**Nominalism, Contingency, and Natural Structure**

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**Abstract**

Ian Hacking’s wide-ranging and penetrating analysis of science contains two well-developed lines of thought. The first emphasizes the *contingent history* of our inquiries into nature, focusing on the various ways in which our concepts and styles of reasoning evolve through time, how their current application is constrained by the conditions under which they arose, and how they might have evolved differently. The second is the mistrust of the idea that the world contains mind-independent natural kinds, preferring *nominalism* to ‘inherent structurism’. These two pillars of thought seem at first to be mutually reinforcing: the lack of natural structure can help make sense of scientific variability and revision, while variability and revision provide reason to suspect that natural structure is little more than idealization. In what follows, I argue that these two pillars not only fail to support each other, but in fact conflict. One of them must fall, and it is clear which.

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**1. Introduction**

Ian Hacking’s wide-ranging and penetrating analysis of science contains two well-developed lines of thought. The first emphasizes the *contingent history* of our inquiries into nature, focusing on the various ways in which our concepts and styles of reasoning evolve through time, how their current application is constrained by the conditions under which they arose, and how they might have evolved differently (e.g. Hacking 1975, 1983, 2002). The second is the mistrust of the idea that the world contains mind-independent natural kinds (Hacking 2007), preferring *nominalism* to ‘inherent structurism’ (Hacking 1999, 83). These two pillars of thought seem at first to be mutually reinforcing: the lack of natural structure can help make sense of scientific variability and revision, while variability and revision provide reason to suspect that natural structure is little more than idealization. In what follows, I argue that these two pillars not only fail to support each other, but in fact conflict. One of them must fall, and it is clear which.

**2. Nominalism**

Does the world have natural, inherent structure, or is such structure only to be found in our heads? This wording is provocative, but the question is a philosophical perennial: what is the relationship between the mind – mental representation – and the world? Kant famously argues that the general structure of the natural world is relative to the human mind: space, time, causation, and more, are formal constraints on thought and perception that also delimit the empirical world itself. The benefit of this view is that it renders the natural realm knowable because it is structured by the mind, which can be apprehended directly, though not necessarily without great effort, through ratiocination.[[1]](#footnote-1) The mind-independent, noumenal, world is, on this picture, inaccessible and beyond our grasp as it lacks the kind of structure familiar from, and required for, empirical experience.

 For Kant, the structure of the categories of thought is universal and necessitating: shared by everyone and compatible with only a single outcome. We all, in other words, share a world on his view. Today, the emphasis is on variability and contingency: various kinds of construction lead to various kinds of world, some of which may be incommensurable (Goodman 1975; Hacking 1993, 1999, 2007; Kuhn 1962; Kukla 2000). The underlying Kantian theme nevertheless retains its allure to this day.

 Here, for example, is Ian Hacking, describing his take on what he calls *nominalism*, the second pillar mentioned above:

The world is so autonomous, so much to itself, that it does not even have what we call structure in itself. We make our puny representations of this world, but all the structure of which we can conceive lies within our representations. (Hacking 1999, 83)

In other words, structure is constructed within our representations rather than discovered through them. He then clarifies his own standing with regard to this understanding of nominalism:

Score yourself from 1 to 5 where 5 means you strongly stick on the constructionist side, and 1 the opposite… Here are my own scores … Nominalism: 4… (Hacking 1999, 99)

Since inherent, mind-independent structure is often associated with the existence of objects and substances ordered in a natural hierarchy of kinds, the thought can also be put as follows:

There is no such thing as the class of natural kinds. (Hacking 2007, 205).[[2]](#footnote-2)

So, Hacking defends a kind of neo-Kantian position according to which the world, considered independently of any relations to a knowing subject, lacks structure.

Hacking assigns Kuhn a score of 5 out of 5 (Hacking 1999, 99) and there are many others who express similar sentiments; Rorty, for example:

…none of us antirepresentationalists have ever doubted that most things in the universe are causally independent of us. What we question is whether they are *representationally independent* of us. (Rorty 1998, 86; emphases added)

Echoing Kant, Merleau-Ponty writes that *time*:

… is not a real process, not an actual succession that I am content to record. It arises from *my* relation to things (2002, 83) … the objective world is too much of a plenum for there to be time. (2002, 478)

Deleuze, to take another example, argues that ‘time is subjective, but in relation to the subjectivity of a passive subject’ (1994, 71). More recently, Dasgupta (2018) argues that there is no way to justify *theorizing* in terms of one kind of classification (e.g. ‘blue’, ‘green’) over any other (e.g. ‘grue’, ‘bleen’), so which system is best for scientific representation can only be determined by our interests. One could list other examples, of course, but these suffice to get the idea across.

