Naturalism and Modality

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"[Science] is for coping, not copying." 

Modality

Since the late 20th century, the concepts of necessity and possibility have occupied center stage in philosophical discourse. Modal facts concern what is possibly or necessarily the case. These contrast with categorical facts, which concern only what, is actually the case. Modal notions including concepts of conceptual, metaphysical, and nomic necessity and the counterfactual conditional are central to philosophical theorizing in every area of philosophy—from the foundations of logic to moral theory.

Modality enters science with notions like cause, natural law, probability, dispositions, and capacities. So, for example, consider laws. Laws are related to regularities in the pattern of actual fact (they have to be, if we are to use information about regularities to form beliefs about laws, and information about laws to predict actual events), but they have implications that outrun their implications for what actually happens. To say that L is a law is to say more than that things always happen in accord with L. It is to say that they must happen that way, i.e., that they couldn’t happen otherwise.

Or consider chance. Facts about chance are related to the categorical facts (they have to be if we are to use information about categorical facts to form beliefs about the chances, and information about the chances to guide expectation for categorical facts), but chances have implications that outrun their implications for what actually happens. To say that a certain type of event (a coin flip coming up heads, or an atom decaying within a given time frame) has a good chance of occurring is to say both more and less than that it will occur.

In both cases, there is an ineliminable modal component to the content of these claims that distinguishes them from any mere claim about how things actually are. They have implications not just for the way things are in non-actual, possible worlds. Similar things can be said about other notions that have important roles in science: causes, for example, are famously connected to counterfactuals. But the same goes for capacities and dispositions. There is no way of giving truth conditions for claims about these structures without adverting to counterfactual implications.

Modality is a sticking point for empiricists, some of them (e.g., Ladyman) recognize that

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1 I have benefitted greatly from audiences in Toronto and Rutgers and especially from discussion and correspondence with Barry Loewer.

2 The original remark comes from Rorty. “The mind is for coping, not copying.”
commitment to science comes with a heavy does of modal commitment – a whole slew of beliefs not only about how things are, but how they might have been, could have been, would have been had they been otherwise, and accept modality on the strength of their commitment to science. Science cares less about the pattern of actual events than what they reveal about the modal substructure behind the phenomena. But others shun it on the grounds that this talk of non-actual possibilities if it is not veiled talk about actuality, must be nonsense. Van Fraassen takes rejection of modality to be one of the defining features of empiricism: “To be an empiricist is to withhold belief in anything that goes beyond the actual, observable phenomena and to recognize no objective modality in nature.”

So understanding modality is a matter of some urgency for philosophers of science. There are different ways of trying to elucidate modal notions. One can try to give an analysis that doesn’t use modal vocabulary. There are good reasons for thinking that no informative analysis of modal concepts in non-modal terms is possible. Barring that, one can shed some light on it by clarifying its formal and logical properties, and its inferential and analytic connections to other notions. A lot of excellent work like this has been done on modal concepts. But one can do more than that as well; one can turn her attention to a side-on view of the role modal beliefs play in our cognitive lives. She can ask how modal beliefs are formed and put to use, why creatures with our concerns and interests developed the capacity for modal thought. What does it do for us? What benefits accrue to the practice of modalizing?

I like Boris Kment’s way of putting this; “Before we start to philosophize about modality, we have an implicit theory about it. The philosopher provides this pre-philosophical system of beliefs with a foundation, and refines, extends and corrects it from within. She acts as a participant of our practice of modalizing, i.e. her standpoint is internal to this practice. But the philosopher should also make the practice of modalizing itself an object of study. She should, as it were, take a standpoint external to the practice, in order to describe the practice, and explain what its function is, i.e. why it exists.”

I want to do something like this for the central modal concepts of science. I wouldn’t follow Kment in calling it an ‘external standpoint’, because it will itself use modal concepts. I want to explicitly deny the possibility of stepping outside the practice, as though we could describe or conceptualize or come to understand the practice without using modal notions. But the idea is to take a side-on view of the practice in which these concepts arise of a kind that is internal to a fully articulated scientific picture of the world. Not only is this the right methodology for a naturalistic philosopher to adopt, but it is one that holds rich rewards for self-understanding.

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5 The process of filling in the part of the scientific vision of the world that takes our epistemic interaction with the environment as subject matter is one that Sellars emphasized and that Shimony described as ‘closing the circle’.
**Intermediate structures**

I’ll talk of the modal content of *models* rather than modal *beliefs*, because models are a more natural mode of representation in science⁶ and look at how these kinds of modalized notions relate to the pattern of actual fact. I’ll focus on the two mentioned above – laws and chance – because they are the most familiar and straightforward.

