Abstract: Dispositional realists convincingly argue that necessitarian essentialism and natural law necessitarianism must be true. Yet, like most philosophers, dispositional realists maintain that it is not the case that everything happens as a matter of necessity. In what follows, I examine three ways that dispositional realists attempt to account for ways things could have been and find that none of them may adequately provide for contingency. I conclude that either a bit more work needs to be done on the part of the dispositional realist to account for possible otherwisedness, or the dispositional realist may be committed not only to necessitarian essentialism and natural law necessitarianism, but perhaps to causal necessitarianism, property manifestation necessitarianism, and a stronger version of natural law necessitarianism, as well. I then suggest that that may be O.K.

1. Dispositional Realism

Much of the recent work in metaphysics aims to provide a scientific realist account of the workings of the world, that is an account that defends causal realism and, specifically, a realism with respect to causal properties and their relations.\(^1\) Dispositional realism is the view that “dispositions have as base properties irreducibly dispositional properties, and it is these irreducibly dispositional base properties that produce their

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\(^1\) According to Chakravartty, causal realism requires that (1) “causation is objective,” and (2) “causation involves some sort of necessity with respect to the connection between causes and effects,” (2007), p. 93, 107. See also: Ellis (2001) and Borghini and Williams (2007).
manifestations.”\textsuperscript{2} The dispositional realist takes dispositions to be among the fundamental natural properties and to be the properties with which science is concerned.\textsuperscript{3} Dispositional monists (or dispositionalists) maintain that all properties have dispositional essences,\textsuperscript{4} while dispositional essentialists hold that at least some properties do.\textsuperscript{5}

Dispositional realism is typically contrasted with categorical monism (or categoricalism), the reductive, neo-humean property theory, on which dispositions are reducible to purely qualitative and non-dispositional categorical properties.\textsuperscript{6} For the categoricalist, categorical properties are independent, “wholly distinct existences.”\textsuperscript{7} In other words, there are no necessary connections between the properties,\textsuperscript{8} and no property instance can entail or exclude the existence of any other wholly distinct state of affairs.\textsuperscript{9} Consequently, a categorical property is not directed at any other property instance or state of affairs and thus has no potential manifestations. Instead, an instantiated categorical property is in pure act; it is doing all it can do and contains

\textsuperscript{2} Borghini and Williams (2007), p. 23.
\textsuperscript{3} Many dispositional realists distinguish between natural and non-natural properties in a way that parallels or is influenced by Lewis's distinction between sparse and abundant properties. See: Jacobs (2010), p. 2.
\textsuperscript{7} Armstrong (1997), p. 155.
\textsuperscript{8} Armstrong (1997), p. 263.
\textsuperscript{9} Armstrong (1997), p. 1; “States of affairs are independent of each other if and only if: (1) no conjunction of states of affairs, including unit-conjunctions, entails the existence of any wholly distinct state of affairs; and (2) no conjunction of states of affairs, including unit-conjunctions, entails the non-existence of any wholly distinct state of affairs,” (139).
within itself nothing about what could be.\textsuperscript{10} Moreover, according to the categoricalist, the nature of a categorical property is not necessary to it; its identity is primitive in the sense that it is not dependent on the identity of its qualitative features,\textsuperscript{11} and its nature is distinct from the powers that it bestows.\textsuperscript{12} It follows that the same categorical property can have different causal powers in different possible worlds.

The dispositional realist argues that categoricalism fails to provide a satisfactory scientific explanation of the world. If the fundamental properties have nonessential natures and are in contingent relationships with other properties, the behavior of things and their interactions turn out to be merely accidental, and the (so-called) laws that explain them amount to nothing more than mere regularities.\textsuperscript{13}

Furthermore, because the categoricalist maintains that the identity of the fundamental categorical properties is primitive, a property could lack all of its qualitative features in another possible world, thus, quidditism with respect to properties is true.\textsuperscript{14} However, most dispositional realists reject property-quidditism because it has some counterintuitive consequences.\textsuperscript{15}

\textsuperscript{10} “Properties are self-contained things, keeping themselves to themselves, not pointing beyond themselves to further effects brought about in virtue of such properties,” Armstrong (1997), 80.
\textsuperscript{12} Armstrong (1997), p. 69. See also: Fred Dretske, \textit{op cit.}; and Michael Tooley, \textit{op cit.}
\textsuperscript{13} Heil (2010), pp. 67ff. Bird (2007), p. 91. Chakravartty (2007), p. 129. Armstrong does maintain that there is a necessitation relation between universals that allows for the relations to be nomically necessary (1997, pp. 223ff.), however, as others have successfully argued (see, for example, Bird (2007) and Ellis (2001), merely calling the connection between universals necessary does not make it so.
\textsuperscript{14} Bird (2007), pp. 70ff.
\textsuperscript{15} Ellis argues that we should not “be afraid” of categorical quidditism since it does not entail that the laws of nature are contingent (2010), pp. 139ff.
allows for the possibility that the property \textit{negative charge} in one world could possess all of the qualitative features of the property \textit{positive charge} in another world, and vice versa. But our intuitions suggest that in such a case, we do not have \textit{two} different properties that switch all of their features; instead we have the \textit{same} property, with two different names.\footnote{Bird (2007), pp. 73ff. “In such worlds, anything goes,” Heil (2010), p. 67.}

