

THE GHOSTS IN OUR MIDST

Samuel Z. Elgin

*“There walked in a massively built, stout young man in spectacles, with a cropped head, light breeches in the mode of the day, with a high lace ruffle and a ginger-coloured coat...He had not yet entered any branch of the service; he had only just returned from abroad, where he had been educated, and this was his first appearance in society...Though Pierre certainly was somewhat bigger than any of the other men in the room, this expression could only have reference to the clever, though shy, observant and natural look that distinguished him from every one else in the drawing room.”—
Tolstoy, *War and Peace**

Introduction

As I write, evening fast approaches. Through my partly opened window, I see the sun lying low on the horizon. My colleagues have all left by now. Some have gone to collect their children from school; others have departed to attend a concert or have a meal. Students have also left for the day—retreating to their dormitories or off-campus housing. It is a quiet time. The buzz of academic chatter that often fills philosophy departments has entirely faded. As far as I know, I am the last person in the building.

But I am not alone. The ghost of Pierre Bezukhov stands beside me.

Of course, I do not *see* Pierre. There is no phantom—no shimmering light or otherworldly presence for me to detect. But he stands there, nonetheless. Beside me is a collection of spacetime points: ones that compose an object that perfectly corresponds to the somewhat awkward—yet entirely earnest—man Tolstoy portrays.

Ordinary speakers might balk at the claim that Pierre stands in my office, but it is a claim that many metaphysicians accept. Plausible principles of unrestricted mereological composition entail that a great many objects exist—including Pierre. But while many embrace this plenitude, they do not fully appreciate the theoretical power that it brings. When supplemented with set theory (and a distinction between those spacetime points that are occupied and those that are not), unrestricted composition provides the resources for a reductive theory of propositions, properties, relations, modality, counterfactuals, and causation.

My aim is to develop and defend this theory. In many respects, the resulting view (which I dub ‘the overlap view’) resembles Lewis’s modal realism: the claim that there are infinitely many concrete, spatiotemporally disconnected possible worlds—and that matters of necessity and possibility amount to goings-on within these worlds.¹ Like the

¹See, canonically, Lewis (1986).

Lewisian, I hold that there are infinitely many possible worlds of a kind with the actual world. Unlike the Lewisian, I deny that they are spatiotemporally disconnected. Rather, they overlap. There is but a single mosaic of spacetime points; all worlds occupy this one mosaic.

While my fundamental ontology differs sharply from Lewis's, the manner in which derivative phenomena depend upon the fundamental remains largely the same. As a result, many advantages of modal realism are also advantages of the overlap view. Many—but not all. Similarly, many disadvantages of modal realism are also disadvantages of the overlap view. Many—but not all.

The primary virtue of this view is its parsimony. There is no ontological extravagance: no need for fundamental laws of nature (pace Maudlin), no use for Platonic universals (pace Armstrong), and no appeal to a plethora of disconnected worlds (pace Lewis).² Fundamental reality is sparse: there are points, and there are ways of partitioning points into those that are occupied and those that are not. All of reality is constructed from this limited basis.

Nevertheless, the resulting view takes determinate stands on contentious debates—like those over propositional granularity and counterfactual logic. The stands it takes are controversial but, I think, eminently defensible. I will not dedicate significant space to defending these positions if they are positions that the Lewisian takes as well. I treat modal realism as my foil; should I establish that the overlap view is *at least as good as* modal realism, I will take myself to have succeeded. Defending points of agreement is not needed for this goal. By contrast, I will dedicate space to discussing costs that the overlap view *in particular* incurs—such as costs concerning mereological and locational essentialism, as well as puzzles concerning causal interaction with, and reference to, mere possibilia.

The structure is as follows. I begin by characterizing fundamental reality: defining worlds and objects. I then describe how properties, propositions, and relations are constructed from this basis. Next, I turn to one of the most significant choice points in the development of the overlap view: that between trans-world identity and counterpart theory. Unlike traditional modal realism, trans-world identity is at least *an option* for the overlapist—though one that comes with costs. I then discuss counterfactuals and causation, and address one of the most pressing explanatory demands for this account: why we do not causally interact with otherworldly objects. I close by addressing a distinct, yet related puzzle concerning our reference to possibilia.

²See Maudlin (2007), Armstrong (1978), and, as before, Lewis (1986).

Worlds and Objects

Contemporary metaphysicians are familiar with the Humean mosaic: a four-dimensional array of spacetime points that extends infinitely in all directions.³ The Lewisian posits infinitely many such mosaics—ones that stand in no spatiotemporal relations to one another.⁴ By contrast, the overlapist holds that there is only one. All of reality reduces to goings-on within this sole mosaic.

What is a going-on? Fundamentally, the goings-on are determined by which spacetime points are occupied.⁵ Intuitively, a spacetime point is occupied if there is something located within it, and it is unoccupied if there is not. For the purposes of this paper, I treat the distinction between occupied and unoccupied points as primitive. This is not because I deny that the distinction can be defined, but rather because I will not define it. All metaphysics requires starting points, and this seems to be as natural a starting point as any.

What occupies the spacetime points? Little can be said at this stage. To be sure, the occupants bear various properties and stand in various relations: some intrinsic, others extrinsic; some quantitative, others qualitative; some contingent, others necessary. But properties and relations are ultimately constructed from objects themselves. At this stage, we can merely note that the occupants are *there*: point-sized entities that are akin

³Interpretations of various physical theories may motivate shifting from a four-dimensional array to a higher-dimensional (perhaps even infinitely high-dimensional) array. Wave-function realists argue that the best interpretation of quantum mechanics involves modifying Lewis's four-dimensional view to one where the dimensionality of the mosaic depends upon the number of particles within it—see Loewer (1996); Albert (1996); Ney and Albert (2013) and North (2013). There seems to be no principled limit on how many particles there could be; if there is but a single mosaic, it presumably has infinitely high dimensionality, and many of these dimensions correspond to particles that do not exist in worlds with only finitely many. Relativistic considerations may also motivate adopting a high-dimensional mosaic. If there is only one mosaic, then its geometry is held constant across possible worlds. This might seem to conflict with general relativity, which holds that curvature depends upon the (contingent) distribution of matter. However, as Khawaja and Murgueitio Ramírez (Forthcoming) argue, it may be possible to recover a Euclidean geometry even within a curved spacetime. A series of results in topology and differential geometry establish that curved manifolds can be embedded in higher-dimensional (semi-)Euclidean spaces that preserve geometric structure—see Whitney (1936); Nash (1956) and Clarke (1970). The mosaic, then, can be taken to be a sufficiently high-dimensional flat ambient space, with each possible world's curved spacetime as an embedded submanifold. Beyond these brief remarks, I will not discuss the interpretation of physics within this paper—but merely note that it seems likely that the overlap view could be modified to accommodate contemporary theories.