Consider laws. The most fundamental laws have the form of differential equations that give the rate of change for a quantity at a point. They entail the existence of regularities, but they cannot be reduced to regularities because the very notion of law recognizes the possibility of regularities that are not laws. Consider chances. These are single case probabilities represented by a real valued function over space-time. The chance of a particular *a* that is *b* (e.g., a particular flip of a coin that lands heads) is derived from the indefinite probability of *a/b* (the indefinite probability that a flip of the same, or physically indistinguishable coin lands heads). And indefinite probabilities are connected to frequencies via a number of theorems of different strength (the weak and strong laws of large numbers and Bernoulli’s Theorem). So the link between chances and categorical facts goes by way of a link to indefinite probabilities, and indefinite probabilities are connected to frequencies in a way that suggests that they are not entirely distinct existences.⁷ But – as with laws - probabilities cannot be reduced to frequencies, because even the strongest of the theorems relating probability and frequency explicitly allow the possibility of probabilities that diverge arbitrarily far (albeit with diminishing probability) from the frequencies. The logic of probability entails if something has the probability of 0.9, that does not mean it will occur. It doesn’t even mean it will occur 9 out of 10 times. It means that it will probably occur 9 out of 10 times, roughly over the indefinately long haul.

I could have added here causal relations, dispositions, capacities, and potencies. These are representative of a class of structures that I call ‘intermediate structures’. They are typically locally defined, but bear necessary connections to distributed structures or ‘patterns’ in the manifold of categorical fact. We might say that they ‘encode information’ about such patterns, and that information is drawn out in the kinds of empirical inferences in which they figure. A convenient way to picture things is that there is

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⁶ This is worth a comment. There is a divide in practice between those who focus on language and those who focus on the kinds of non-linguistic models that are the primary vehicles of representation in science. And that difference in focus goes with a difference in how much emphasis on the social and cultural environment of cognition. Languages are essentially social media, designed for the exchange of information among a collection of people. They are elusive, living creatures that embody a good deal of culturally incubated knowledge embodied in inferential practices that guide the individual cognition. Those inferential practices are elastic, evolving, and hard to localize. Models of the kind constructed by brains or developed in science have a different use and answer to different constraints than languages. They serve as practical and epistemic interfaces with a localized physical system. They have an explicit and rigid computational structure that is much easier to study. More importantly for our purposes, treating linguistic representation as paradigmatic forces everything into the rather constraining mould of propositional structure and logical inference. By treating models as the primary vehicles of representation we not only sideline the specifically social factors that come into play when we talk about language, we open up the space for a much richer set of representational formats, a better understanding of the different roles that various elements of structure can play, and forms of computation (conceived here just as content-preserving ways of transforming representations) that don’t take the form of inference.

⁷ Whenever we have a necessary connection between a and h, even if that link is merely a probabilistic one, we have a violation of the Humean ban on necessary connections between distinct existences. In contexts like the present, this ban functions as a test for identity, and a violation signals some redundancy in the ontology.
the ground level of categorical fact and then a second-order overlay of modalized structures that play a role guiding belief about matters of categorical fact and decision.

It is tempting to suppose that these structures on the second-order overlay are just redescriptions of lower level patterns, compact summaries of information about the pattern of actual fact. It is easy to see why we might find these locally defined quantities that contain this kind of veiled information about distributed patterns useful. Because it's useful to build information about the way things generally hang together into our descriptions of the here and now. In general, we build a lot of useful, but extrinsic, information into our local representations of things, and this information can be unpacked to guide prediction, and interaction with those things. When I describe someone as a wife, mother, and physician, that is not an intrinsic description. It carries a lot of extrinsic information about the world, her place in it, and her habits. And that information comes with a slew of expectations and guides interaction with her. And this is not just true of the way that we represent in language. It has been known for a long time that the brain engages in predictive coding at various different levels. The brain is a rather messy and hard-to-unravel edifice, but it does build complex models of worldly regularities, and it is these models that guide both expectation and action. This is all common ground with representation in physics, and turns on the use of known or learned regularities both to predict a signal and guide offline expectation about what would happen in hypothetical conditions. Even perception may best be seen as a process in which various parts of our brains) try to predict what is out there, using the incoming signal as input to a stored schema used to generate predictions rather than as a high band-width encoding of the state of the world.