In contrast to the categoricalist, the dispositional realist maintains that \textit{dispositional essentialism} is true, that is, that at least some of the properties with which science is concerned must have dispositional essences. Unlike categorical properties, dispositional properties are “causally potent;”\footnote{Mumford (1998), p. 164.} they are nomic and causal powers that provide the abilities of things in the world.\footnote{Heil (2010), p. 66. Shoemaker (1980).} And because the nature of a dispositional property is necessary to it, all of its causal potentialities are essential.\footnote{Bird (2005a), p. 353, (2005b), p. 439, (2007), p. 44. Shoemaker (1980), p. 120. Borghini and Williams (2007), p. 24.} In other words, the identity of a dispositional property is determined by its dispositional character.\footnote{Not all dispositional realists will agree with this particular distinction between categorical and dispositional properties. For example, Mumford argues that the distinction is merely about \textit{predicates} not properties. He also maintains that dispositions \textit{are} categorical, but by this he means that they are \textit{actual} (1998), p. 37. And Heil argues that some properties can be partly dispositional and partly categorical (2003), p. 112.} Since an essentially dispositional property has the same causal and nomic properties in all possible worlds,\footnote{Bird (2005a), p. 353, (2007), p. 24. “According to the theory of properties I am proposing, all of the causal potentialities possessed by a property at any time in the actual world are essential to it and so belong to it at all times and in all possible worlds,” Shoemaker (1980), p. 124.} relations between them will hold of necessity.\footnote{Bird (2007), p. 43. Heil (2010), p. 69.} It follows that the
natural laws that reflect or describe the essences of properties and the relations between them, hold in all possible worlds in which the grounding properties are instantiated.\textsuperscript{23} That is, the laws of nature are metaphysically necessary.\textsuperscript{24}

Although dispositional realists defend \textit{natural law necessitarianism},\textsuperscript{25} they are not full-blown necessitarians;\textsuperscript{26} they do not believe that everything happens as a matter of absolute necessity and hold that at least some things in the world could have been otherwise. In various places, dispositional realists have appealed to three features of dispositional realism in order to provide for contingency (or for at least some non-absolute necessity). First, as \textit{potencies}, dispositions are such that they \textit{might or might not} be manifested. Since unmanifested dispositions are existing unrealized possibilities, some dispositions manifest contingently, and thus dispositional realism does not entail \textit{property manifestation necessitarianism}. Second, some dispositions are \textit{propensities},

\begin{itemize}
\item \textsuperscript{23}“[T]he truth-makers for the relevant laws of nature are, we hold, just the fundamental dispositional properties,” Ellis (2001), p. 128, see also p. 115. Bird (2007), p. 43, see also p. 46, 64. Mumford contends that this means that the natural laws are, in some sense, redundant and thus endorses an eliminativist view with respect to them, (1998), pp. 228ff.
\item \textsuperscript{24}“If properties have a dispositional essence then certain relations will hold of necessity between the relevant universals; these relations we may identify as the laws of nature,” Bird (2007), p. 43, 169. “If the introduction into certain circumstances of a thing having certain properties causally necessitates the occurrence of certain effects, then it is impossible, logically impossible, that such an introduction could fail to have such an effect, and so logically necessary that it has it. To the extent that causal laws can be viewed as propositions describing the causal potentialities of properties, it is impossible that the same properties should be governed by different causal laws in different possible worlds, for such proposition will be necessarily true when true at all,” Shoemaker (1980), pp. 124, 128-9. I will assess the claim that the laws are \textit{metaphysically} necessary in more detail below.
\item \textsuperscript{25}Or, in the case of Mumford, natural law eliminativism.
\item \textsuperscript{26}I use \textit{full-blown} necessitarianism here to distinguish it from Bird’s use of \textit{strong} necessitarianism. For Bird, strong necessitarianism is the view that all possible worlds have the same possible laws, and it is true (2007), pp. 50-59.
\end{itemize}
properties that are causally indeterminate. Since propensities are merely disposed
towards, but do not necessitate, their effects, causal necessitarianism is not true. And
third, because the initial conditions might have been different and because the
fundamental dispositional properties that are instantiated in this world might not have
been instantiated, the laws of nature that hold in this world might not hold in others. It
follows that the natural laws are not absolutely metaphysically necessary, but merely
slightly restrictedly metaphysically necessary.²⁷

In what follows, I provide a detailed analysis of these three features of dispositional
realism to see whether any of them can adequately provide for at least some
contingency or ways things could have been otherwise.

2.1 Potencies and Unrealized Possibilities

According to the dispositional realist, dispositions are potencies, actual properties
that might or might not be manifested. Potencies have possible manifestations even if
they are never realized.²⁸ For example, fragility is an actual property of a glass even if

²⁷ There may be a fourth way in which a dispositional realist might defend contingency. Ellis maintains that all causal powers are such that “their instances must all have contingent locations,” (2010), p. 137. However, since Ellis concedes that his belief that location is contingent is mere conjecture and provides no further defense for that view, I will not take up the issue of contingent locations here.
²⁸ “Properties with dispositional essences I shall call potencies. [Dispositionalism] is the claim that potencies exist and that the fundamental natural properties are potencies,” Bird (2007), p. 45. “Part of the being of a potency is the existence of a potentiality. Since properties are essentially dispositional, every potency will have potential manifestations. But these manifestations may be merely potential. A disposition can have unrealized manifestations,” Bird (2007), p. 100. See also: p. 130, 197, and 206. “What makes a
the glass is never struck and never breaks. And, on some accounts, because
unmanifested dispositions could be realized even if they remain forever unrealized,
unrealized manifestations are real, existing mere possibilities.