⁴While Lewis characterizes modal realism in terms of spatiotemporal isolation, Bricker (2001, 2008) defends a version where single worlds contain 'island universes' that are spatiotemporally disconnected. I will not explore the possibility of an island universe view within this paper, though the overlap view could easily accommodate them.

⁵An important precursor to this view is developed by Esfeld (2014), who also defends a version of Humeanism with primitive occupation, rather than qualitative properties. Esfeld's aims differ from mine—with the aim to provide a version of Humeanism friendly to Bohmian mechanics, rather than an alternative to modal realism.

to undifferentiated bits of Aristotelian prime matter.⁶ This marks another departure point from Lewisian Humeanism. On the overlap view, fundamental reality consists of a distribution of *things*, rather than qualitative properties.

The notion of maximal consistency is central to any conception of possible worlds. A structure that is non-maximal is not a world; a structure that is inconsistent is not possible. These constraints most naturally apply to propositions (i.e., they require that, within a given world, every proposition is either true or false, and no proposition is both true and false). Nevertheless, analogs apply to spacetime occupation. Every point is either occupied or unoccupied; no point is both occupied and unoccupied. Possible worlds are thus binary partitions of the set of spacetime points: complete specifications of which points are occupied and which are not. More formally, if we let S be the set of all spacetime points, a *possible world* is any ordered pair $\langle O, U \rangle$, where both O and U are sets of points that satisfy the following constraints:

$$\begin{aligned} \text{Maximality: } & O \cup U = S \\ \text{Consistency: } & O \cap U = \emptyset \end{aligned}$$

Why include the set of unoccupied points? In order to distinguish a structure that *holds* that a spacetime point is unoccupied from one that *takes no stand* on whether that point is occupied. Structures that take no stand with respect to occupation do not count as possible worlds precisely because they are nonmaximal; it is by including set U that this requirement has force.

Because the overlap view treats possible worlds as ordered pairs of sets, there is some concern that it amounts to *ersatzism*: the view that possible worlds are abstract representations of how things might be. If so, then the overlap view is subject to traditional objections to ersatzism—most notably, that the representational relationship between the abstract and reality is mysterious.⁷

I deny that this constitutes ersatzism—at least as traditionally understood. The overlap view does not distinguish physical reality from these ordered pairs; the actual world *just is* one of them. The relationship between the actual world and physical reality is identity; it is thus no more mysterious than identity itself.

The standard distinction between abstract and concrete objects is somewhat tenuous on this theory. These categories are often introduced by appealing to paradigmatic

⁶There is a large literature, tracing back at least as far as Locke (1689), on conceptions of matter that are independent from properties in roughly this sense. Some have claimed that this independent matter is unintelligible (on the grounds that we cannot conceive of matter that does not bear properties), but I find these objections to be largely misguided. The occupants of spacetime points genuinely *do* bear properties; once this theory of modality is developed, it will be clear that they even bear some necessarily. It is impossible for them *not* to bear properties, so it should be no surprise that we cannot conceive of them as property-less. See Sider (2006) for an argument along these lines.

⁷See Lewis (1986).

examples—with sets cited as paradigmatically abstract, and physical reality cited as paradigmatically concrete. On the overlap view, possible worlds are both; they are abstract insofar as they are ordered pairs of sets and are concrete insofar as the physical world is one of them.

Reality contains more than occupied and unoccupied points. There are also objects composed of them. I assume that mereological composition is classical; parthood forms a partial ordering and is unrestricted.⁸ This does not fully determine which objects there are, for it does not determine which points compose. There are two natural candidates. We could either hold that only *occupied* points compose or, alternatively, allow for composition of *any points whatsoever*. On the narrow conception of objects (which restricts composition to set *O*), there may be empty space between an object's parts, but these spaces are not parts themselves. By contrast, on the broad conception (which allows for composition over set *S*), empty space may be a constituent of ordinary objects, and holes and voids count as objects in their own right.⁹ Both conceptions are in good standing; I will flag the choice between them where significant.¹⁰

There is a sense in which the narrow conception of objects is contingentist and the broad necessitist.¹¹ If only occupied points compose, then different objects exist in worlds where different points are occupied. By contrast, if any points whatsoever compose, then the same objects exist in all possible worlds because the same points exist in all possible worlds.

The qualifier 'there is a sense in which' is philosophically significant. What necessitism amounts to turns on a controversial choice-point in the development of the overlap view: the choice between trans-world identity and counterpart theory. These differ with respect to the semantic value of sentences like 'Necessarily, Socrates exists.' According to the identity theorist, the sentence is true just in case Socrates *himself* exists within every possible world. According to the counterpart theorist, the sentence is true just in case Socrates has a *counterpart* in every possible world: i.e., iff there is an object within every world that is similar enough to Socrates to play the Socrates-role. What should be uncontroversial is that the overlap view has the *resources* for trans-world identity. Because the very same spacetime points exist in every possible world, the same objects may exist in different worlds. The decision between identity and counterpart theory will have to wait. To determine what an object's counterpart is, we need a theory of relative similarity. And in order to develop *that*, we need a theory of properties.

⁸The debate over when (if ever) objects compose is substantial. My motivations for accepting unrestricted composition are primarily abductive—the theory as a whole is more natural and powerful with this assumption in place. For some canonical discussions regarding composition, see van Inwagen (1990); Lewis (1990) and Sider (1997).