But as tempting as it is to see intermediate structures as simply summaries of information about lower level patterns, it turns out that no reduction is possible. Intermediate structures fail the logical test for identity with lower level patterns. There is a logical gap between claims about law and regularity, or chance and frequency. Make any stipulation you like about what the laws are and that stipulation will have models in which there are exceptionless regularities that are not laws. Or make any stipulation you like about what the chances are and that stipulation will have models in which the chances diverge arbitrarily far from the frequencies. And the same goes for dispositions, capacities and causes. Humeans in the tradition of Lewis have tried to finesse this by combining stipulations about all of these into a single package and try for a more holistic reduction. But the difficulty remains. The problem is a generalization of the one that foils the more simple-minded reductions above; the logic of beliefs about laws-and-chances recognizes a modal gap between the facts about laws-and-chances and the categorical facts. There are models of our law+chance packages in which the categorical facts are very different than they actually are,

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*To so much as call something a material object, or talk about its location in space, is to say something with very broad consequences about the possibility of various types of experience. It presupposes the whole embedding framework in terms of which material objects are defined, and the constraints imposed by the embedding framework are the source of the most basic expectations about the world.

and there are worlds in which the categorical facts are as they are, but the laws and chances are different. Let \( C \) be the categorical facts at a world \( W \), and \( T \) the Best Systematization of \( C \). There are worlds at which \( C \) but not \( T \) (\( C \) is a model of other theories), and worlds at which \( T \) but not \( C \) (there are models of \( T \) in which not \( C \)).

The persistent stumbling block for Humeanism is that there is a difference in truth conditions between structures on the second-order overlay and patterns in the manifold of categorical fact. Information about the pattern of actual fact can provide evidence for claims about law or chance, but the relationship between them falls short of identity. You might scratch your head here and say ‘but what does that mean, since the difference in truth conditions can only be made out in modal terms. It’s an empty difference if all meaningful claims about modality bottom out in implications for actuality’. Or you might say that the claim that there are models of our law+chance packages in which the categorical facts are very different than they actually are, and there are worlds in which the categorical facts are as they are, but the laws and chances are different is just the denial of Humeanism, so the argument presupposes what it means to prove. And there is always the option of simply acknowledging that the Humean view closes a logical gap that our everyday notions of law and chance leave open, but biting the bullet. So, for example, Loewer is willing to acknowledge that the view is slightly revisionist about the everyday meaning of chance, but he can say ‘so much the worse for our everyday notion of chance’, so long as the revised notion can serve all of the crucial functions of the everyday notion. So, I think the really telling problem for the Humean view emerges clearly when we adopt the side-on view. The logical gap is connected to the function of these notions. No non-modal counterpart of these notions (no non-modal belief offered as an analysis or extensional analogue, no mere description of patterns in the manifold of actual fact) could play the role that these modalized notions play in guiding belief and action.

**Function**

Let’s start with a wide-angle view of why we construct models of the world at all. And here I don’t just mean the relatively esoteric products of professional science, I mean, the internal world-models that the brain makes to help us navigate a complex and changing terrain. We are the only creatures who seem to have evolved to use models as the setting for an explicit form of practical reasoning (or at least do so with anything like the power and sophistication that we do). There is evidence that mice and other creatures do a rudimentary form of map-keeping, but we have full-blown models of the world on which we represent ourselves and our ends. Our behavior (or, rather, our deliberate behavior, not the beating of our hearts, but the willfully initiated movements of our limbs) is governed by a decision process that involves

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10 See Maudlin, The Metaphysics in Physics, OUP. P.

11 The Humean can say this only at the cost of rejecting the claim that the models of a physical theory represent physically possible worlds in which that theory holds, which is as close to a definition as there is in physical contexts, but perhaps the Humean has something to say here.

12 Modalized notions have different cognitive roles from their proposed non-modal counterparts, so even though the Humean wants to say that their representational content is exhausted by what they say about actuality, their modal implications are needed to capture their cognitive role.
explicitly representing potential actions, imaginatively tracing out their effects, and making a choice based out projected outcomes. This process is our most powerful cognitive tool, one that gives us our primary advantage over other kinds of naturally evolved cognitive system. Models provide the setting for this deliberative process. The added layer of representational mediation between stimulus and response gives us a kind of flexibility and foresight that holds perhaps our greatest advantage over natural competitors.

So, functionally, constructing models is a human strategy for behavior management. Science is an extension of this basic strategy involving the collectivization and systematization of information, construction of models of varying scope, different models for different contexts. We construct maps of space, models of atoms, cells and ecosystems. And these models all play a role in interaction with the natural environment. In this capacity, model construction is not merely a matter of copying. It involves restructuring, reorganizing, transforming, and reconfiguring. It involves gathering, storing, integrating and transforming information collected, combining and transforming it, reformatting it in ways designed to make certain kinds of tasks easier.

