertibility of genuine predictions guarantees that Peircean tense logic stays closer to natural language than does Ockhamism and thus, all other things being equal, is to be preferred.

4. An Ockhamist Counterargument

Alfred Freddoso counters that the Ockhamist construal of WILL is needed to make sense of our common practice of retrospectively predicating truth of successful predictions about future contingents. Suppose, he says, that a coin has just been tossed and that its chances of its landing heads or tails, respectively, are exactly 50-50. At that same moment, a person with accurate knowledge of the odds forecasts, “The coin will land heads.” The claim, insists Freddoso, is not that the coin *will probably* land heads but that it unqualifiedly *will*. He then notes that, if the coin *does* land heads, then in retrospect we would ordinarily say that the person spoke truly when he made the prediction. Colloquial speech, then, holds that a prediction is true at the time it is made just in case things turn out as predicted, even though they might not have.¹⁰

As in the roulette example, Freddoso starts with an apparently genuine prediction about a future contingent, but arrives at a different conclusion, namely, that “will” in its predictive use need not have *any* causal force. He achieves this result by shifting focus from our use of the word “will” to our use of the word “true.” And it must be conceded that we often do retrospectively predicate “truth” of sentences saying that something “will” happen simply because it has happened. From this Freddoso derives (O), the core Ockhamist principle that $IS(p)$ implies $WAS(WILL(p))$.

In response, we should note first that attempting to derive a logical principle like (O) *solely* from observations of colloquial usage is not generally a strong way to argue, for the flexibility of colloquial usage often leaves the meaning of sentences underdetermined. Thus, it does not *follow* from the fact that we often retrospectively predicate “truth” of a sentence like “X will obtain” when it is clear that X has obtained, that the *proposition* expressed by the sentence was antecedently *true*.

Furthermore, the Peircean will counter-charge that Freddoso's example is either (a) not a genuine prediction at all, or (b) it is a prediction, but one with causal force. On the one hand, since the speaker in Freddoso's example has no reason to prefer heads over tails, neither prediction is rationally assertible for him. By the principle of charity, we should conclude that he is not predicting but just randomly guessing, in which case the statement's *meaning* is merely something

like “I pick heads.” On the other hand, if he really does mean to assert that the coin *will* land heads, then we have to wonder *why* he believes this. The natural answer is that he thinks the coin’s landing heads is *more probable*. But the minute we bring probability into the mix, we no longer have the noncausal usage of “will” that Freddoso wants. Thus, Freddoso fails to reconcile Ockhamism with the requirements of rational assertibility.

For a full rebuttal, however, the Peircean must go further and give a positive account of our linguistic behavior. Here the imprecision of natural language comes to his aid. Strictly speaking, the Peircean truth conditions of “X *will* obtain at *t*” uttered at time *u* would include both X’s obtaining at *t* and its being causally necessary at *u* that X be going to obtain at *t*. But outside of philosophy, such strictness is not to be expected. So the Peircean will say that when we retrospectively predicate “truth” of contingently successful predictions and guesses we are speaking loosely, but not inappropriately, because we recognize that *part* of the truth condition of “X *will* obtain at *t*” has been fulfilled, namely, X’s obtaining at *t*.

5. The Grounding Problem

A common feature of all A-theoretical ontologies, whether that of presentism,¹¹ Tooley’s growing universe model,¹² or McCall’s branch attrition model,¹³ is that the future is not metaphysically settled—indeed, for the presentist and growing universe theorist, the future doesn’t even *exist*. This raises a further difficulty for A-theoretical versions of Ockhamism, for what is there to *ground* the *present* truth of propositions about the future? Ockhamism says that future facts themselves do this—but how can future facts ground present truths about the future if those facts don’t even exist or, on McCall’s view, are susceptible to change?

To simply matters, let’s focus on presentism,¹⁴ the view that all of reality exists now, in the present.¹⁵ Thus, for every state of affairs X, either X obtains now or it doesn’t obtain at all. Hence, no non-present states of affairs obtain. According to the correspondence theory, however, a proposition is true if and only if the state of affairs it posits obtains. Consequently, for the presentist a proposition can be true if and only if the state of affairs it posits obtains now, in the present. Thus, the presentist needs presently obtaining states of affairs to ground truths about the future. Most presentists nowadays hold that such truths are grounded in presently obtaining *future-tense* states of affairs.¹⁶ Thus, “Humans will land on Mars” is now true just in case our *going to land* on Mars now obtains.

But what it is for a future-tense state of affairs to obtain? What could that possibly amount to in concrete terms? Given presentism and correspondence, if a proposition about the future is now true then it is true in virtue of what is now the case. Accordingly, what is now the case must somehow *bear upon* what will be the case. But how can present reality bear upon a future that does not yet exist?

