

*The Bounds of Possibility: Puzzles of Modal Variation.* CIAN DORR and JOHN HAWTHORNE, with JUHANI YLI-VAKKURI. Oxford: Oxford University Press, 2021. xi + 436 p. Hardcover \$45.00.

It is sometimes natural to think that an object could have been somewhat different – say, in its qualitative character or its originating matter – but could not have been radically different. The Great Pyramid could have been somewhat smaller; but it couldn't have been as small as a thimble. The table before me could have been originally made from somewhat different parts; but it couldn't have been made from completely different parts. Objects, typically, are modally *tolerant*, but not modally *hypertolerant*. But when tolerance is combined with other plausible modal claims, hypertolerance logically follows. We are thus faced with puzzles of modal variation, puzzles that challenge our understanding of ordinary *de re* modal claims.

In *The Bounds of Possibility*, Cian Dorr, John Hawthorne, and Juhani Yli-Vakkuri provide a comprehensive discussion of “tolerance puzzles”, critically examining an array of possible solutions and ultimately developing and defending a solution of their own. That may sound narrow in scope. But strategies for solving tolerance puzzles will tend to be relevant to solving other puzzles involving *de re* modality. Moreover, the book engages with a broad range of issues in metaphysics, as well as touching on issues in logic, epistemology, and the philosophy of language. The book is long, filled with detailed and complex argumentation. I suspect that many readers will not have the time or patience to read the book cover to cover. But those who persevere will be richly rewarded. For any philosopher with a special interest in tolerance puzzles or the interpretation of *de re* modality, the book should be required reading.

Three features of the book are worth highlighting at the start. First, as is a trend in much recent metaphysics, the logical framework within which the puzzles are presented and analyzed

is *higher-order* modal logic with *higher-order* quantification and identity. Some key arguments in the book depend on how such a logic is to be interpreted. The authors usefully include a chapter that introduces and develops their preferred logical framework. Second, going against the tide of much recent metaphysics, modality takes center stage with nary a mention of grounding or truthmaking. Supervenience theses play a central role in the argumentation, especially microphysical supervenience. But third, the modal logical framework is taken to be fundamental, with any talk of possible worlds playing only a heuristic role. Thus, in the debate over whether issues in the metaphysics of modality should be expressed within a fundamental modal logic (as Williamson holds) or an extensional language quantifying over *possibilia* (as Lewis holds), the authors side with the former.

The book focuses on two argument schemata, one based on the tolerance of a specific object (such as the Great Pyramid), the other based on the tolerance of all members of a given kind (e.g., tables or ships). I will focus on the former. To instantiate the schema, one needs to specify an object *a*, by name or demonstrative, and specify a family of properties with a closeness relation on those properties. For example, the properties may be heights, where one height is close to another if it is no more than 10% shorter or longer. Say that *x* is *tolerant* iff for any *F* and *G* such that *x* is *F* and *G* is close to *F*, it is possible that *x* is *G*; and *x* is *hypertolerant* iff for any *F* and *G* such that *x* is *F* and *G* is ancestrally close to *F*, it is possible that *x* is *G*. An instance of the first argument schema has the following four premises:

**Tolerance** *a* is tolerant.

**Non-Contingency** If *a* is tolerant, it is necessary that *a* is tolerant.

**Iteration** Whatever is possibly possible is possible.

**Persistent Closeness** When properties are close, they are necessarily close.

The argument's conclusion is

**Hypertolerance**  $a$  is hypertolerant.

The argument is logically valid within the minimal modal logic presupposed by the authors. The puzzle arises whenever there is pressure to accept Tolerance but reject Hypertolerance. There is pressure then to reject one of the other premises, but which one? The argument can typically be set up so as to make Persistent Closeness uncontroversial. So the debate will be over whether to reject Non-Contingency, reject Iteration, or accept Hypertolerance after all. The book is a deep dive into the pros and cons of these three options.