Models are tools. Their job is to facilitate interaction between an embodied agent and an open environment. Some of the structures defined in a model have the job of representing: tracking, or mirroring localized elements in the landscape. In those cases, the account of use will support the kinds of localized correspondence that most people think of as paradigmatic of representation. It seems natural to expect this kind of localized extensional correspondence, for example, between representations of local matters of particular fact in a first order model and something in the world (e.g. a lightning strike, or the decay of a radioactive atom). But that’s a quite specialized function. There are others that encode information about more distributed structures: beliefs about trends and currencies, the latest fashions, the value of the dollar, and the state of the union. And there are others that facilitate computation. We store information about dates and locations in formats that make it easy to compute duration and distance. And in general information will be encoded in different formats to facilitate different kinds of function. The lesson here is that models provide embedding frameworks for phenomena that package information for useful application in situ, and this re-packaging can introduce a holistic restructuring that not only doesn’t preserve piecemeal correspondence, but introduces elements that have a role of doing something other than (purely) corresponding.

Chance is easy to understand in these terms. Chances guide expectation in open-ended classes of systems. It doesn’t correspond to actual frequencies because actual frequencies can be skewed in a way that would make them unsuitable for that role. If a coin falls heads half the time, but all of those head-tosses occur before the birth of Socrates and after the 5011 (supposing someone is around tossing at that time), it would be stupid to take even odds on heads or tails. Chances reflect facts about stable relative frequencies over the short term in a way that is quite precisely designed to allow them to play their role guiding expectation.
The epistemic uses of models have to do with carrying information, computing, predicting. But these are not the only uses. Models also guide our interactions with the systems they represent. In this manner, the ways in which we represent things will contain implicit directions to action. To think of models in purely epistemic terms is to forget about their practical functions. To the embedded agent, the world is chock-full of opportunities and affordances, and the terms in which he represents the world will be designed to disclose them. They will contain conditional invitations to action, not in the expressivist sense, but in the sense that to represent ice cream as delicious is to present it as worth eating if one is hungry. That is information about the way things are that is tailored to interface with the practical needs and capabilities that we have. To represent cheating as wrong and tigers as dangerous is to warn us away from both if we don’t want to be censured or injured. There are more complex, conditional practical imperatives built into causal beliefs. A map of causal pathways highlights potential strategies for achieving ends. They have practical consequences that are drawn out in deliberative application. The practical consequences are a little more complex than ‘do x’. They say ‘do x if you want y to be the case’, ‘do x if you want y to be the case, and one of \{z_1…z_n\} and none of \{z^*_1…z^*_n\} obtain as well’, … you get the idea.\textsuperscript{13}

Recognizing the practical dimension of use is what we need to understand the so-called ‘alethic modalities’. These are the sorts of modalities that concern not just ‘how things might actually be, given what we already know’, but ‘how things would be, had they been otherwise’. These are notions that concern specifically counterfactual possibilities. Saying that A follows B is not merely a regularity (even an exceptionless regularity), but a \textit{law}, means not just that B failing to follow A doesn’t happen but that it \textit{couldn’t}. This extra modal force can only be made out in counterfactual terms. And they have always seemed more problematic. What does the modal force add? It doesn’t have an effect on one’s opinions about what \textit{actually} happens. But it does add something of practical importance, something that makes a difference to choice. You might try to bring about an exception to a regularity, but you wouldn’t want to try to bring about an exception to a law. It would be a waste of time – a \textit{strategic} mistake.

The same goes for the difference between causes and correlations. This has been a topic of a good deal of discussion since Russell pointed out that causal information is not reducible to information about laws of temporal evolution. To say that the association between A and B is not merely a correlation but a cause also adds some counterfactual force. It supports the inference that if one were to bring about A, B would follow. This doesn’t add anything new to our beliefs about what \textit{does} happen. But it does add that one could use the link strategically manipulating A to bring B about. The specifically counterfactual implications of beliefs about laws and causes play a crucial role in \textit{practical} reasoning. Should I accept the Queen’s Gambit or defend my knight? Should I buy the red shirt or the blue one? Should I take the beaten path or the road less traveled? That depends on what \textit{would} happen \textit{if} I did.\textsuperscript{14} And there’s no way of

\textsuperscript{13}The conditional nature of the implications of causal claims is explicit in the interventionist account of cause, according to which causal claims are claims about what would happen under hypothetical interventions on different parameters.