The most obvious answer, I submit, is that the present bears upon the future in the manner of a cause upon its effect. For example, we think it is now true that the sun will rise tomorrow. Why? Presumably because we think the world in its current state is governed by laws that make highly probable the sun’s rising tomorrow. It appears, then, that the future-tense state of affairs *the sun’s going to rise tomorrow* consists in the present reality’s tending strongly (if not inexorably) in that direction. We might say that, in that respect, the future is already *present in its causes*.¹⁷

Indeed, as presentism and correspondence require, the present truth of “X will obtain” depends entirely on *X’s going to obtain* now being the case. Thus, if present conditions were not *sufficient* for its now being the case that X is going to obtain, then they would not be sufficient for the present truth of “X will obtain.” But if present conditions are sufficient for its now being the case that X is going to obtain, then X’s future obtaining is a *necessary* consequence of present conditions. Thus, the future-tense proposition “X will obtain” is now *true*, strictly speaking, if and only if present conditions are in fact sufficient, i.e., fully determinative, of the future obtaining of X. This contradicts (O). Hence, given an A-theoretical ontology, grounding considerations strongly favor Peircean tense logic over against its Ockhamist rival.

6. Peircean Tense Logic, Bivalence, and Fatalism

While it fares well vis-à-vis Ockhamism on the issues of assertibility and grounding, some think Peircean tense logic fares sufficiently badly elsewhere that we ought to prefer Ockhamism nonetheless. A common charge is that the Peircean must either embrace logical fatalism or deny bivalence. Since, presumably, neither is acceptable,¹⁸ Peirceanism must go. In other words, it may be urged that the following theses constitute an inconsistent set:

- (C) There are future contingents.
- (P) The future tense-operator WILL carries determinative causal force.
- (B) All propositions are either true or if not true then false.

The inconsistency emerges given the seemingly plausible assumption that the propositions $WILL(p)$ and $WILL(\text{not-}p)$ are contradictories, in which case, by (B), one is now true and the other false for all p . Given that consequence, (C) and (P) entail the denial of (B); (P) and (B) entail the denial of (C); and (C) and (B) entail the denial of (P). Thus, the Peircean seems to be faced with a dilemma: Either embrace fatalism or give up bivalence.

Now it may be that the Peircean can simply give up bivalence with equanimity. Such a move would leave her in good company.¹⁹ But that concession is unnecessary because the dilemma is a false one. The reason is simple: In Peircean tense logic $WILL(p)$ and $WILL(\text{not-}p)$ are *not* contradictories, but contraries. $WILL(p)$ holds when p is true in *all* causally possible futures. $WILL(\text{not-}p)$ holds when p is true in *no* causally possible future. But both are false when p is a future contingent, i.e., when p is true in *some but not all* causally possible futures. In that case, what is true is $MIGHT(p)$, where $MIGHT()$ is a future contingency operator equivalent to $[\text{not-}WILL(p) \text{ and not-}WILL(\text{not-}p)]$.

7. Conclusion

In conclusion, I have argued that the Peircean / Ockhamist tense-logic debate turns on whether the future tense-operator WILL is defined so as to carry either no causal force (Ockham) or determinative causal force (Peirce). I then argued that Peircean tense logic is to be preferred because (1) it better squares with our intuitions regarding the assertibility of claim about the future and thereby stays closer to natural language, and (2) it has no problem grounding truths about the future on an A-theoretical ontology, whereas Ockhamism does. Finally, I rebutted the charge that Peirceanism leads to either logical fatalism or a denial of bivalence. On the contrary, the Peircean *avoids* logical fatalism without denying bivalence by leading us to realize that $WILL(p)$ and $WILL(\text{not-}p)$ are not contradictories.

¹ Prior makes the Ockhamist/Peircean distinction in at least two places: “The Formalities of Omniscience” in *Papers on Time and Tense* (Oxford: Oxford Univ. Press, 2003), pp. 39-58; and “Time and Determinism” in *Past, Present and Future* (Oxford: Clarendon Press, 1967), pp. 113-36.

² Prior, “The Formalities of Omniscience,” p. 44.

³ For example, it is frequently claimed to be a matter of simple logic that what is true about the future is just as unalterable as what is true about the past. This is true for the Ockhamist, but not for the Peircean. See, for example, Alvin Plantinga, “On Ockham’s Way Out,” in John Martin Fischer, ed., *God, Foreknowledge, and Freedom* (Stanford, CA: Stanford Univ. Press, 1989), p. 189; William Lane Craig, *Time and Eternity* (Wheaton, IL: Crossway Books, 2001), p. 262.