⁹For a discussion of the existence of holes, see Lewis and Lewis (1983).

¹⁰Note that the claim that Pierre Bezukhov stands in my office is presumably true only on the broad conception of objects.

¹¹This assumes that facts regarding mereological composition hold necessarily. See Williamson (2013) for an argument for necessitism.

Propositions, Properties and Relations

Modal realism and the overlap view differ with respect to their fundamental ontology—but the manner in which propositions, properties and relations depend upon the basis remains largely the same. The most straightforward view is that propositions are sets of possible worlds; the proposition *Socrates is wise* is identified with the set of worlds in which Socrates is wise.¹² Monadic properties are functions from worlds to extensions. The property *being wise* is treated as a function that takes a world as its input and has, as its output, the set of everything wise within that world. This is naturally extended to n -ary relations: they are functions from worlds to sets of ordered n -tuples of objects.

This can be stated somewhat more formally—both on the broad and the narrow conception of objects. Let W be the set of worlds, D be the set of objects defined mereologically over S , and D_w be the set of objects defined over set O_w for world w . On the broad conception, a monadic property is any function $F : W \rightarrow \mathcal{P}(D)$. We then have identity conditions for propositions: $p = Fa$ just in case $p = \{w \in W : a \in F(w)\}$. The only modification required for the narrow conception of objects is to substitute D_w for D .¹³

These definitions are precise enough to allow ascriptions of cardinalities to the entities within our ontology—at least on the broad conception of objects.¹⁴ Given that there are continuum many spacetime points, the cardinality of S (the set of points) is \beth_1 . The cardinality of both D and W (the sets of objects and worlds) is \beth_2 , while the cardinality of both the set of propositions and the set of properties is \beth_3 .

The resulting theory is coarse-grained. Necessarily equivalent propositions are identical—as are intensionally equivalent properties and relations. Given the recent rise of hyperintensional views, I suspect some will take this to be a significant cost.¹⁵ The judgments that lead philosophers to reject intensionalism vary. Necessarily equivalent propositions do not generally seem substitutable within belief ascriptions; the fact that an agent knows that $2+2=4$ does not entail that they know every mathematical truth whatsoever. Other substitution failures concern relevant implication; p seems to be relevant to $p \vee \neg p$ but irrelevant to $q \vee \neg q$. Perhaps the most serious concern is that coarse-grained theories cannot account for asymmetric ontological dependence; the fact that $\{\text{Socrates}\}$ exists depends upon the fact that Socrates exists—not the reverse. But if the two existential facts hold in the same possible worlds, there is presumably no asymmetry to be found.

Nothing I say will convince adherents of hyperintensionalism to accept intensionalism. The decision over granularity is among the most contentious in contemporary meta-

¹²However, Dorr (2005) argues that Lewis should consider ‘singular’ propositions, rather than sets of worlds; similar modifications could be made to the overlap view.

¹³In the obvious way, n -ary relations are to be identified with functions $R : W \rightarrow \mathcal{P}(D^n)$ or $R : W \rightarrow \mathcal{P}(D_w^n)$, where $p = Ra_1, a_2, \dots, a_n$ just in case $p = \{w \in W : \langle a_1, a_2, \dots, a_n \rangle \in R(w)\}$.

¹⁴On the narrow conception, the number of objects within a given world varies; in some, there are only 15. However, the cardinalities constitute an upper-bound on that number.

¹⁵See, canonically, Fine (1993).

physics. In some respects, it exemplifies a choice that analytic philosophers often face: to accept a view that is simple and elegant—but that violates some intuitive judgments—or to accept a view that is comparatively more contrived—but that better aligns with our intuitions.¹⁶ Reasonable philosophers disagree about which alternative is best. However, I note that the overlap view’s foil is Lewisian modal realism. Both are coarse-grained—so considerations of granularity do not privilege one over the other.

Necessity and possibility can be defined in terms of worlds and propositions.¹⁷ For a proposition to hold necessarily is for it to be the set of all possible worlds; $\Box p$ iff $p = W$. It would be natural to define possibility in terms of distinctness from the empty set, so that $\Diamond p$ iff $p \neq \emptyset$. A problem with this initial definition is that it is far too permissive. A great many things (indeed, nearly everything!) are distinct from the empty set—yet many are not possible propositions. Julius Caesar is not the empty set, yet ‘ \Diamond Julius Caesar’ is nonsense. We could remedy this problem in several ways. We could introduce syntactic restrictions, so that ‘ $\Diamond\phi$ ’ is only a grammatical expression if ϕ is a parameter for propositions. (Given that ‘ \Diamond Julius Caesar’ seems to be not merely false, but nonsense, this is not entirely unreasonable). Alternatively, we could introduce quantifiers over worlds, and interpret $\Diamond p$ as $\exists w \in p$ —or else define possibility in terms of necessity, so that $\Diamond p := \neg\Box\neg p$.¹⁸ Given any alternative, the resulting logic is naturally taken to be S5. There is no structure on W that privileges some worlds over others: no reason to hold that some worlds are inaccessible. In light of this, it is reasonable to maintain that every world can access every other.

Trans-World Identity and Counterpart Theory

Shifting from a propositional to a quantified language (with singular terms) introduces one of the most significant choice-points in the development of the overlap view: that between trans-world identity and counterpart theory. The identity theorist interprets modals in terms of objects that exist in numerous possible worlds; the sentence ‘Socrates is possibly foolish’ holds just in case there is a possible world in which *Socrates himself* is foolish. By contrast, the counterpart theorist evaluates the sentence in terms of Socrates’ counterpart; the sentence holds iff there is a possible world where someone foolish is *similar enough* to Socrates to play the Socrates-role.

In some respects, trans-world identity is more natural than counterpart theory. A

¹⁶See Williamson (2024) for an argument in favor of coarse-grained views on abductive grounds.

¹⁷Note that these definitions only hold when \Box and \Diamond are taken to refer to the broadest notion of necessity; restricted modals require other definitions. Note, too, that these are effectively identity conditions for \top and \perp . Within the background of an S5 logic, all truths regarding necessity and possibility are themselves necessary; what follows are conditions for $\Box p$ to be identical to \top .