**3. Contingency**

The other pillar is historical contingency. Hacking is impressed with the manner in which our concepts evolve with time[[3]](#footnote-3) and how this opens up the possibility of non-equivalent but equally successful scientific and mathematical theories and practices:

I think that the ‘forms’ of scientific knowledge could have been different, yet still, we would be recognizably exploring the same aspects of nature. But if they were different, we might be as successful as at present (on Lakatosian criteria), yet not obtain results equivalent to or implying our present results. (Hacking 2000, S71)

We might not have done so well by our present standards of success, but on a different walk we might have evolved other standards by whose measure our mathematics was altogether satisfactory (Hacking 2014, 117)[[4]](#footnote-4)

Given this, we can understand why he calls his position ‘*dynamic* nominalism’ (Hacking 2002, 99-114). Natural structure, limited as it is to that which appears in our representations, is *active*, evolving in response to the changing material and intellectual conditions that guide scientific progress. Importantly, the ways in which the sciences progress is contingent: human inquiry might have taken a very different, but not any worse, path.

 Part of why this matters is that the way we think about the world impacts how we investigate it: which questions we ask, what evidence we take to be relevant, and which answers we accept. For example:

I am inclined to think that the preconditions for the emergence of our concept of probability determined the very nature of this intellectual object, ‘probability’, that we still recognize and employ and which, as philosophers, we still argue about. The preconditions for the emergence of probability determined the space of possible theories about probability. That means they determined, in part, the space of possible interpretations of quantum mechanics, of statistical inference, and inductive logic. (Hacking 1975, 9)

Because of the Pythagorean traditions of music and mathematics, students of nature deployed many harmonic series. Their role in physics may not be due to nature *qua* nature, but to the ways that we began to investigate nature on the Pythagorean model. (Hacking 2014, 130)

In short, scientists bring a set of contingent, historically conditioned concepts to bear on their study of nature, and this influences the direction and results of the investigation. Not only is empirical investigation theory-laden, it is laden with theory that might very well have been different. Accordingly, we should avoid making claims about the way the world is independently of our styles of thinking and inquiring.

**4. The conflict**

It seems that nominalism and historical contingency are mutually reinforcing: one may think that if the world lacks inherent structure, variability is exactly what one should expect; similarly, given that even the greatest scientific theories of a given time are often overturned, one may feel compelled to doubt the existence of an independent, natural structure to which theories answer. However, the opposite is in fact the case. The two pillars not only fail to support each other, they are incompatible. *One of them must go*. It gets worse. Once one falls, so does the other. Hence, we must in the end reject both. I begin with the incompatibility argument.

*Premise*: Human beings represent (through, amongst other things, our scientific theories).[[5]](#footnote-5)

I take it as undeniable, and shall assume in what follows, that we regularly construct representations. I don’t have anything particularly lofty or philosophically loaded in mind behind my use of the term ‘representation’. All of the following, and more, count as representations in the sense intended here:

1. The formula *E = mc2*;
2. The Mona Lisa;
3. A written set of directions;
4. A note on an office door that reads ‘back in 5 minutes’;
5. A shopping list;
6. The thought that today is warm;
7. The utterance, ‘the meeting is in the first room on the left’.

Since such things exist, the premise is a reasonable starting point. At any rate, Hacking’s dynamic nominalist assumes representations exist, as all structure is relative to them, so this fist premise is safe ground in analyzing Hacking’s views.

*First conclusion*: It follows that we are the kind of creature that is *capable* of representing.

Note that this isn’t trivial. Many things are not capable of this: rocks, hydrogen atoms, rivers, armchairs, and stars, to name a few. The ability to have representational states, the very kind of states that can be influenced so profoundly by the historical contingencies Hacking documents, is something special, at least amongst the kinds of entity with which we are familiar.

*Second conclusion*: It follows that we have certain capacities.

 I take this as a logical consequence of the first conclusion: if we have the capacity to represent, then we have at least one capacity.

*Third conclusion*: It is absurd to suppose that we endow ourselves with these capacities via our representational content or representational activities.

This is because our representations, and related activities, depend for their existence on the capacities: without the capacities, there would be no representing in the first place. Hence, it would be impossible to self-endow representational capacities via representational activities.

*Fourth conclusion*:It follows that we have at least one kind of capacity independently of any representation or theory.