Bird provides an example of an unrealized possibility. He asks us to consider a piece
of paper that could be turned into an origami swan, but never will, because he will burn
it instead. The piece of paper has the disposition foldability, and thus could be folded,
even if it never is. Since the foldable piece of paper has the potential manifestation of
being shaped into an origami swan, in the case that it is never so shaped, there exists
the unrealized possibility that is the possible origami swan, itself. Consequently, the
unrealized manifestation, the folding of the piece of paper, is an existing mere
property the property it is ... is its potential for contributing to the causal powers of the
things that have it,” Shoemaker (1980), p. 114. “Properties are clusters of conditional
powers,” (1980), p. 115. “[D]ispositionality is the source of causal potency,” Borghini
and Williams (2007), p. 24. “For any dispositional state, there are actual readinesses with
an indefinite number of alternative reciprocal disposition partners for an indefinite
number of alternative mutual manifestations,” Martin (2008), p. 31, p. 48. “Among the
things that powers do ... is the grounding of possibility and necessity,” Mumford (2004),
p. 194. See also: Mumford (1998), p. 74; Mumford and Anjum (2010); Molnar (2003),
pp. 94ff.

192.

contains some disposition such that the manifestation is the state of affairs S, then S is


“dispositional possibility” and explains it as follows: “The having of one property may
dispositionally make possible the having of another property. For example, being fragile

Bird (2007), pp. 100, 111.
possibility and the realized manifestation, the burning of the piece of paper, occurs contingently.\textsuperscript{34}

Many dispositional realists maintain that mere possibilities are rooted in type-level properties, or universals.\textsuperscript{35} Unlike property instances that concern the ways that things \textit{are}, universals concern the ways things \textit{could be},\textsuperscript{36} so universals “need not at any given time be doing all that they could do.”\textsuperscript{37} The type-level dispositional property is a property that “can be manifested in many different ways depending on its circumstances.”\textsuperscript{38} Thus, to designate a property as a disposition, is “to suggest possibilities of behavior. It is to say that something could or would happen if the circumstances were right.”\textsuperscript{39} Bird’s piece of paper is \textit{foldable}, and since the type-level property \textit{foldability} concerns the way that pieces of paper could be, Bird’s piece of could have been folded into an origami swan rather than burned, given the right

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\item \textsuperscript{34} Bird (2007), pp. 100, 111. See also: Mumford (2004), pp. 175ff, and Mumford and Anjum (2010).
\item \textsuperscript{35} Molnar maintains that dispositions are tropes, properties instances that are non-repeatably particular. Thus, according to him, the possibility of unrealized manifestations is rooted in particular-level dispositions (2003) pp. 22-26. Mumford and Anjum maintain that their argument in support of contingent causation works for both type-level and particular-level causation (2010), p. 147. However, in the end, grounding unrealized possibilities in property instances will fall prey to the same problem that arises for the universal-level property account: the manifestation is possible only if the stimulus is possible, and so it would still need to be shown that the stimulus \textit{is} possible.
\item \textsuperscript{37} Heil (2003), p. 87.
\item \textsuperscript{38} Ellis (2001), p. 133. “[W]hat dispositional properties do is dispose the things that have them to behave in certain ways, depending on the context,” (2001), p. 198. See also p. 124.
\item \textsuperscript{39} Mumford (1998), p. 5.
\end{itemize}
circumstances. Therefore, it is contingent and not necessary that Bird’s piece of paper was burned rather than folded.\(^{40}\)

2.2 Unrealized Circumstances and Conditions

According to the above account, the possibility of the unrealized manifestation, \textit{being folded}, is rooted in the universal property, foldability, a property that can be manifested in many different ways, \textit{depending on the circumstances}. Since the manifestation of a disposition is conditional upon the circumstances, it would seem that the possibility of the unrealized manifestation is grounded not only in the fact that the universal can be manifested in many different ways, but also in the possibility that some unrealized circumstances are realized and in the possibility that some realized circumstances remain unrealized.\(^{41}\) Bird’s never-folded piece of paper is \textit{flammable}, and it is this disposition that is actually manifested because it is set on fire in the right conditions. In the case that Bird’s piece of paper fails to burn, at least some of the actual circumstances involved in Bird’s setting it on fire must have failed to have manifested. Thus, the possibility that Bird’s piece of paper fails to burn, would require the possibility


\(^{41}\) With respect to the unrealized possible breaking of a glass, Bird writes that the “merely possible breaking is a product of the actual fragility \textit{and} the merely possible stressing,” (2007), p. 105. Mumford and Anjum maintain that “it seems hard to deny outright” that the “possibility of additive interference” is “a real possibility,” (2010), p. 148) and that “it is clear in most causal cases admit the possibility of prevention,” (p. 149), but they fail to offer further evidence that a particular unrealized interference \textit{is} possible or that a particular unrealized prevention \textit{is} possible.
that some of the realized circumstances could have failed to have occurred. Moreover, in order for it to have been possible that Bird’s piece of paper was folded, the paper must be foldable, and the unrealized stimuli – folding and creasing – would need to have been possible, as well. For if it is not possible that this piece of paper was manipulated in a way that resulted in folding, it seems to follow that it is not possible that this piece of paper was folded, even though it is foldable. Since the dispositional realist maintains that it is of the nature of a disposition that the manifestation results from the appropriate stimulus,\(^{42}\) in the absence of the appropriate stimulus, the manifestation cannot occur. Therefore, in order to defend the contingency of at least some property manifestations, the dispositional realist would still need to show that some actual circumstances are contingent and that some unrealized conditions are possible.

The dispositional realist might try to maintain that the conditions and circumstances are contingently realized because they are manifested dispositions that are such that they might or might not be manifested. However, if the contingency of realized manifestations is rooted in circumstances that are, themselves, manifested dispositions and, as such, might not have manifested, and the contingency of those realized manifestations is grounded in further circumstances that are also manifested dispositions, and, as such, could have failed to have manifested, then either the contingency of any realized manifestation is rooted in the contingency of other realized circumstances and so on and so on, in which case the account appears to be

dangerously regressive and the contingency is not adequately explained; or the regress ends somewhere – there is some *ultimate basis* for the contingency of realized manifestations – and *that* still needs expounding. Either way, further explanation is needed in order to account for the contingency of any property manifestation.