\textsuperscript{14}On the logic of these imaginative explorations and what distinguishes them from purely epistemic reasoning, see Joyce, J. (2002), “Levi on Causal Decision Theory and the Possibility of Predicting One’s Own Actions”, Philosophical Studies 110: 69–102, Anscombe, E.
eliminating the modal content. Only some of the hypothetical futures I consider under the guise of potential actions will be actualized. The others are, and will remain, strictly counterfactual. And therein lies the puzzle for the interpreter: he has to square the semantic content with the practical function. If he makes beliefs about counterfactual possibilities beliefs about other worlds, he has to explain why beliefs about such things would guide action in our world. If he makes them beliefs about linguistic entities of some kind, he gives them something actual to refer to, but then he has to explain why beliefs about linguistic entities would guide action. And if the answer is that they do so because they represent possibilities, he has gotten nowhere.

Looking back now we can see more clearly why the attempts at reduction failed. In both cases, the looseness of fit between the categorical facts and the structures on the second-order overlay is essential to the function of those structures. Chances have the function of guiding expectation in open-ended classes of systems under conditions in which we have some general information about the distribution of values for some quantity in the class from which the system is drawn, but no specific information about the value the quantity takes in the case in question. And the open-ended application means they have to cover possible, not merely actual instances. They have to cover any system we might come across, and we have no way of delimiting the ones we will come across from those we could. Claims about laws have specifically counterfactual implications because they have the function of guiding the kinds of purely hypothetical imaginings that are part of deliberation. To play this role, these quantities have to have implications that could guide belief about hypothetical, potential futures. And I think this conclusion generalizes to other kinds of intermediate structures: causes, dispositions, capacities, statistical probabilities.

How to think of models: models as PPS’s to FEP’s

I like to think of models (using a notion that I borrow from Edwin Hutchins and that he takes, I believe, from computer science) as partially prepared solutions to frequently encountered problems (PPS’s to FEP’s). They package information in a form that facilitates application in tasks that we expect to encounter. They are like the palettes that a painter prepares before he begins to paint, the various powders and gels that a dentist keeps in his cabinet to be mixed into cement or impression material when the occasion demands, or the various utensils in your drawer shaped and ready to perform: to whisk, cut, spoon and crush. Viewing models as PPS’s to FEP’s gives us a more nuanced differentiation of structures, corresponding to the array of possible uses described above. In the case of models, our tasks are predict, compute, and intervene, and there are various ways in which structures can facilitate those tasks. It also captures the fact that the shape our tools will depend in detail on both the tasks for which they are fashioned and the capacities of their users. We have a very specific set of epistemic and practical

\[\text{Intention, and my "Decision and the Open Future", in The Future of the Philosophy of Time, Adrian Bardon (ed), Oxford University Press, forthcoming.}\]

\[\text{There are well-defined probabilities only when there are stable relative frequencies across arbitrary subselections from the class. If the class doesn't have the right structure, or we have specific information about the instance in question, then chances aren't relevant (or not in the same way).}\]
limitations, and a very specific set of epistemic and practical needs. Together these set the task for cognition, and also for science: overcoming the limitations that our native equipment imposes on how far our vision of the universe reaches, and how effectively we can intervene.

It is also a good antidote to the temptation to reify the modalized structures on the second order overlay of the manifold of actual fact, to see them as requiring substantial commitment to truthmakers for modal claims, above, behind or alongside the categorical facts. It makes room for all of the variety of different things we do with models, recognizing extensional correspondences where they are called for, with the degree of strictness that is demanded by use, but also recognizing that some structures have different roles. Viewing models as PPS’s sets the agenda for interpretation of a wide class of structures that are important in science. It fits very naturally with a lot of the work that has been done on chance and on laws. I’ve found it especially useful to think about causal structure in these terms, and dispositions and capacities are easily accommodated in this framework.

What do intermediate structures represent?

This sort of naturalistic account of representational activity comes very naturally to philosophers accustomed to viewing the human organism in naturalistic terms, and seeing cognition – including the fully developed products of our best collective cognitive enterprises (i.e. science in general and physics in particular) – as a strategy for managing behavior, fine-tuning our responses to the environment. But there is a tradition in analytic metaphysics that starts with different questions. Here is a recent, characteristic statement of the ‘metaphysical’ question:

“... I assume that there are truths involving modal qualification ... if modality is grounded in reality, it is either a primitive or a non-primitive feature of that reality. If it is primitive, then there is nothing nonmodal in virtue of which reality possesses modal characteristics–there are no nonmodal facts that wholly constitute modal facts. If it is not primitive, then there is something non-modal in virtue of which modality is present in reality–there are nonmodal facts that wholly constitute modal facts.”