In turning the argument schema into an argument, one also has to specify the modality involved. Much of the discussion in the literature takes the modality to be metaphysical possibility. But the authors also consider narrower modalities such as nomic possibility, having a non-zero objective chance, and various concocted modalities introduced for the purpose of sharpening the argument or evaluating possible solutions. They also consider the argument with the modal operators replaced by temporal operators. This raises a question. Given such a wide range of arguments that they take to fall under their schema, is there any reason to expect a general solution to the puzzles? Sometimes the authors suggest that if an option cannot provide a general solution, that is a strike against it. But that can't be because they suppose there must be a general solution: they allow that in some cases accepting Hypertolerance is the right response (§12.1). When being more careful, they say only that once one sees that an option cannot provide a general solution, that shows that another option needs to be considered; and if that option better generalizes, it will give reason to prefer it to the first option. In any case, I will focus below on the case of metaphysical modality where Hypertolerance is often not a plausible option. In the

literature, tolerance puzzles with metaphysical modality are often referred to as “Chisholm’s Paradox”.

A popular response to Chisholm’s Paradox has been to reject Iteration. The response comes in two different versions. (I frame the response, as is common, in terms of possible worlds; but I do not suppose the Iteration denier must take possible worlds semantics to play an explanatory role.) One version, suggested by Chandler and developed and defended by Salmon, holds that the semantics for metaphysical modality appeals to an accessibility relation that is intransitive.<sup>1</sup> To illustrate: suppose we want to say that  $a$  could be F but couldn’t be G, where G is close to F. Then, there is a world  $w$  accessible to the actual world where  $a$  is F, and, by Non-Contingency, a world  $v$  accessible to  $w$  where  $a$  is G. Thus, it is possible that it is possible that  $a$  is G. But if we reject the transitivity of accessibility, we can allow that  $v$  is not accessible to the actual world and that  $a$  couldn’t possibly be G. Iteration fails. A standard challenge to this response is to say why the world  $v$  where  $a$  is G is not relevant to what  $a$  could have been. For metaphysical modality, as normally understood, quantifies over all the worlds. A second response, defended by Lewis, is to invoke counterpart theory and note that the counterpart relation, being a relation of qualitative similarity, need not be transitive.<sup>2</sup> Thus,  $a$  could be F in virtue of having a counterpart in  $w$  that is F. And that counterpart could be G in virtue of having a counterpart in  $v$  that is G. But since a counterpart of a counterpart of  $a$  need not be a counterpart of  $a$ , it doesn’t follow that  $a$  could be G. Again, Iteration fails. But, arguably (see below), the failure of Iteration is not due to any restriction on metaphysical modality: the modal operator is interpreted as a quantifier over all the worlds.

In three central chapters of the book, chapters 7 through 9, the authors present their arguments in defense of Iteration. (I say something about one of them below.) Once the strategy

of rejecting Iteration is off the table, they turn their attention to the strategy they endorse: rejecting Non-Contingency. In an earlier chapter, they had considered various arguments for Non-Contingency, dismissing all but one. The first takes Non-Contingency to be supported by the intuition underlying sorites arguments, that small differences can't matter. But that intuition, the authors rightly claim, must be rejected in any case. Moreover, although sorites arguments can be put into the form of a tolerance argument, tolerance arguments need not be sorites arguments: the relevant closeness relation need not make the differences small. Another argument for Non-Contingency that the authors reject is based on the claim that Tolerance is known a priori. This argument, in my view, is stronger than the authors allow. It seems plausible, for example, that it is part of our concept of a material object that, if material objects are composed of atoms as we think, then they can survive the gain or loss of a single atom. The necessity of Tolerance plausibly follows. But the authors would reject this, it seems, owing to a general skepticism about the a priori, and any notion of conceptual truth. The only argument for Non-Contingency that they find compelling they call the Security Argument. The idea, roughly, is that if Tolerance were only contingently true, then it would be a matter of luck that we are not mistaken about it. For if Tolerance fails at some worlds, then it seems it would fail at worlds very much like the actual world; and so Tolerance could easily have been false. But then if we accept what the authors call Independence – if Tolerance could easily have been false, we could have easily falsely believed it – then it seems our belief in Tolerance is not secure. Thus, the security of our tolerance beliefs requires the acceptance of Non-Contingency.