2.3 Different Types of Possibility

The dispositional realist, and Mumford, in particular,⁴³ might argue that if the above analysis works at all, it only succeeds in showing that it is not *naturally* or *physically* possible that Bird’s piece of paper was folded, given the circumstances and conditions that actually occurred. However, the dispositional realist might maintain, it is still *logically, metaphysically, or in some other way* possible that the piece of paper was folded since there is no contradiction between *being Bird’s piece of paper* and *being folded*, and the lack of contradiction entails that *being burned* (and *not-folded*) is not an necessary property manifestation of *Bird’s piece of paper*.⁴⁴

However, such an argument seems to presuppose at least some level of possibility with respect to the relationship between *being Bird’s piece of paper* and *being folded*. In particular, the claim that there is no contradiction between *being Bird’s piece of paper* and *being folded* entails that *being burned* (and *not folded*) is a contingent property of Bird’s piece of paper. Although it is widely believed that *being burned* is not an essential

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⁴⁴ Mumford and Anjum raise a similar point (2010), p. 151.
property of any piece of paper, since the question under consideration here concerns whether it is in any sense possible that Bird’s piece of paper is folded and not-burned, it cannot be merely assumed that being burned is a contingent property.

In response, dispositional realist may well argue that the fact that Bird’s piece of paper is foldable is evidence that it is possible that the piece of paper could have been folded and thus being burned (and not-folded) is a contingent property of it. For if it is not at all possible for Bird’s piece of paper to be folded, it makes no sense to say that the piece of paper is foldable, which is absurd. Since paper is foldable, and what is foldable is such that it can be folded, but might not be, it follows that Bird’s piece of paper is such that it can be folded, even if it never was. Therefore, it must be in some sense possible that the piece of paper was folded.

2.4 What is Foldable Can Be Folded but Might Not be

Let’s take a careful look at the phrase what is foldable can be folded but might not be. There seem to be at least two ways to interpret it. On one reading, the phrase involves the particular-level object and its particular properties. So, with respect to the example under consideration, we get: Bird’s piece of paper is foldable; it can be folded but might not be. This interpretation is then taken to indicate that it is possible that Bird’s piece of paper was folded, even though it never was, for had the circumstances and conditions been different, it could have been folded and not burned.
However, there is another way to interpret the phrase *what is foldable can be folded but might not be*, a reading that is consistent with dispositional realism but that need not entail that any particular never-folded piece of paper is possibly folded. The second reading focuses on the type-level, rather than the particular-level; it takes the phrase to be about the type, *paper* and not specifically about Bird’s particular piece. Understood in this way, the phrase describes what happens to some of the entities of that type, but (perhaps) not to all of them; *some pieces of paper are folded, and other pieces of paper are not*. Whereas on the first interpretation, *possible manifestations* include both the realized and unrealized manifestations of *some particular object*, on the second interpretation, *possible manifestations* include only the various actually realized manifestations of the many particulars of that type. Thus, unlike the first interpretation, this second reading of the phrase does not suggest that the unrealized manifestation – the folding of Bird’s piece of paper – is possible; it merely indicates that given the nature of foldability, some pieces of paper are actually folded (since they are in the right situation with appropriate circumstances), and others, like Bird’s piece of paper, are not (since the appropriate circumstances never occur). But, since Bird’s piece of paper is *paper*, and *paper is foldable*, it is still true that *Bird’s piece of paper is foldable*, that is, given the nature of *paper*, it can be folded and creased, depending on the circumstances.

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45 In section 5.2, I will show that taking statements to be about the type of entity could be used by the dispositional realist to provide an account of counterfactual conditionals that need not require a commitment to unrealized possibilities.
Notice that the second interpretation is consistent with dispositional realism: The nature of the disposition is still essential in the sense that its causal powers are the same across all possible worlds; it is still true that Bird’s piece of paper is foldable; and it is still true that *the foldable can be folded but might not be*. In addition, the second reading seems to more accurately express the majority view among dispositional realists that dispositions are type-level universals and the fact that although causal *relations* may well be at the level of the universal,⁴⁶ *causation* occurs at the level of the particular. And, finally, the difference between the two interpretations helps to illuminate the fact that whereas the necessary causal relations between universal dispositional properties are capable of grounding the necessity of the natural laws, universals (alone) cannot provide for the contingency of a particular property instance manifestation. Thus, once again, we see that the contingency of a property instance manifestation must be rooted not only in the relevant universal, but in the contingency of the relevant particular actual circumstances and conditions, as well. So, at the very least, the dispositional realist would still need to show that some actual circumstances could have failed to have occurred in order to adequately account for contingent property-manifestation.⁴⁷

3.1 Indeterminate Property Manifestations: Propensities

⁴⁶ “Causal relations are not primarily relations between particular events (as Armstrong believes) but relations between kinds of events,” Ellis (2001), p. 135
⁴⁷ Yet, if the dispositional realist continues to maintain that property instances concern the way that things are and not the way things can be, it would seem that the dispositional realist may well have their work cut out for them.
A second way that some dispositional realists attempt to account for contingency is by appeal causally indeterminate dispositions. Ellis explains that in “an indeterministic world such as ours, there must be dispositions that are not causally determinate ... they are causally indeterminate, not because of vagueness, but because of the indeterminacy of the underlying physical process.”48 A causally indeterminate dispositional property is a *propensity*, but unlike causal powers, “the activities of their bearers do not depend on the circumstances of their existence.”49 A propensity is “a disposition to act in a certain kind of way in any of a wide range of circumstances.”50 The manifestation of a propensity will happen at some time and in some place, but “the somewhere and somewhen are not necessary for the having of the power. They are among the contingent details of its manifestation.”51 Indeterminate dispositions are *stochastic* rather than causal.52 Whereas anything having a causal disposition would normally display it in response to the appropriate stimulus, in the case of a stochastic disposition, the stimulus is not strictly the cause of the result,53 consequently, “the causation may be