Metaphysics has always derived a good part of its inspiration from the attempt to develop an account of what Aristotle called Being qua Being: i.e., all-inclusive vision of the world, not as it appears in the fleeting, partial, fragmentary representations of creatures like us, and not in terms of how it affects our sensory apparatus, but as it is in itself, viewed sub specie aeternitatis. In the hands of contemporary metaphysicians, this program has taken the form of solving what Frank Jackson calls ‘location problems’.

16 If we could analyse cognitive content generally into a categorical and a modal component, so that a truth conditional account of content that lists categorical and modal implications would suffice to express the cognitive significance of any belief, then the account of modality offered here would have a relatively conservative impact on semantics. It would only remove the metaphysical commitments that some have thought realism about modal facts demanded. There is reason to think that a deeper reworking is needed to capture the content of indexical belief, however, and I suspect some other forms of belief. So I remain neutral.


18 This program is given closest articulation in Frank Jackson’s From Metaphysics to Ethics, Oxford University Press, 2000. According to Stich and Weinberg (2001, p. 637), Jackson’s book “is, by a long shot, the most sophisticated defence of the use of conceptual analysis in philosophy that has ever been offered.”
One starts with an account of reality seen from the perspective of Being (borrowed from fundamental physics, or a favored metaphysical theory) then goes about providing analyses of problematic classes of beliefs – e.g., modal beliefs, ethical beliefs, or beliefs about intentional states – by identifying their extensions in reality so conceived. This idea incorporates some quite strong assumptions about how belief relates to Being. It incorporates the view that all beliefs are in the business of standing for objects, properties, or structures that are intrinsic to Being, or – as Bernard Williams used to say – structures that are ‘there anyway’. The ways in which these assumptions express themselves in the analytic literature has been brought out and very effectively criticized by others. But the fact that it fails emerges very clearly from the side-on view adopted above. We represent the landscape in ways that reflect our epistemic and practical relations to its contents. Our knowledge is limited in certain ways. And our practical interaction with the world is limited in certain ways. And those epistemic and practical relations define the cognitive context in which intermediate structures have their role. To the creatures who use them, the structures on the second order overlay of categorical fact – with their implications not only for what is, but what might be and could be, and would be if things had been otherwise – reveal latent potentialities that can be accessed by appropriately situated agents. If we want to understand how these structures earn their place in our maps of reality, there is a story to be told of how they figure in the interaction between user of the map and the domain represented by the map.

The problem with Shalkowski’s question and the tradition of analysis in which it was embedded is that it assumed that story was going to take the form of an extensional mapping into a view of Being qua Being. A side-on view of representational activity reveals a much more complex story. To think that the structures defined on our maps of the world are all to be understood in terms of correspondences to structure that is ‘there anyway’ cannot capture the complexity of roles that emerge when we take a side-on, dynamic view of cognitive activity. A static perspective loses crucial differences that appear from a dynamic perspective when we look at their role in that coupling. If we want an interesting and informative account of how different structures find a place on our models of the world, we have to locate them in the epistemic and practical context created by the embedded perspective. We have to see them as an interface between agent and environment.

Cognition has both an epistemic and a practical dimension. We tend to think of representation in epistemic terms, on the model of a painter viewing a landscape from outside or a camera filming a scene it does not alter. In these examples, the painter falls outside the frame, so that what is being represented is well-defined independently of the painter’s movements. But of course, it is the very essence of cognitive activity when it casts its gaze over the field of Being, part of what it sees are products of its own activity.

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19 What I am calling ‘Being qua Being’ is what Bernard Williams used to call the Absolute Conception of Reality, and which philosophers sometimes refer to loosely as the God’s Eye View.

There is no stable position that sees cognition as in the business of merely reflecting what is ‘there anyway’, because some of what occurs in the publicly observable domain of action is the product of its own decisions. The mind of a decision-maker is less like a painter and more like a filmmaker filming a desert that he moves through with his camera cast at an angle that captures his own footprints. He cannot make predictions about what the progression of images will reveal until he has planned his path through the landscape, because the landscape will inevitably bear the traces of his passage through it. So there is no way of stabilizing his beliefs about what the camera will show without stabilizing his plans, and the way of stabilizing one’s plans will involve tracing out the results of potential paths. That is what makes reasoning for an embedded agent – a participant in the events that he represents, not merely an observer – necessarily, in part practical. His beliefs about what will happen are inseparable from his beliefs about what he will do. So cognitive activity isn’t all epistemic, there is the practical side as well. A view that sees all belief as in the business of reflecting features of the landscape that are ‘there anyways’ ignores the practical. Belief for embodied, embedded participants in history whose decisions feed into and alter the landscape they represent is belief about a landscape that is full of latent potentiality.