⁴ See, for example, Nuel Belnap, Michael Perloff, and Ming Xu, *Facing the Future* (Oxford: Oxford Univ. Press, 2001), p. 159; and Paul Horwich, *Asymmetries in Time: Problems in the Philosophy of Science* (Cambridge, MA: The MIT Press, 1987), pp. 31-32. In this vein, William Lane Craig is fond of misquoting Prior, attributing to him the admission that for the Peircean contingently true predictions are “perversely” inexpressible (*The Only Wise God* [Grand Rapids: Baker, 1987], p. 63; *Divine Foreknowledge and Human Freedom* [Leiden: E. J. Brill, 1991], p. 21). But what Prior actually says is, “*To the Ockhamist*, Peircean tense-logic is incomplete; it is simply a fragment of his own system—a fragment in which contingently true predictions are, perversely, inexpressible” (*Past, Present, and Future*, p. 130, emphasis added). Clearly, Prior is not claiming that this consequence of the Peircean system is “perverse,” as Craig implies. Prior is simply pointing out how the Peircean system looks *from the Ockhamist perspective*. The Ockhamist system looks similarly perverse from the Peircean perspective.

⁵ The existence of a complete, unchanging set of truths about the future can either be grounded in causal determinism or in the future events themselves. Causal indeterminism excludes the former; Ockhamism embraces the latter. It’s not clear what other options are available.

⁶ Without clearly distinguishing between them, Prior tersely hints at both of these objections in “The Formalities of Omniscience,” p. 49.

⁷ For example, one might predict, “A sea battle will take place tomorrow,” without either desiring that it happen or intending by that prediction to influence or bring about its happening.

⁸ I am not suggesting that a sincere predictor must be consciously aware that his prediction carries causal force or have an explicit grasp of notions like causality and probability. The causal force of the claim may be merely tacit or implicit.

⁹ It makes more sense to fix the causal force of WILL at probability one and to use qualifications like “probably” when lesser causal force is intended, than it does to fix the causal force of WILL at a probability of, say, 0.8, which would then require qualification in both directions.

¹⁰ Alfred J. Fredosso, “Introduction” to Luis de Molina, *On Divine Foreknowledge: Part IV of the Concordia*, tr. Alfred J. Fredosso (Ithaca: Cornell Univ. Press, 1988), pp. 71-72.

¹¹ For a recent discussion, see Thomas M. Crisp, “Presentism,” in Michael J. Loux and Dean W. Zimmerman, eds., *The Oxford Handbook of Metaphysics* (Oxford: Oxford Univ. Press, 2003), pp. 211-245.

¹² Michael Tooley, *Time, Tense, and Causation* (Oxford: Clarendon Press, 1997).

¹³ Storrs McCall, *A Model of the Universe: Space-Time, Probability, and Decision* (Oxford: Clarendon Press, 1994).

¹⁴ With minor adjustments, the conclusions reached can be extended to cover growing universe and branch attrition models as well. In the first case, the future does not exist, and so future events are not available to ground present truths about the future. In the second, the future does exist, but branches in several directions, and there is no unique sequences of future events of which it is *now* true that it *will* happen.

¹⁵ On the definition of presentism, see Thomas M. Crisp, “On Presentism and Triviality,” in Dean W. Zimmerman, ed., *Oxford Studies in Metaphysics*, Volume 1 (Oxford: Clarendon Press, 2004), pp. 15-20; and Trenton Merricks, *Truth and Ontology* (Oxford: Clarendon Press, forthcoming).

¹⁶ See, for example, John Bigelow, “Presentism and Properties,” in James E. Tomberlin, ed., *Philosophical Perspectives*, 10, *Metaphysics* (Oxford: Blackwell, 1996); Thomas M. Crisp, “Presentism and the Grounding Objection” (forthcoming in *Noûs*); and my “Presentism, Truthmakers, and God” (currently under review).

¹⁷ Prior, *Papers on Tense and Time*, p. 52. In “Presentism, Truthmakers, and God” I develop and defend the converse idea that truths about the past are grounded by the fact that the past is *present in its effects*.

¹⁸ So argues William Lane Craig, *Divine Foreknowledge and Human Freedom*, ch. 2.

¹⁹ Aristotle famously makes this move in *De Interpretatione* 9. He has been followed more recently by Jan Łukasiewicz, the eminent Polish logician: Steven M. Cahn, *Fate, Logic, and Time* (Atascadero: Ridgeview, 1967); and J. R. Lucas, *The Future: An Essay on God, Temporality, and Truth* (Oxford: Basil Blackwell, 1989).