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50 Ellis (2001), pp. 128; 131.
53 Ellis (2001), p. 129. “By probabilistic causation we do not mean completely random chance events, which may best be described as uncaused. Rather, we mean causation that is chancy yet probabilistically constrained,” Mumford and Anjum (2010), p. 153.
nonnecissitating.\textsuperscript{54} Furthermore, propensities are not ontologically dependent upon any dispositions that are causally determinate.\textsuperscript{55} In other words, it is in principle impossible to eliminate a causally indeterminate disposition in favor of any more precisely defined causally determinate dispositions.\textsuperscript{56} Instead, a propensity either is, or is further rooted in, an essential and irreducible indeterminacy.\textsuperscript{57}

Radium atom decay is often used as a typical example of a stochastic disposition: “A substance that undergoes radioactive decay does so independently of the circumstances of its existence.”\textsuperscript{58} Since there is no definite moment at which the radium atom's disposition to disintegrate must manifest; the manifestation-outcome is “\textit{de re} indeterminate as to timing.”\textsuperscript{59} The decay-timing of the radium atom is indeterminate because it is not caused by anything; “There is just a certain objective probability p that within a given time-interval d, such an event will occur.”\textsuperscript{60} And that objective probability is “independent of the circumstances in which the radium atom exists.”\textsuperscript{61} Finally, the indeterminacy of radium atom decay is not merely a matter of vagueness or lack of

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\textsuperscript{55} “[P]ropensities are more primitive than causal powers, and their laws of action are independent of circumstances,” Ellis (2010), p. 142.
\textsuperscript{56} “[W]e cannot even in principle eliminate this causally indeterminate disposition in favor of any more precisely defined dispositions that are causally determinate,” Ellis (2001), p. 131.
\textsuperscript{57} Ellis (2001), p. 131. Molnar (2003), p. 64. Again, see Martin (2008), pp. 72-3 for a refutation of this view.
\textsuperscript{58} Ellis (2010), p. 141-2.
\textsuperscript{60} Ellis (2001), p. 129. See also: Mumford (2004), p. 194; Molnar (2003), p. 64.
\textsuperscript{61} Ellis (2001), p. 131.
specificity on our part.\textsuperscript{62} That is, radium atom behavior is not \textit{description-dependent} and a result of our \textit{fuzzy} or incomplete description of the atom's behavior.\textsuperscript{63} Instead, the causally indeterminate behavior of radium atoms is an objective feature of the world; “there is no causal process by which this change of state comes about. \textit{It just happens}.”\textsuperscript{64}

Thus, a dispositional realist might argue, dispositional realism does not entail causal necessitarianism; because propensities manifest indeterminately, some effects are nonnecessitated.\textsuperscript{65}

3.2 Probability does not entail Indeterminacy

According to the above account, the decay of a particular radium atom $r$ is indeterminate as to timing and there is only a certain probability that $r$ will decay within a certain time-interval $d$. But the probability that $r$ will decay within $d$ does not necessarily entail that the time when $r$ decays is indeterminate.

Consider how the time-interval $d$ might be produced: A scientist observes many different radium atoms and records the time when each atom decays. A time-interval $d$ is generated from the various decay-times that are recorded. And from the distribution

\textsuperscript{62} Ellis (2001), p. 131.
\textsuperscript{63} Molnar (2003), p. 64.
\textsuperscript{64} Ellis (2010), p. 142 (emphasis added).
\textsuperscript{65} Mumford and Anjum (2010), pp. 153ff.
among the various decay-times, the scientist can calculate the probability that a radium atom will decay within \( d \).

However, notice that the time-interval \( d \) is generated from the various recorded decay-times of many different atoms, in which case there is no time-interval when \( r \) decays; there is only the moment when \( r \) decays, whether we can predict that moment or not. And, notice, as well, that although the indeterminist maintains that radium atom behavior is description-independent, the probability that \( r \) will decay in \( d \) involves a description of the recorded activity of other radium atoms and would thus seem to be description-dependent. Moreover, it appears that the probability that \( r \) will decay in \( d \) is relative to the various moments when different observed atoms decayed. So, when the particular atom \( r \) is under consideration, there is no objective probability \( p \). In fact, given that the description of the observed activity of other radium atoms does not include the activity of \( r \) (since the activity occurs prior to \( r \)'s decay), the description does not even include \( r \)'s behavior.

Finally, the mere fact that different observed radium atoms decayed at different times does not mean that the decay-time of \( r \) is indeterminate.\(^66\) Even if the scientist cannot accurately predict when \( r \) will decay or whether \( r \) will decay within the interval, that, in and of itself, does not mean that the timing of \( r \)'s decay lacks a determining cause. It could merely mean that the timing of radium atom decay varies from atom to atom, and we cannot – and may never be able to – accurately predict the moment when any given radium will decay.