¹⁸Bobzien and Rumfit (2020) argue against interdefinability on the grounds that an intuitionist modal logic accommodates vagueness. For the purposes of this paper, I assume a classical background logic, and so set considerations about intuitionism aside.

possible situation where Kamala Harris won the 2024 presidential election seems to involve *her*—not someone who resembles her in certain respects.¹⁹ As previously mentioned, the overlap view has the resources for trans-world identity: resources that modal realism lacks. The points that Harris occupies are constituents of every possible world. On the broad conception of objects, she exists in every world; even on the narrow conception, she exists in a great many (namely, every world in which the same points are occupied as the points she actually occupies).²⁰ Trans-world identity is a genuine option for the overlapist.

This option is costly. Coupling trans-world identity with the overlap view conflicts with ordinary modal judgments. One conflict is *mereological essentialism*: everything necessarily has the mereological parts that it actually has.²¹ Objects are identified with the spacetime points that they actually occupy. If they occupy these same points in every possible world, then they necessarily have their actual parts. This seems false. Intuitively, had my lunch been somewhat smaller, I would have occupied fewer points; had my lunch been larger, I would have occupied more.²²

While certainly unintuitive, mereological essentialism is not entirely indefensible.²³ Some philosophers endorse it in response to tolerance puzzles. Objects seem to tolerate slight modal variation with respect to size, but not extreme modal variation. The Eiffel Tower could have been slightly smaller; Gustave Eiffel could have designed it so that it is one centimeter shorter than it actually is. However, the Eiffel Tower could not have been the size of a thimble. (Of course, French builders could have erected a thimble-sized structure where the Eiffel Tower is actually located, but it would not be the Eiffel Tower). Nevertheless, sequences of slight variation generate extreme variation; plausible assumptions entail that if the Eiffel Tower could have differed in size even slightly, then it could have been any size whatsoever.²⁴ One response is to deny that the Eiffel Tower could have varied in size at all; it necessarily is the size that it actually is. And if it *does* have its size necessarily, mereological essentialism may seem to incur little additional cost.

An arguably more serious cost for trans-world identity is *locational essentialism*: objects necessarily stand in the spatial relations that they actually stand in. If Jack is actually two

¹⁹This objection is canonically given in Kripke (1980).

²⁰Note that the broad conception of objects gives rise to somewhat odd views about what is possible for Harris; ‘Harris could have been entirely empty space’ is true, because there are some worlds in which every point that Harris actually occupies is unoccupied.

²¹On the narrow view of objects, this needs some restriction: everything necessarily has the parts that it actually has if it exists.

²²Note that this inference implicitly relies upon a principle that Williamson (2008) dubs ‘Possibility’: $(\Diamond p \wedge p \Box \rightarrow q) \rightarrow \Diamond q$. From the fact that I could have eaten a smaller lunch, and the fact that—if I had eaten a smaller lunch, I would have occupied fewer points—I conclude that I could have occupied fewer points.

²³Mereological essentialism has its defenders; see Chisholm (1973, 1976) for an influential example.

²⁴The assumptions are *Non-Contingency* (if an object tolerates slight variation, then it necessarily tolerates slight variation), *Iteration* (whatever is possibly possible is itself possible), and *Persistent Closeness* (whatever counts as close necessarily counts as close). For a sustained investigation into these premises, see Dorr, Hawthorne and Yli-Vakkuri (2022).

feet from Jill, then Jack is necessarily two feet from Jill.²⁵ Jack and Jill are both identified with the spacetime points that they actually occupy. These points are the same distance from one another in every possible world, so Jack and Jill are the same distance from one another in every possible world. This is radically counterintuitive; while they may actually be two feet apart, it seems clear that they could have been three.

Locational essentialism is not the view that objects bear all of their properties necessarily; it does not result in modal collapse.²⁶ Properties and relations are identified with functions from worlds to extensions; an object might belong to the extension of a property F in world w_1 , but not belong to the extension of F in world w_2 . The identity theorist must hold that two balls that are actually next to each other are necessarily next to each other—but need not accept that if they are actually red then they are necessarily red.

Mereological and locational essentialism are sufficiently unintuitive that it is worth exploring counterpart theory. On this alternative, the sentence ‘Napoleon could have won the Battle of Waterloo’ is true just in case a counterpart of Napoleon—rather than Napoleon himself—wins in some possible world. What makes something count as Napoleon’s counterpart within a given world is that it is the thing *most similar* and *similar enough* to Napoleon to play the Napoleon-role.

What prevents counterpart theory from collapsing into trans-world identity? If (as the overlapist maintains) Napoleon exists in numerous possible worlds, then surely *he* is the object that is most similar to himself in every possible world he exists in. (How could some object distinct from Napoleon resemble Napoleon more than Napoleon resembles Napoleon?) And if Napoleon *is* his own counterpart in every possible world, then counterpart theory ought to yield the same modal verdicts as trans-world identity; mereological and locational essentialism reemerge.

But Napoleon need not be his own counterpart. Within a possible world w , what makes something count as Napoleon’s counterpart is not how much it resembles Napoleon within w , but rather how much it resembles Napoleon in the actual world. It could be that within world w , Napoleon is *vastly different* from how Napoleon actually is—sufficiently different that some other object is more similar to actual-Napoleon than Napoleon-within- w . While there remains a sense in which Napoleon exists within w (in that the spacetime points that actually compose him compose an object within w), the counterpart theorist evaluates modals that embed ‘Napoleon’ with respect to this other object, rather than Napoleon himself.

Which properties are similarity-making? Given the abundant conception in play, any

²⁵As before, on the narrow conception of objects, Jack is necessarily two feet from Jill *if they both exist*.

²⁶By ‘modal collapse’ I mean the claim that everything actually true is necessarily true. If an object bore all of its properties necessarily, this would indeed result in modal collapse—at least given a standard background higher-order logic. If an object a bears its properties necessarily, then given an arbitrary true proposition p , a necessarily bears the property $\lambda x.p$. While it is somewhat controversial whether $\lambda x.p(a)$ is identical to p , it is relatively uncontroversial that the two are necessarily co-extensive. If they are, then the claim that a bears all of its properties necessarily gives rise to necessitarianism.

two objects will share infinitely many properties—and have infinitely many that divide them. ‘Counting up’ properties is not an option; there must be a restricted class that gives rise to genuine similarity.