The challenge, then, is to reject this Security Argument by developing a view under which Independence is false. There are two main components to the authors' view. First, what they call "semantic plasticity": there is fine-grained variation within the space of nearby worlds

as regard to what our utterances are used to assert. In particular, demonstratives, names, and common nouns undergo a shift in reference. To see how this works in the case of names, consider a table, Woody, and a nearby world in which Woody is not tolerant. When I assert in that world, “Woody is tolerant”, what I say is true because ‘Woody’ refers, not to Woody, but to some object distinct from Woody that *is* tolerant. This other object that I refer to is similar to Woody in salient respects: it is table-shaped and right in front of me. Thus, the authors’ reference-shifting strategy requires that in this nearby world, and presumably also in our world, there are multiple table-shaped objects in front of me, differing with respect to their tolerance. And for this positing of objects not to be obnoxiously arbitrary, it requires supporting some version of “plenitude” according to which, co-located with any material object, there are countless other material objects differing only in their modal profiles. When this approach is applied to quantified tolerance puzzles without names or demonstratives, it leads the authors to accept controversial views about common nouns like ‘table’. In particular, they hold that of all the co-located table-like objects before me, only one of them is a table. Moreover, which object before me is the table depends in surprising ways on external factors. Presumably the same would be said of ‘cube’, which can also be used to formulate tolerance puzzles. Cube-shaped material objects, it seems, need not be cubes.

After presenting their approach to tolerance puzzles in chapter 11, the authors devote two additional chapters to developing and defending their view. In particular, they consider whether their approach has objectionable consequences when applied to tolerance puzzles involving persons. Then, in the final two chapters, the authors consider tolerance puzzles based on what they call “indiscernible modalities”, modalities that hold fixed the truth values of qualitative

propositions. These tolerance puzzles are not amenable to the strategy of denying Non-Contingency and will require some other solution.

That concludes a brief tour of the contents of the book. The bare summaries I have provided only hint at the richness and intricacy of their views.

In the brief space remaining, let me say something from my own theoretical perspective. I am a counterpart theorist and a deflationist about *de re* modality. *De re* modal claims in ordinary discourse often have determinate truth values, but those truth values are largely up to us, depending on our conventions and the context of utterance. Fixing on an object *a*, a property *P*, and a definite modality  $\diamond$  is not enough to determine whether  $\diamond Pa$ ; one also needs to supply a counterpart relation. The authors devote chapter 10 of their book to a discussion of counterpart theory, and its relevance to tolerance puzzles. It might be useful for this review to give one counterpart theorist's response. But I should note that, since the authors have no inclination to accept counterpart theory, what I say will not affect their calculus as to which option to accept.

First I ask: should a deflationist about *de re* modality even care much about tolerance puzzles? It might seem that I should approach the puzzles a bit like an atheist approaches philosophical puzzles generated by Catholic dogma, as mere curiosities. But tolerance puzzles require solutions no less for the deflationist about *de re* modality. For tolerance puzzles can be expressed in our modal discourse, both ordinary and philosophical; and even though I do not take such discourse to be at all fundamental, I am committed to thinking that, appropriately interpreted, it can be made consistent.

I thus take tolerance puzzles seriously and think the authors' arguments deserve careful scrutiny. But I was puzzled by the main conclusion that they draw from their chapter on

counterpart theory, that “counterpart theory is more or less inert when it comes to the relative merits of the main options for escaping Tolerance Puzzles” (261). I hope they don’t expect the counterpart theorist to agree with that. Granted, the options for responding to tolerance puzzles don’t change for the counterpart theorist: one of the premises must still be denied. But I do not think the counterpart theorist’s perspective can so easily be dismissed.

Let me begin by setting aside two ways in which counterpart theory is indeed not especially relevant to the debate. First, one of the chief selling points of counterpart theory is that, by positing different counterpart relations in different contexts, it can accommodate the flexibility or inconstancy that characterizes much of our ordinary *de re* modal discourse. But the authors can allow for substantial flexibility and context dependence as well through their theses of semantic plasticity and material plenitude. Moreover, even for a counterpart theorist who rejects inconstancy and accepts a single counterpart relation, the tolerance puzzles would need a solution. Second, a distinctive feature of many versions of counterpart theory is the rejection of some generally accepted logical principles. Some counterpart theorists have developed versions that are more logically standard; others argue that the apparent deviations from logic can be adequately explained. In any case, since the authors do not include Iteration in the minimal modal logic that they assume, I don’t think the logical heterodoxy of counterpart theory will be directly relevant to the debate over tolerance puzzles. But note that it will be relevant to other puzzles having to do with *de re* modality, including the coincidence puzzles that the authors consider in chapter 4.<sup>3</sup>