\(^{66}\) Unless we accept the positivist interpretation that what occurs must be observed.
3.3 Indeterminism May be an Incomplete Description of the Behavior

Consider a particular radium atom \( r \). It is possible that \( r \) decays at \( t \), but it is also possible that \( r \) decays at not-\( t \). According to the indeterminist, there is no reason or cause that determines that \( r \) decays at \( t \), so it would seem to follow that \( r \) will not decay at \( t \). Yet, there is also no reason or cause that determines that \( r \) will decay at some time not-\( t \), in which case it would seem that \( r \) will not decay at not-\( t \). Now \( r \) must decay at \( t \) or at not-\( t \), and \( r \) cannot decay at both. But, as Martin convincingly argues, “If there is not such a selection or production of one disjunct rather than another between the candidates, there is no election nor a production of a disjunct at all.”\(^{67}\) Since \( r \) must decay at \( t \) or at not-\( t \), there would need to be some determining cause or reason for its decaying at the one rather than the other, otherwise neither can result, which is impossible. Thus, the absence of an explanation for the actual decay at \( t \), rather than at not-\( t \), does not necessarily mean that there is no reason why \( r \) decays at \( t \); it may merely entail that the explanation is incomplete and fails to take us “up to the very production of the specific result itself.”\(^{68}\)

It would seem that at least part of the determining cause of \( r \)'s decaying at \( t \) would involve the circumstances and conditions surrounding the existence of \( r \). But the indeterminist maintains that the decay-timing of \( r \) is independent of the circumstances.

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\(^{67}\) Martin (2008), p. 72.

\(^{68}\) Martin (2008), p. 72.
in which $r$ exists. Since the dispositional realists recognize that, in the case of causal
dispositions, the manifestation is very much dependent upon the circumstances and the
occurrence of the stimulus, it is not clear why they would want to eliminate
circumstances and stimuli in the attempt to account for the explanation of $r$'s decaying
at $t$.

Indeed, given the often insurmountable burden involved in proving that something
does not exist, any attempt by the indeterminist to prove that there is no cause for $r$'s
decaying at $t$ will be quite difficult, to say the least. Hence, in the absence of any
adequate evidence that no cause exists (rather than that we are unable to discern what
the existing cause is), the claim that no cause results in $r$'s decaying at $t$ rather than at
not-$t$ remains questionable, at best.

Finally, even if $r$'s decaying at $t$ is indeterminate, that does not require that not-
decaying at $t$ must be possible for $r$. In other words, the fact that a property
manifestation occurs indeterminately does not, in and of itself, entail that it could have
failed to have occurred or that it could have occurred at a different time. On the
assumption that the timing of $r$'s decay occurs indeterminately, in the sense that there is
no cause for it, it may yet be the case that $r$ could not have failed to have decayed when
it did. Thus, even if $r$'s decay time is indeterminate, the dispositional realist must still
show that $r$ could have failed to have decayed at $t$ and that $r$'s not decaying at $t$ is an
unrealized possibility.

3.4 Indeterminism May Be Inconsistent with Dispositional Realism
One might even argue that the doctrine of indeterminism is incompatible with the basic tenets of dispositional realism. Because the manifestation of a propensity is not strictly caused by its stimulus, a causally indeterminate disposition seems to behave like an independent, discrete property that neither entails nor excludes the existence of any other property.\textsuperscript{69} Also, in the absence of any determining cause or reason for manifesting, a property instance of a propensity appears to manifest accidentally and not lawfully, in which case the property would have a merely nominal essence. In other words, a propensity seems to function much more like one of the categoricalist’s properties, for properties that can manifest without any stimulus at all appear to be self-contained, and the (so-called) statistical laws that reflect the observation of the behavior of things with propensities seem to be superimposed upon the world. Since the dispositional realist rejects the doctrine of independence and primitive property identity that is at the heart of categoricalism and posits, instead, properties that have essential natures – properties that interact with each other and the identities of which depend on their roles in those processes\textsuperscript{70} – it would seem that the dispositional realist cannot consistently accept the existence of properties that can manifest with no determining cause. It is just not clear that a dispositional realist can successfully defend

\textsuperscript{69} As Ellis writes, “From the perspective of scientific essentialism, the world is not an agglomeration of logically independent states of affairs or self-contained atoms of any other kind,” (2001), p. 5.
\textsuperscript{70} Ellis, (2001), pp. 1-2
natural law necessitarianism while allowing for irreducible indeterminacies and indeterminate property manifestations.

Moreover, the view that there are indeterminate property manifestations would seem to run contrary to the dispositional realist's pursuit of a scientific explanation of the workings of the world. For the belief that there is no cause for r's decaying at t terminates too quickly the scientific search for any such explanation. And, finally, without any proof that it is impossible that any such cause exists, it must be conceded that it is at least possible that there is a cause. Thus, it would seem that the dispositional realist who aims to provide a realist account of the causal connections in the world would well want to continue to search for those real, possible connections, rather than ruling out any as impossible and thereby effectively terminating the search.

4.1 Different Initial Conditions, Different Fundamental Properties, Different Laws

There is a third feature of dispositional realism to which some might appeal in order to allow for at least some contingency. Many hold that had the initial conditions of the world been different, different fundamental properties would have been instantiated, and there would be different natural laws. Shoemaker writes:

Nothing I have said precludes the possibility of there being worlds in which the causal laws are different from those that prevail in this world. But it seems to follow from my account of property identity that if the laws are different then the properties will have to be different as well.

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Likewise, Bird explains the dispositionalist's fundamental properties taken to be Aristotelian in re universals means that the properties need not be instantiated in every world. It follows that “a world could lack a law that another world possesses. It would achieve this by lacking the potency that underwrites the law.” Bird claims that the necessity of the natural laws can be taken to be slightly restricted. According to him, metaphysically necessary laws hold in all the worlds that share the same fundamental properties. Similarly, Ellis explains that this world is one of a natural kind. Worlds that are of the same natural kind as our world have the same fundamental properties and thus the same natural laws ours, but there may be worlds of a different natural kind, with different fundamental properties. According to Ellis, the hypothesis that the world is a member of a natural kind provides for an account of natural necessity, natural possibility, and natural contingency:

What is naturally necessary in our world is what must be true in any world of the same natural kind as ours. What is naturally possible is what might be true in a world of the same natural kind as ours. What is naturally contingent is what might or might not be true in a world that is essentially the same as ours.