There are two dominant views of privileged properties. Lewis (1983) himself defended the notion of *naturalness*: a primitive, second-order gradable property; some properties are *more natural* than others.²⁷ Perhaps the property of *being green* is more natural than the property of *being grue*. At the far end of the spectrum are the perfectly natural properties: those that figure in the laws of nature and that form a supervenience basis for all others.²⁸ Importantly, facts about naturalness are independent of human interests—the *world itself* determines which properties carve at the joints. Naturalness is similarity-making; if *F* is more natural than *G*, then sharing *F* does more to render objects similar than sharing *G*.

The other dominant view is that humans privilege properties.²⁹ Facts about our linguistic practice, practical interests, or scientific inquiry determine which properties are similarity-making. A population that reasons in terms of grue-like properties makes no objective mistake (though from the perspective of a population that reasons in terms of green-like properties they certainly seem to). On this alternative, counterparts are determined by which objects share properties that *we ourselves* have privileged. Either view generates a way of identifying an object’s counterparts in other possible worlds.

Counterpart theory comes with its own costs. A notable example is discussed by Dorr (2005). The problem arises for theories that accept counterpart theory and that treat propositions as sets of worlds. In principle, an object could have multiple counterparts within the same possible world: perhaps two objects are equally (and sufficiently) similar to Hillary Clinton to qualify as her counterpart in a given world *w*. However, these counterparts may differ with respect to each other in at least some respects. For the sake of concreteness, suppose that one of Clinton’s counterparts won the 2016 presidential election, while the other lost. Is world *w* one in which the proposition *Clinton wins* is true? If so, then there is a possible situation where Clinton wins even though she loses; if not, then there is a possible situation where Clinton does not win even though she wins. Neither alternative is plausible; perhaps we ought to reject counterpart theory.³⁰

The upshot is this. Unlike Lewisian modal realism, the overlap view has the resources to evaluate modally embedded singular terms with appeal to trans-world identity. This

²⁷See also Sider (2011). For an objection that naturalness cannot consistently perform all of the theoretical work Lewis ascribes to it, see Dorr and Hawthorne (2013). For an objection that naturalness involves primitive normativity, see Dasgupta (2018).

²⁸Within this framework, it would be natural to treat the property of *being occupied* as perfectly natural. While I have no objection to this being natural, I doubt that it can be the *only* perfectly natural property. At minimum, I do not see a way for it to distinguish between more and less gerrymandered macroscopic events.

²⁹For adherents of this alternative, see Goodman (1983); Dasgupta (2018) and Loewer (2024).

³⁰Dorr notes that Lewis has a reply readily available, which involves taking a proposition’s counterpart (and not merely an object’s). However, problems persist; if we consider a Black-like world with two indiscernible objects *a* and *b*, Lewis will identify the proposition that *Fa* with the proposition that *Fb*. Intuitively, these propositions are distinct; it could be that one of the objects is *F* while the other is not.

is somewhat more natural than counterpart theory, but comes with notable costs: mereological and locational essentialism. Facing these, a defender of overlap might appeal to counterpart theory instead—a theory that incurs costs of its own. How to weigh these competing considerations is a task I leave to the reader.

Counterfactuals and Causation

There is an elephant in the room: both literally and figuratively. It is possible for there to be an elephant in the room with me. According to the overlap view, this requires there to be an elephant in the room in some possible world. That possible world occupies the same Humean mosaic that I occupy—so there is an elephant *right here*: in *this very place*. But where is it? I neither see it nor hear it. I am unable to feed or ride it—and run no risk of being trampled by it. Just as it is incapable of affecting me, so too I am incapable of affecting it; if it should encounter a rogue poacher, nothing I did would save it. In fact it seems impossible for us to interact *in any way whatsoever*. Why? If I am surrounded by ghosts—the plethora of possibilities that occupy the same mosaic as me—what explains our inability to interact?

One of the most attractive features of the overlap view is that it has a ready-made answer to this question. For objects to interact, they must occupy not only the same mosaic, but the same possible world. The elephant exists in a different possible world from me, so we cannot causally interact. This is not an ad-hoc stipulation; it falls out of the counterfactual analysis of causation. Understanding why this is so requires developing accounts of both counterfactuals and causation.

The canonical account of counterfactuals appeals to the similarity of worlds. Just as some objects are more similar than others, so too some worlds are more similar than others; some worlds are comparatively close to the actual world, while others are comparatively far.³¹ A world that is exactly like the actual world except for the location of a single electron is close. A world with radically different distribution of matter is far. A counterfactual—a sentence of the form ‘If *A* were true then *B* would be true’—holds just in case the closest possible worlds in which *A* is true are worlds in which *B* is true.³² For example, the

³¹This is not to claim that similarity of worlds depends straightforwardly on similarity of objects. Lewis (1979) provides a more elaborate procedure for evaluating world-similarity. In order of priority: avoid widespread violations of natural law; maximize the spatiotemporal regions that perfectly match matters of fact; avoid small, local violations of law; and approximate similarity of particular fact, which has little or no weight.

³²This particular account (in terms of ‘the worlds’ rather than ‘world’) is faithful to Lewis’s original account—but takes a stand on a controversial principle of counterfactual logic: it denies the Counterfactual Excluded Middle (either if *A* were true then *B* would be true, or if *A* were true then *B* would be false). After all, it could be that some of the most-similar *A*-worlds are *B*-worlds, while others of the closest *A*-worlds are \neg *B*-worlds. The variant semantics given by Stalnaker (1968) evaluates counterfactuals based on the most-similar world (singular), and licenses this principle. Debates over the CEM would take us far afield—but I note that Lewis (1979) provides putative counterexamples, such as ‘If Bizet and Verdi had been compatriots,

counterfactual ‘If John had studied, he would have passed’ holds just in case the closest worlds in which John studied are worlds in which he passed.