Agents form all kinds of belief: beliefs about dogs, colors, democracy, about the value of the American dollar, what tastes good and looks good, what is beautiful, and what is right. The various roles that the different structures defined on a model play in the practical and epistemic lives of agents are displayed quite readily when we take a side-on view. Some of them reflect features of the world, some reflect our attitudes towards features of the world, others of them aid computation, others guide belief and action. There is no simple, monolithic relation, no single direction of fit to which we can assimilate them. There are a lot of distinctions to be drawn in terms of the roles of various structures and the widely distributed facts about world and agent that jointly support those roles. The body of belief is a complex, living thing that has an internal dynamics of its own that interacts with the landscape it represents. There is no way in general of capturing how a class of beliefs relate to the landscape except by giving a full account of its role in the coupled exchange, how they are modified by information coming in through perceptual channels and how they feed into practical reasoning and modify action.

Models are not just tools for prediction, they are handmaids to choice. And the whole story of modal belief is discharged in the account of its role guiding action. If no part of that story invoked correspondence to the kinds of modal truthmakers that Shalkowski seemed to be calling for – something that will play the role supporting modal beliefs that dogs play in the explanation of dog-beliefs - then no such truthmakers are needed in our account of Being. Instead of an extensional mapping into an account of Being, I’m suggesting that if we want to understand the modal content of our scientific models – laws and chances and causes and dispositions and the rest - we should resituate models in the dynamics of interaction between agent and world, recount the complex variety of facts about ourselves, the world, and our situation

\[21\] And woefully obscured by the focus on language, which forces everything into a propositional mould.
\[22\] The distinction between belief and intention, just to take one very glaring example is not a difference that can be made out in static terms. And the same goes for differences in my beliefs about my upcoming actions that my beliefs about your upcoming actions.
in it that gives the modal content an ineliminable role. There is no shortcut, no way to bypass the account of this complex story. Whatever we say about the metaphysics of modality has to square with the side-on view. When we abstract from the epistemic limitations that give chance its epistemic role and the practical perspective of a contributor to history that gives modal beliefs their practical role, and reify modal facts in our account of Being to give modal beliefs something over and above the actual to be about, we don’t have a sensible story about how and why we form such beliefs and the role they play in guiding belief and cognition.

When it comes to understanding how concepts employed by situated creatures relate to a world viewed from the perspective of Being, old dichotomies like realism/anti-realism, objective/subjective are too simple to capture the rich plurality of different forms of dependence on both agent and world, and a static picture misses all of the important distinctions. More often than not the type of dependence in question is a complex dynamical codependence that cannot even be described in static terms. Consider, for example, the construction of causal models of localizable systems established in the back and forth of experiment. The experimental interaction between the investigator and the system under study is essential to this process, and it is important that it is an open boundary across which influence passes in both directions. The tightly coupled interaction stabilizes the robust counterfactual-supporting regularities that serve as strategic points of entry for action. The causal pathways identified in this back and forth are neither ‘in the world’ nor ‘in the agent’, and they can’t be described in static terms.

Gone also is the old idea that the distinctions between these different degrees and forms of dependence be draw-able a priori, as though mere reflection on concept of – e.g., color – should tell us about the complicated set of intertwined processes that mediate the reflectance properties of surfaces and the belief that I’m looking at a red thing. Intermediate structures carry information about the world to their users in a form that is prepared for belief and action-guiding purposes, but which the users may not have any more basic or articulated representation of. It takes a quite complicated bit of self-directed hermeneutics to view ourselves from the side-on and come to an explicit understanding of how the various structures on our models find their place in all-inclusive account of Being qua Being. In developing such an account, we ask ourselves: what has to be in the world from the perspective of Being to recover the view of the embedded, embodied participant in history? And the answer we give will reconstruct a lot of our most basic beliefs as internal to an evolving practical and epistemic standpoint. Such a standpoint furnishes the distinctions that we need to make sense of modal vocabulary – distinctions between what is and what is known, between what one does and what merely happens – that don’t have any non-relational interpretation from the perspective of Being.