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73 Bird (2007), p. 64.
74 Bird (2007), p. 64.
75 Bird (2007), p. 64.
On Ellis's account, some propositions that are true in this world are merely *naturally contingently* true, since they might be false in worlds that have the same fundamental properties as ours.

So, the dispositional realist can maintain, natural law necessitarianism need not entail the *strong* natural law necessitarian view that the laws hold in every possible world. Because worlds with different fundamental properties have different natural laws, the natural laws are restrictedly metaphysically necessary, but they are not *absolutely* metaphysically necessary.

4.2 Fundamental Properties cannot be Contingent

The dispositional realist claims that the natural laws in this world could have been different because the fundamental properties that are instantiated in this world could have failed to have been instantiated in different possible worlds. It seems to follow that these fundamental properties are contingent (or naturally contingent), since they could have failed to have been.

Yet, if it is possible that the actually instantiated fundamental properties could have failed to have been instantiated, it would seem that there would need to be something prior to the fundamental properties that determines that these properties are instantiated, *rather than not*. On many accounts, it is the *initial conditions* that determine which properties are instantiated. But, if there are some prior initial conditions that determine that *these* properties are instantiated, rather than not, then
these properties are not *fundamental*; they are further rooted in the initial conditions. So, either these properties are fundamental, in which case their instantiation is not further grounded in anything else, and thus there is *nothing* that further determines that they are instantiated *rather than not* and *nothing* that can ground the possibility that they might not have been instantiated; or there are some ontologically prior initial conditions upon which these dispositional properties depend for their instantiation, in which case the key premise of dispositional realism is false since it is those conditions, and not dispositions, that are the basic natural properties with which science is concerned.\(^78\)

A somewhat similar problem arises when we consider possible worlds. In this, the actual world, *these* are the actually instantiated fundamental properties. If some other world were to have been actual, some other essentially dispositional properties may have been instantiated. However, the question concerning possible otherwisedness has now been pushed back: We were originally exploring the question whether the dispositional realist can account for ways things could have been otherwise. On this particular solution, dispositional realism provides for otherwisedness by appeal to the fact that *these*, the actually instantiated fundamental dispositions, could have failed to have been instantiated, and other fundamental dispositions could have been instantiated, instead. But, we are now faced with some further questions: What

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\(^{78}\) This line of reasoning can also be used against the view that the initial conditions are contingent: If the initial conditions are contingent, then there must be some *prior* conditions that determine that the (so-called) initial conditions are instantiated, *rather than not*.\(^ {78}\)
accounts for the possible non-instantiation of these, the actually instantiated
dispositions? And, what accounts for the possible instantiation of other, noninstantiated
dispositions? Since we would still need responses to these and other such questions, the
attempt to avoid commitment to absolutely necessary natural laws by appeal to the
possible noninstantiation of actually instantiated dispositions appears to remain, at
best, incomplete and in need of further elucidation.

4.3 Slightly Restricted Necessity is not Metaphysical Necessity

As explained above, the dispositional realist might hold that the metaphysical
necessity of the laws of nature is taken to be *slightly restricted*; the laws turn out to be
metaphysically necessary as long as the scope of predication is restricted. However, if a
natural law can fail to hold in some world that has different fundamental properties
than ours, then that law *can* fail to hold, and, as such, it is at least in some sense
contingent. 79

The above point can be expressed in a different way: Slightly restricted necessity is
not metaphysical necessity. 80 Let’s call the type of necessity that the dispositional realist

79 See Mumford (2004), p. 165 for a similar argument. Also, keeping in mind that the
dispositional realists convincingly argue that if the natural laws are in any way contingent
then humeanism is true, this position seems to be a tricky one for them to defend (see
footnote 81).
80 I provide a similar argument in a different context in (author’s paper).
Chakravartty makes a similar point (2007), pp. 130ff. He suggests that the necessity
that results from the dispositional realist’s property identity theory is *natural* necessity,
not metaphysical necessity (p. 131). However, he goes on to claim that the view that
natural laws are metaphysically necessary is appropriate only on a *linguistic*, as opposed
attributes to the natural laws $\textit{metaphysical necessity}_{DR}$, where a law is $\textit{metaphysically necessary}_{DR}$ if it holds in all worlds with the same fundamental properties as ours. Even if there are some metaphysically necessary$_{DR}$ laws, we can still ask whether the laws that hold in this world hold in $\textit{every}$ world, that is, we can ask whether natural laws are $\textit{metaphysically necessary}$. And since the dispositional realist must respond $\textit{no}$ to that question, they must concede that at least some laws are $\textit{not}$ metaphysically necessary (even if they are $\textit{metaphysically necessary}_{DR}$). So, slightly restricted metaphysically necessary natural laws are not metaphysically necessary; slightly restricted metaphysically necessary natural laws are in some sense contingent. And, as Bird convincingly argues, and any position that supports contingent natural laws will ultimately collapse into humeanism.$^{81}$

If the natural laws are $\textit{metaphysically necessary}$ (and not merely $\textit{metaphysically necessary}_{DR}$), then the natural laws that hold in this world hold in every possible world, and the stronger version of natural law necessitarianism is true.$^{82}$ Moreover, lacking any further reason for the instantiation of these fundamental properties, there seems to be nothing that can adequately account for the possibility that some of these properties might have failed to have been instantiated or for the possibility that some other

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82 And, one might argue, since modal realism is false, this is the only possible world, and the metaphysical necessity of the natural laws entails that they are absolutely necessary.
properties might have been instantiated, instead. And thus, once again, the dispositional realist’s attempt to provide for at least some contingency in the world would remain, at best, unfinished since they would still need to show that the initial conditions could have been otherwise.