This account of counterfactuals is not universally accepted. Fine (1975a) and Nute (1975) (independently) note that this licenses the substitution of logically equivalent expressions within the antecedents of counterfactuals. This substitution violates independently plausible principles of counterfactual logic. Someone who endorses substitution must either reject Simplification (the claim that ‘If p or q were true, then r would be true’ entails ‘If p were true then r would be true’) or else be saddled with Antecedent Strengthening (‘If p were true then r would be true’ entails ‘If p and q were true then r would be true’).³³ Both alternatives conflict with ordinary judgments; it would be strange to hold that if either Tim or Alex came to the party, it would be fun—yet deny that if Tim came to the party, it would be fun; it would be bizarre to hold that the counterfactual ‘If I were to take Tylenol, I would feel better’ entails ‘If I were to take Tylenol and cyanide, I would feel better.’ In response, alternative semantics have been developed that reject the substitution of equivalents.³⁴

While controversial, the substitution of equivalent expressions remains defensible. This aspect of the overlap view (and of modal realism) does not arise from the most controversial aspects of the theory. Rather, it results from the fact that it is coarse-grained; any (classical) theory that identifies logically equivalent propositions must allow for them to be substituted in every context—including the antecedents of counterfactuals.³⁵ Insofar as coarse-grained views are defensible, so too is the substitution of equivalents.

The most straightforward counterfactual analysis of causation is this: event C causes event E just in case both C and E actually occur and, if event C had not occurred, event E would not have occurred. In order for a spark to cause a fire, the spark and fire must both occur and, had the spark not occurred, the fire would not have occurred.

There is a large literature on this analysis—one that produced a number of putative counterexamples and corresponding refinements. These involve preemption, overdetermination, and epiphenomena.³⁶ Despite the prevalence of putative counterexamples, counterfactual analyses of causation continue to hold broad appeal. It is a near truism that there is a close connection between the fact that one event causes another and the fact that it counterfactually depends upon the other.

both would have been French.’

| | |
|---|-----------------------------|
| $p \Box \rightarrow r$ | Supposition |
| ³³ Proof: $p \vee (p \wedge q) \Box \rightarrow r$ | Substitution of Equivalents |
| $(p \wedge q) \Box \rightarrow r$ | Simplification |

³⁴See, e.g., Fine (2015); Santorio (2018).

³⁵This results from a substitutional formulation of Leibniz’s Law: $a = b \rightarrow (\phi \leftrightarrow \phi^{[a/b]})$. This variant is provably equivalent to the (arguably more familiar) formulation in terms of properties: $a = b \rightarrow (Fa \leftrightarrow Fb)$, given the background assumption that β -equivalent expressions co-refer.

³⁶The literatures on these phenomena are too vast to adequately canvas here. For a canonical discussion on preemption, see Lewis (1973). For one on trumping preemption, see Schaffer (2000). For one on overdetermination, see McDermott (1995). For one on epiphenomena, see Kim (1973).

The subtleties of competing accounts are largely irrelevant for our purposes; what matters is a feature they all have in common. In order for event *C* to cause event *E*, events *C* and *E* *must actually occur*. ‘Actually’ is an indexical; it identifies the world in which it occurs (in this case, the world in which the causation occurs). If Emily does not actually throw a rock, then the event of Emily’s throw does not cause anything. If the window does not actually shatter, then nothing causes the window to shatter.

For event *C* to cause event *E*, *C* and *E* must both occur within the same possible world; events that occur within different worlds do not causally interact. This explains why we do not interact with merely possible elephants. While there is possibly an elephant in the room, there is not actually an elephant in the room. There are thus no actually-occurring events involving an elephant in the room with me. Because the elephant does not figure in any such events, there are no causal interactions between me and the elephant. (Of course, on the broad conception of objects, the object that comprises the elephant exists necessarily; in every possible world, the points that comprise it exist. But in the actual world, many of these points are unoccupied. They exist merely as empty space. While I causally interact with these points, I do not interact with them the way that I would an elephant.)

This holds for the plethora of possibilities that surround me. If an object is merely possible, then it figures in no actually-occurring events, and so stands in no causal relations to them.³⁷ Nothing I do can causally affect them; nothing they do can causally affect me.

Ghostly Reference

The overlap view conflicts with ordinary judgments in other ways. Because possibilities occupy the same mosaic as us, they stand in spatial relations to us; Pierre Bezukhov is standing *four feet away from me*. A bit bluntly, this just sounds *weird*. Need the overlapist bite this bullet?

Some might deny that this is particularly problematic. In some respects, it resembles an odd consequence of modal realism. The realist maintains that it is possible for there to be talking donkeys; when quantifying unrestrictedly, there *are* talking donkeys. To be sure, the sentence ‘There are no talking donkeys’ is typically true—but this is because ordinary speakers usually employ a restricted quantifier: one that ranges over objects within the actual world. Arguably, the sentence ‘Pierre stands four feet away from me’ is no more counterintuitive than ‘There are talking donkeys’—so the overlapist may be no worse off than the modal realist.

The overlapist need not concede so much; further resources explain the difficulty of referring to mere possibilities. On the most natural explanation, terms like ‘Pierre’ have

³⁷Note that it may stand in various *counterfactual* relations to events that actually occur. The elephant in the room is such that, if I were to wear a green shirt, it would be in the same room as someone wearing a green shirt. But these counterfactual relations do not amount to causation.

indeterminate reference; there is no fact of the matter about what they refer to. Different possible worlds contain rival candidates for the referent of ‘Pierre.’ In some worlds, the candidate is two feet to my left; in others, two feet to my right. Nothing makes it the case that ‘Pierre’ determinately refers to one of these, rather than the other; there is no metasemantic glue that identifies a unique referent of the name. And because the referent of ‘Pierre’ is indeterminate, attributions of his location relative to me are indeterminate.