**Unanswered questions**

This leaves open several questions. If intermediate structures are to be understood in terms of their role mediating inferences from known fact to expectation or decision, should we be instrumentalists
about them, holding that they are merely nodes in a formal calculus that mediates inferences? Or should we deny that they state facts, holding with non-cognitivists that they express commitments or rules of some kind? The problem with developing this sort of position is that it supposes that we can draw a distinction between representational and non-representational beliefs, and there is nothing internal — nothing psychological — that distinguishes beliefs about probabilities or causes from beliefs about colors or shapes. Probabilities, dispositions, causes are all written into the world, defined in space alongside colors, smells, shape and size. One would be hard-put to find a descriptive concept that didn’t have some modal or dispositional content. I believe that glass is fragile, that diamonds have the capacity to cut glass, and that smoking causes cancer, in the same way that I believe that it rained this morning, that my sister has two children, and that I am taller than my mother. These beliefs carry information to me about the world; they are integrated into the web of belief seamlessly and play an ineliminable role in practical and epistemic inferences.

The difficulties of developing an instrumentalist or non-cognitivist position have been explored related discussion in metaethics about the status of ethical belief. It is partly a question of how to divide up the territory for purposes of theorizing. My view is that we should keep the distinction between representational and non-representational discourse to mark the difference between discourse that has the surface-form of truth-aptness and discourse that doesn’t. If we use the notion of ‘fact’ in a deflationary way, we can hold that for every belief there is a corresponding fact, so there are cow facts and modal facts and moral facts, and facts about rainbows and telephones and colors. And if we use the notion of ‘representation’ in a similarly deflationary way, we can hold that modal beliefs represent modal facts and counterfactual beliefs represent counterfactual facts just as aesthetic beliefs represent aesthetic facts, beliefs about colors represent color facts and beliefs about cows represent cow facts. From the top down, all of these beliefs look the same. Formally, they behave truth conditionally, serve as belief contents, and enter into inferences. From the agent’s perspective, belief is belief is belief. But when we are doing metaphysics, we look to a science that includes the agent in its scope to sort out how all of these things fit into a vision of the world as it appears qua Being. The sorts of differences that we want to draw between different types of belief will not be drawn in semantic terms or at the psychological level, but will appear from the side-on.25

25 To see how this kind of deflationary story can be developed, see Brandom, R., “Modal Expressivism and Modal Realism: Together Again” found at http://www.pitt.edu/~brandom/index.html, Price, H., Models and modal. In Donald Gillies, ed., _Laws and Models in Science_ (King’s College Publications, 2004), 49—60, Thomasson, A. _The Descent of Metaphysics_, ms. The deflationist doesn’t deny that modal beliefs represent. She separates the thinner deflationary notion of representation that just describes the internal form of truth-bearing discourse and rejects what Ryle described as the “preposterous assumption that every true or false statement either asserts or denies that a mentioned object or set of objects possesses a specified attribute”. _The Concept of Mind_, University of Chicago Press (1949), p. 115. That is, so long as what it is for an object to possess an attribute is understood in inflationary terms. Ryle had a very similar story about the practical point of modal beliefs. He noted that part of the point of trying to establish laws is to find out how to infer from particular matters of fact to other particular matters of fact, how to explain particular matters of fact by reference to other matters of fact, and how to bring about particular states of affairs. A law, Ryle writes, is “an inference ticket (a season ticket) which licenses its possessors... to move from one assertion to another, to provide explanations of given facts, and to bring about desired states of affairs by manipulating what is found existing or happening” (ibid, p. 117).
Does this view from the side-on bring with it a deflated sense of possibility? My view is that it does so only if we start with an artificially inflated view of what possibility is, but that is not a simple question.

**In Sum**

Not every term employed by an embedded creature will have the function of ‘standing for’ a feature of the world that is ‘there anyway’. The right approach for someone trying to understand how a class of beliefs ‘earn their place’ in an account of Being is to take side-on view of cognitive activity in which those beliefs appear and make explicit the coalition of factors – about ourselves, the environment, and our relationship to the environment – that support that activity. There will be some mappings and tracking relationships, some terms or concepts that have the job of referring or corresponding to features of the world that are ‘there anyway’, but the appropriateness of that interpretation is tempered and modulated by the side-on view. For the philosophy of science, this opens up the space for examination of the central modalized concepts of science that is not forced into the mould of a search for truth conditions, and it defuses the worry that realism about those concepts comes with uncomfortable metaphysical commitments for an empiricist.24

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24 See my “How Causes ‘Depend on Us’: perspectivalism, frame-dependence, and republicanism” for development in the causal example and more detailed look at how the generalization should go, and “A Modest Proposal About Chance” for discussion of chance. See also Giere’s *Scientific Perspectivism*, University of Chicago Press (2010).