There are three ways, however, in which counterpart theory seems to me very much relevant. First, although counterpart theory is neutral between the strategies of rejecting Non-Contingency and rejecting Iteration (see below), let me begin with the standard counterpart-



theoretic response that rejects Iteration. The reason to uphold the Non-Contingency premise and reject the Iteration premise comes from our modal discourse, and how we are inclined to speak about the puzzle cases. The authors put stock in our modal discourse when evaluating Tolerance claims, but not when modal operators are iterated, as in Non-Contingency and Iteration. Such differential treatment seems hard to justify. It is common to say, for example, that I couldn't have done something, but if this or that had happened, it would have been possible for me to do it. In ordinary discourse, of course, the modality in question will be narrower than metaphysical modality. But the inclination to say such things doesn't diminish when we have philosophical discussions about matters of essence. Pretend, for the sake of having a definite case at hand, that I could have had one different parent, but could not have had two different parents. Let my actual mother and father be  $m$  and  $f$ , and let  $m'$  be a mother and  $f'$  a father I could possibly have had. Then it seems natural to say: I could have had  $m'$  and  $f$  as my parents; and if I had had  $m'$  and  $f$  as my parents, it would then have been possible for me to have  $m'$  and  $f'$  as my parents. I see no reason to think in this context that the 'could'-modality cannot be metaphysical modality, or must somehow be distinguished from the 'would'-modality. And thanks to counterpart theory, I have no pressure to do so. For taking the relevant counterpart relation to be intransitive allows for a satisfying *semantic explanation* for why Iteration fails in this case. And, for modal realists, taking the counterpart relation to be a relation of qualitative similarity allows for a satisfying *metaphysical explanation* for why Iteration fails. This by itself is enough to show that counterpart theory has a substantive role to play in the debate over tolerance puzzles.

Of course, the counterpart theorist must still respond to the authors' arguments that support Iteration. I will say something about their argument, given in chapter 8, that directly targets Iteration denial for metaphysical modality. Roughly, the argument is that metaphysical

modality is the “broadest modality” or “absolute modality”; and that Iteration holds for the broadest modality because if Iteration failed, then being necessarily necessary would be associated with a broader modality than being necessary. Now, I for one do not believe that metaphysical modality is absolute modality; for I think metaphysical modality quantifies only over possible worlds, properly so-called, whereas absolute modality quantifies also over mathematical structures and worldlike entities not properly called “possible worlds”. But set that aside. For I think the counterpart theorist should respond by claiming that even if metaphysical modality is the broadest modality, Iteration can be denied. For the counterpart theorist, the denial of Iteration requires no restriction on the modality involved. Why do the authors think otherwise?

The issue as I see it has to do with whether the counterpart relation comes into play when the modal operator is interpreted, or only when the variables and names are interpreted. If the former, then the modal operator is not as broad as possible because it quantifies only over the counterparts of a given object, not over all possible objects. On Lewis’s original way of presenting counterpart theory as a translation from the sentences of quantified modal logic into a first-order language, the counterpart relation came into the translation scheme only for the clause that interpreted sentences headed by a modal operator, not for the clause that interpreted atomic sentences with free variables. (Lewis did not include names in the language, which allows him to say that Iteration holds when modal operators are applied to complete sentences; but let us suppose that there are names and treat them semantically the same as free variables.) Modal operators, in effect, quantified doubly over worlds and counterparts. But Lewis was not committed to this. In *On the Plurality of Worlds*, he calls it the “complex account” and contrasts it with a “simple account” according to which modal operators are just quantifiers over possible

worlds, and the counterpart relation comes into the picture when we interpret atomic formulae, when we say what it means for an inhabitant of one world to exist in and satisfy predicates at another world. He claims there is no need to choose between these accounts because they are equivalent, that is, because they assign the same truth values to the sentences of quantified modal logic.<sup>4</sup>