Works of fiction are invariably incomplete. No matter how rich a novel or series is, it does not take a stand on absolutely everything—from the number of blades of grass in a lawn to the movements of individual electrons in distant galaxies. Numerous possible worlds are thus compatible with everything contained in a work of fiction.³⁸ There are possible worlds that are equally faithful to *War and Peace*, yet that differ slightly with respect to Pierre’s location. In one, he is a nanometer to the left; in another, a nanometer to the right. Which person does my use of ‘Pierre’ refer to? There seems to be nothing that privileges one referential candidate; each is just as strong a candidate as the other.

Even if Tolstoy had described his world in maximal detail—down to the position of every last subatomic particle—the problem would remain. There are ‘shifted worlds’: ones where the location of everything *within* the world is held constant, but location *relative to me* changes.³⁹ That is, there are worlds where the matter is uniformly shifted in some-direction-or-other. This gives rise to a myriad of possible locations for Pierre; indeed, he could be at *any location whatsoever*. Because the referent of ‘Pierre’ is indeterminate, his location relative to me is indeterminate. And because sentences like ‘Pierre is four feet to my left’ have indeterminate truth-values, they sound odd.

What prevents this argument from generalizing to attributions of our relative location to objects that actually exist? Just as there are shifted worlds equally faithful to *War and Peace*, so too the actual world has shifted worlds; there is a world *precisely like the actual one*, except that matter is displaced uniformly to the left. If I claim that I am two miles from Rebecca, what determines that ‘Rebecca’ refers (determinately) to the person in the actual world, rather than to one of the possible Rebeccas scattered throughout modal space (or is indeterminate between them)?

The obvious reply is that objects that occupy the same possible world as me are *reference magnets*.⁴⁰ It is in virtue of the fact that Rebecca is in my world that my use of ‘Rebecca’ attaches to her, rather than to someone else. It is precisely because terms like ‘Pierre’ cannot refer to someone who actually exists that indeterminate reference arises.⁴¹

³⁸The obvious exception is a novel whose claims are impossible, and so incompatible with every possible world.

³⁹More formally: let $T : R \rightarrow R$ be an isometry of the mosaic (a bijection preserving whatever metric or differential structure has been imposed on R). Given a world $W = \langle O, U \rangle$, the T -shift of W is the world $W^T = \langle T(O), T(U) \rangle$. A world W' is a *shifted variant* of W iff there exists an isometry T such that $W' = W^T$. This relation is reflexive (the identity is an isometry), symmetric (T^{-1} is an isometry whenever T is), and transitive (compositions of isometries are isometries), so worlds partition into shift-equivalence classes.

⁴⁰See Lewis (1984) for the canonical discussion of reference magnetism.

⁴¹More precisely: indeterminate reference of the kind that arises from the overlap view. There may be other

Not every sentence that includes 'Pierre' has indeterminate truth. (After all, the sentence 'It is possible for Pierre to be to my left' ought to be determinately true). Supervaluations over all candidate referents sometimes yield determinate truth-values. If a sentence includes 'Pierre', but it *doesn't matter* what the precise referent of the name is, the sentence is either determinately true or determinately false.⁴² Notably, this holds for sentences embedded within modals like 'Possibly' or 'Necessarily.' Arguably, every precisification of 'Pierre' yields a truth when occurring in 'Necessarily, Pierre is human if he exists'—so this sentence is determinately true.

Of course, there are some sentences that are not embedded within modals that yield determinate truth-values on the supervaluationist approach. The sentence 'I am some-distance-or-other from Pierre' is determinately true, as every precisification of 'Pierre' is such that I am some-distance-or-other from him. This, I think, is an oddity that the overlapist must embrace.

The overlap view thus maintains that we stand in spatiotemporal relations to mere possibilities, as these possibilities occupy the same Humean mosaic that we occupy. However, ascriptions of relative location to possibilities often have indeterminate truth-values, since their names lack determinate referents. This indeterminacy explains why these ascriptions sound so odd. By contrast, when these sentences are embedded within modals, they often have determinate truth-values—because modals function as quantifiers over worlds. Nevertheless, some odd truths remain. I see no recourse but to admit that they are strange implications of the overlap view.

Conclusion

The overlap view maintains that there is but a single mosaic of spacetime points. Some points are occupied; others are not. A possible world is a binary partition of the mosaic: a specification of which points are occupied and which are not. The actual world is one such partition; merely possible worlds are others. Matters of metaphysical necessity and possibility reduce to goings-on within these possible worlds. This foundation provides the resources for accounts of numerous phenomena: mereology, propositions, properties, relations, counterfactuals and causation. These accounts are not entirely uncontroversial, but remain plausible.

The overlap view enjoys several advantages over modal realism. It is more parsimonious. Rather than positing infinitely many spatiotemporally isolated mosaics, it posits only one. Moreover, it allows for trans-world identity, which is (in at least some respects) more natural than counterpart theory. While there are genuine puzzles about our inability to causally interact with mere possibilities, the overlap view has a ready-made answer.

sources of indeterminacy—vagueness, Quinean inscrutability—about which the present account has nothing to say.

⁴²See Fine (1975*b*) for a discussion of supervaluationism.

Causal interaction requires the causal relata to occupy the same possible world; mere possibilia do not.

Nevertheless, overlap incurs some costs. Trans-world identity brings mereological and locational essentialism—both of which conflict with ordinary modal judgments. While counterpart theory avoids these costs, it generates problems for worlds that contain multiple counterparts for the same object. Additionally, the overlap view entails that we stand in spatiotemporal relations to mere possibilia—though attributions of these relations are often indeterminate. Finally, the view is coarse-grained, and inherits all of the standard challenges to coarse-grained views (though these are challenges that modal realism shares).

Whether the overlap view is worth these costs can only be determined by weighing them against its theoretical virtues and intuitive verdicts. I think that this view is at least as plausible as modal realism: it matches realism's virtues, avoids one of its central peculiarities, and incurs costs that are different in kind but not obviously worse in degree. Indeed, some might view it as *the best version* of modal realism; those tempted by realism—but balk at spatiotemporally isolated worlds—may be attracted to the overlap view.