5. The Belief that there Must Be Ways Things Could Have Been

I have shown that three of the main strategies that dispositional realists use to account for at least some contingency in the world fail to provide for contingent property manifestations, for nonnecessitated causation, and for not-absolutely metaphysically necessary natural laws.¹³

At this point, we might consider whether the dispositional realist has good reason for believing that some things are contingency. Some dispositional realists maintain that is just intuitive that some things could have been otherwise.¹⁴ But, although intuition may help to point us toward true beliefs, it cannot, on its own, work to adequately justify any belief as true.

¹³ I do not mean to suggest that this examination exhausts the means by which the dispositional realist might attempt to account for contingency. I have taken up the three strongest and most common attempts and recognize that there may be other strategies that one might offer that would then require further analysis.

¹⁴ “[The dispositional realist] takes modal talk seriously, without trying to dismiss it as fictional talk,” Borghini and Williams (2008), p. 33. “[T]he being of an unmanifested disposition and the being of a counterfactual state of affairs involve unrealized possibilities. And if the unmanifested disposition is fully part of the actual world or the counterfactual is true in virtue of the way the actual world is, then unrealized possibilities must be part of the actual world,” Bird (2007), p. 109; p. 206. Ellis (2001), p. 279ff.
Many dispositional realists claim that there must be unrealized possibilities in order to make sense of true counterfactuals.\textsuperscript{85} However, anyone who asserts that a given counterfactual is true not because the antecedent it is \textit{impossible} for the antecedent to be true, but because \textit{it is really possible that the antecedent could have been true}, presupposes that there are unrealized possibilities in order to maintain that the antecedent \textit{could} have been true. Consequently, any appeal to true counterfactuals in order to justify the belief that there are unrealized possibilities appears to beg the question.

In fact, one might suggest that we need not posit unrealized possibilities in order to defend the truth of a (so-called) counterfactual.\textsuperscript{86} Most hold that the following counterfactual about a glass that is never struck and never broken is true: \textit{If the glass had been struck (with appropriate force, in the right conditions), it would have broken.} But, if we were to ask \textit{why} this statement is true, it seems that a dispositional realist could respond that the statement is true because \textit{the glass is glass, and glass is fragile, and what is fragile is such that it breaks when struck}. In other words, rather than grounding the truth of the statement in what happens in a situation that never occurs, the dispositional realist can maintain that its truth is grounded in the type-level dispositional property and its essential nature.\textsuperscript{87} In this way, the dispositional realist

\textsuperscript{85} See, for example: Borghini and Williams (2007); Jacobs (2010); Pruss (2001); Mumford and Anjum (2010).
\textsuperscript{86} I develop this more fully in (author’s paper) (in progress).
\textsuperscript{87} See section 2.4.
need not be committed to the real possibility that a never-struck glass is struck, but need merely be committed to the truth of dispositional realism.

At the very least, the dispositional realist may have a bit more work to do to defend the belief that there is contingency in the world. For although contingentarianism is the default position, and “the burden of proof falls to those who would deny contingency,” it may be “time that we recognize that, in philosophy, there are no default views,” and that, “Substantive claims of contingency, no less than claims of necessity, as Charlie Martin used to put it, need to earn their keep.”

6. Concluding Remarks

Dispositional realists convincingly argue that necessitarian essentialism and natural law necessitarianism must be true. Yet, like most philosophers, dispositional realists deny that everything happens as a matter of necessity and maintain that at least some things about the world could have been different. But, the three primary strategies used to account for contingency – by appeal to unrealized possible manifestations, indeterminate property manifestations, and possibly different fundamental properties – all fail to adequately provide for possible otherwisedness. At the very least, then, a bit more work would need to be done on the part of the dispositional realist to develop a satisfactory account of ways things could have been.

88 Heil (2010), p. 70. Heil is here making a point against twentieth-century analytic philosophy that “inculcated a Humean picture of the world as a default.”
However, the dispositional realist may not need to defend the view that some things in the world could have been otherwise than what they are. For one could argue that the consideration of a really possible but never-realized, never-actual, never-existing origami swan fails to inform our scientific understanding of the way that the real, actual, existing things in the world work. In fact, the belief that there are possible but never-manifested property manifestations and that there is indeterminacy in the world may well hinder any serious attempts to figure out what will happen, given the actual circumstances and conditions that really occur. For if there are contingent or indeterminate property manifestations, the behavior of things and their interactions appear to be accidental, the “laws will be unable to explain their instances,” and too many predications about the future can be justified. In other words, any philosophical-scientific story that includes the existence of indeterminate and unrealized-but-possible property manifestations would seem to fail to “provide an illuminating ontological picture that makes sense of the world and our place in it.”

Thus, the dispositional realist who is interested in developing a “metaphysic for scientific realism,” that is “intended to be naturalistic,” and who defends necessitarian essentialism, natural law necessitarianism, and the doctrine that

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89 This is similar to one of Ellis’s objections against humeanism (2001), pp. 1-2.
90 This is Bird’s basic objection to a “thin” picture of laws (2007), p. 1.
91 Ellis raises such an objection against a lack of theoretical involvement of the subject-matter of our inferences (2001), p. 288.
92 Heil (2010, p. 70.
“necessity is conceptually central to science and common sense,”
may not need to shy away from a commitment to property-manifestation necessitarianism, causal
necessitarianism, and a stronger natural law necessitarianism. For not only are such forms of necessitarianism compatible with dispositional realism, it just might be the case that necessary fundamental dispositional properties could play a significant role in the scientific explanation of the universe, even if – in fact, perhaps even because – they cannot allow for ways things could have been.

95 Molnar, in one of his objections against Hume's attempt to invert the “obvious truth” that “necessity of causal connexions enables us to infer the future from the past,” (2003), p. 223.
References