But when addressing why Iteration fails, the counterpart theorist does have a reason to choose the simple account. The counterpart theorist should forgo Lewis's translation approach and instead provide a model-theoretic semantics for the sentences of quantified modal logic. And the assignment to variables and names should encode information about the counterpart relation.<sup>5</sup> For example, if objects are worldbound, a variable 'x' might be assigned the set containing me and all my counterparts. And then it is straightforward to have 'x is a philosopher' be true, under that assignment, not just at the actual world but at every world in which I have a philosophizing counterpart. To get Iteration to fail when the counterpart relation is intransitive, we allow the assignment to shift when the world of evaluation shifts. Thus, omitting some details, to evaluate ' $\Diamond\phi x$ ' at the actual world, we need to evaluate ' $\phi x$ ' at each world  $w$ ; we do so by shifting the assignment to 'x' from me and all my counterparts to a counterpart of me in  $w$  and all his counterparts. Iteration will fail not because of any restriction on metaphysical modality, but because of the shift in the assignment to variables. Metaphysical modality is still absolute, as the counterpart theorist sees it, in virtue of quantifying unrestrictedly over all possible worlds.<sup>6</sup> So here is a second way in which counterpart theory has an impact on the debate: it provides a response to a key argument the authors give in support of Iteration.

Finally, suppose that one finds the case for Iteration stronger than any modal intuitions that Iteration fails in tolerance puzzle cases: after philosophical reflection, one concludes that an

object's essence couldn't have been otherwise. The counterpart semantics can accommodate this by not allowing the assignment to variables and names to shift from world to world. In that case, even an intransitive counterpart relation will not undermine Iteration. Returning to the above example: that I essentially have either *m* or *f* as one of my parents holds not just at the actual world, but at all worlds where I have a counterpart. Adopting this semantics and combining it with semantic plasticity would allow a counterpart theorist to endorse the authors' strategy of upholding Iteration and rejecting Non-Contingency. But it does so without endorsing material plenitude, without populating the actual world with countless coincident entities. The counterpart theorist, as is well known, can multiply counterpart relations without multiplying material objects in the actual world. We can conceive of actual objects in many ways, with different modal profiles, without there being distinct actual objects that have those different modal profiles. In my view, that allows for a saner ontology more in accord with our ordinary and scientific view of the world. And that is a third, and perhaps most important, way that counterpart theory is relevant to debates over how best to resolve tolerance puzzles.<sup>7</sup>

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<sup>1</sup> See Hugh Chandler, “Plantinga and the Contingently Possible,” *Analysis*, 36 (1976): 107-9; and Nathan Salmon, *Reference and Essence* (Princeton University Press, 1981).

<sup>2</sup> David Lewis, *On the Plurality of Worlds* (Blackwell, 1986): 243-8.

<sup>3</sup> Note also that refusing to engage with counterpart-theoretic approaches that violate their minimal logic has the effect of making some versions of counterpart theory irrelevant by fiat.

<sup>4</sup> See David Lewis, *op. cit.*, pp. 8-10. I suspect Lewis’s indifference owed to his view that, although there is limited indeterminacy as to the truth values of entire sentences, it is largely indeterminate how the semantic content should be divided up among the sentences’ components.

<sup>5</sup> This can be implemented in different ways. Individual concepts determined by the counterpart relation are assigned to variables in Benj Helle, Adam Murray, and Jessica Wilson, “Relativized Metaphysical Modality: Index and Context,” in Scott Shalkowski and Otavio Bueno (eds.), *The Routledge Handbook of Modality* (Routledge, 2021): 82-99. Wolfgang Schwarz introduces a domain of “intensional objects” determined by the counterpart relation, members of which are assigned to variables in “How Things are Elsewhere: Adventures in Counterpart Semantics,” in Greg Restall and Gillian Russell (eds.), *New Waves in Philosophical Logic* (Palgrave Macmillan, 2012): 8-29. The authors discuss semantic approaches of this sort in three footnotes; see pp. 260, 273-4, 309.

<sup>6</sup> I do not expect the authors to accept this way of characterizing absolute modality, even from the perspective of a counterpart theorist. Indeed, in *Counterparts* (forthcoming), Dorr claims that the best way to be a modal realist interprets modality entirely in terms of quantification over counterparts eliminating any role for worlds in the semantic analysis. That would undermine the response I propose. But the counterpart theorist, whether modal realist or not, should refuse

Dorr's offer. See also Schwarz, *op. cit.*, on world-centered vs. individual-centered semantics for counterpart theory.

<sup>7</sup> Thanks to Ted Sider for helpful comments.