References

- Albert, David. 1996. Elementary Quantum Mechanics. In *Bohmian Mechanics and Quantum Theory: an Appraisal*, ed. James Cushing, Arthur Fine and Shelly Goldstein. Springer pp. 277–84.
- Armstrong, D. M. 1978. *Universals and Scientific Realism*. Vol. 1 and 2 Cambridge: Cambridge University Press.
- Bobzien, Susanne and Ian Rumfit. 2020. "Intuitionism and the Modal Logic of Vagueness." *Journal of Philosophical Logic* 49:221–48.
- Bricker, Phillip. 2001. Island Universes and the Analysis of Modality. In *Reality and Humean Supervenience: Essays on the Philosophy of David Lewis*, ed. Gerhard Preyer and Frank Siebelt. Lanham, MD: Rowman & Littlefield pp. 27–55.
- Bricker, Phillip. 2008. Concrete Possible Worlds. In *Contemporary Debates in Metaphysics*, ed. Theodore Sider, John Hawthorne and Dean Zimmerman. Oxford: Blackwell pp. 111–134.
- Chisholm, Roderick M. 1973. "Parts as Essential to Their Wholes." *The Review of Metaphysics* 26(4):581–603.
- Chisholm, Roderick M. 1976. *Person and Object: A Metaphysical Study*. La Salle, IL: Open Court.
- Clarke, C. J. S. 1970. "On the Global Isometric Embedding of Pseudo-Riemannian Manifolds." *Proceedings of the Royal Society of London. Series A* 314(1518):417–428.
- Dasgupta, Shamik. 2018. "Realism and the Absence of Value." *The Philosophical Review* 127(3):279–322.
- Dorr, Cian. 2005. "Propositions and Counterpart Theory." *Analysis* 65(3):210–8.
- Dorr, Cian and John Hawthorne. 2013. "Naturalness." *Oxford Studies in Metaphysics* 8.
- Dorr, Cian, John Hawthorne and Juhani Yli-Vakkuri. 2022. *The Bounds of Possibility: Puzzles of Modal Variation*. Oxford University Press.
- Esfeld, Michael. 2014. "Quantum Humeanism, or: Physicalism Without Properties." *Philosophical Quarterly* 64(256):453–70.
- Fine, Kit. 1975a. "Critical Notice." *Mind* 84(335):451–8.
- Fine, Kit. 1975b. "Vagueness, Truth and Logic." *Synthese* 30(3-4):265–300.

- Fine, Kit. 1993. "Essence and Modality." *Philosophical Perspectives* 8:1–16.
- Fine, Kit. 2015. "Counterfactuals Without Possible Worlds." *The Journal of Philosophy* 109(3):221–46.
- Goodman, Nelson. 1983. *Fact, Fiction and Forecast*. Harvard University Press.
- Khawaja, Jake and Sebastián Murgueitio Ramírez. Forthcoming. "Outside Spacetime: Rehabilitating Extrinsic Geometry."
- Kim, Jaegwon. 1973. "Causes and Counterfactuals." *The Journal of Philosophy* 70(17):570–2.
- Kripke, Saul. 1980. "Naming and Necessity."
- Lewis, David. 1973. "Causation." *The Journal of Philosophy* 70(17):556–67.
- Lewis, David. 1979. "Counterfactual Dependence and Time's Arrow." *Noûs* 13(4):455–76.
- Lewis, David. 1983. "New Work for a Theory of Universals." *Australasian Journal of Philosophy* 61(4):343–77.
- Lewis, David. 1984. "Putnam's Paradox." *Australasian Journal of Philosophy* 62(3):221–236.
- Lewis, David. 1986. *On the Plurality of Worlds*. Blackwell.
- Lewis, David. 1990. *Parts of Classes*. Blackwell.
- Lewis, David and Stephanie Lewis. 1983. Holes. In *Philosophical Papers, Volume I*. Oxford: Oxford University Press. Originally published in *Australasian Journal of Philosophy* 48 (1970): 206–212.
- Locke, John. 1689. *An Essay Concerning Human Understanding*.
- Loewer, Barry. 1996. "Humean Supervenience." *Philosophical Topics* 24(1):101–27.
- Loewer, Barry. 2024. *Laws of Nature and Chances: What Breathes Fire into the Equations*. Oxford University Press.
- Maudlin, Tim. 2007. *The Metaphysics Within Physics*. Oxford: Oxford University Press.
- McDermott, Michael. 1995. "Redundant Causation." *British Journal for the Philosophy of Science* 46(4):523–44.
- Nash, John. 1956. "The Imbedding Problem for Riemannian Manifolds." *Annals of Mathematics* 63(1):20–63.
- Ney, Alyssa and David Albert. 2013. *The Wave Function: Essays on the Metaphysics of Quantum Mechanics*. Oxford University Press.

- North, Jill. 2013. The Structure of the Quantum World. In *The Wave Function: Essays on the Metaphysics of Quantum Mechanics*, ed. Alyssa Ney and David Albert. Oxford University Press pp. 184–202.
- Nute, Donald. 1975. "Counterfactuals." *Notre Dame Journal of Formal Logic* 16(4):476–82.
- Santorio, Paolo. 2018. "Alternatives and Truthmakers in Conditional Semantics." *The Journal of Philosophy* 115(10):513–49.
- Schaffer, Jonathan. 2000. "Trumping Preemption." *The Journal of Philosophy* 97(4).
- Sider, Theodore. 1997. "Four Dimensionalism." *The Philosophical Review* 106:197–231.
- Sider, Theodore. 2006. "Bare Particulars." *Philosophical Perspectives* 20:387–97.
- Sider, Theodore. 2011. *Writing the Book of the World*. Oxford University Press.
- Stalnaker, Robert. 1968. A Theory of Conditionals. In *Studies in Logical Theory*, ed. Nicholas Rescher. 98–112.
- van Inwagen, Peter. 1990. *Material Beings*. Cornell University Press.
- Whitney, Hassler. 1936. "Differentiable Manifolds." *Annals of Mathematics* 37(3):645–680.
- Williamson, Timothy. 2008. *The Philosophy of Philosophy*. Wiley Blackwell.
- Williamson, Timothy. 2013. *Modal Logic as Metaphysics*. Oxford University Press.
- Williamson, Timothy. 2024. *Heuristics in Philosophy*. Oxford University Press.