 The existence of the capacity or capacities that enable us to represent things is independent of, i.e. logically, causally, and temporally prior to, the resultant representations and their contents. Logically because the existence of the representation entails the existence of the capacity but not vice versa; causally because the capacity is (part of) the cause of the representation but not vice versa; temporally because it takes time to form a representation once the right conditions are in place.

*Fifth conclusion*: Capacities entail structure.

We have the ability to represent and construct theories of various kinds: mathematical, physical, philosophical, psychological, theological, literary, etc. There is almost no end to the range of our activities in this regard. What explains this? Even if we could only form one kind of representation, this would require explanation given that most material objects cannot do so. Such an explanation cannot appeal to nothing. A structureless void is explanatorily impotent and, therefore, cannot shed any light on how representational capacities could develop and why some kinds of being develop them while others do not. So, there must be some structure in whatever it is that gives rise to the existence of our representational abilities and is, therefore, entailed by their existence.[[6]](#footnote-6)

*Sixth conclusion*: At least some structure is independent of, i.e. logically, causally and temporally prior to, our representations and their contents.

This follows from the fifth conclusion: if the existence of representational capacities is independent of representations and their contents, and if the existence of these capacities cannot be explained by, or entail, a *lack* of structure, then the existence of the capacities entails the existence of representation-independent structure.[[7]](#footnote-7)

*Grand conclusion*: Dynamic nominalism is false.

 Given that we are creatures who have a history of contingent and changing scientific representations, it follows that there is representation-independent structure. Since it cannot be the case that all structure is contained in or limited to that which is in our representations, Hacking’s version of nominalism cannot be true. The second pillar must fall.

**5. Structure, representation, and change**

If the foregoing is correct, then there must exist natural, representation-independent structure; at least as much as required to explain how there are human representors. This has implications for the first pillar, contingency. This is because, if we assume that part of the reason we construct scientific representations is to accurately describe the world, then truly distinct representations of the same aspect[[8]](#footnote-8) of the world, i.e. those that are not mere notational variants of each other, cannot be equally good: at most one, or one set of equivalent representations, will accurately describe representation-independent structure. If there are two accounts of the same part of the world, and one entails that there are *m* kinds of *F* while the other entails that there are *n* kinds of *F*, where *n* ≠ *m*, then they can’t both be equally good,[[9]](#footnote-9) even if both are, somehow, equally good at predicting future observations and unifying past observations. Given the assumption that one desideratum of scientific representation is accuracy, then the fall of dynamic nominalism entails that non-equivalent theories cannot both be equally good.

 The conclusion to draw here is that not only is dynamic nominalism incompatible with the contingency thesis, but that the downfall of the former entails the downfall of the latter. The two views are not contradictories but, rather, contraries: they cannot both be true, but they can both be false.

 It is important to note that none of this entails that inherent structure is permanent or unchanging. Goldstick (2009, 162-173) for example, argues that such permanence is impossible. If this is correct, it poses no threat to the overall conclusion because the proposition that representation-independent structure exists can, and should,[[10]](#footnote-10) be temporally relativized. If *S1* is such structure at time *t1*, and *S2* is such structure at time *t2*, then the truth conditions of an utterance type such as ‘inherent structure exists’ will change from *that* S1 *exists* to *that* S2 *exists* as time passes. The grand conclusion isn’t that unchanging structure exists mind-independently but, rather, that such structure exists, at least at any time at which a representation is entertained.

**6. Humans and the natural world**

As mentioned, I see Hacking’s dynamic nominalism as a contemporary neo-Kantianism, a view that renders the structure of the empirical world relative to the human cognization of that world. I have argued against the tenability of such an account of reality. The problem can be looked at slightly differently: any theory that renders natural structure relative to the human representor thereby pushes the human being – at least the representing capacities of the human being – outside of nature. It becomes impossible, on such a view, to provide an account or explanation of human representations and representational activities – in short, of the human mind – in the same terms as the explanation of the natural phenomena structured by our representations, since the former conceptually precede the latter.

 Suppose, for example, that as a result of our investigations, we conclude that human beings evolved from earlier biological ancestors under pressure from natural selection to finally end up where we are today, with relatively sophisticated cognitive powers driven by the structure of our neurological systems. Such a story will involve chemical interactions, energy transfer, cause and effect, etc., all constrained by the structure of the space-time in which such processes occur. If we combine that account with dynamic nominalism, then the inevitable conclusion is that chemical interactions, energy transfer, cause and effect, space-time, gravity, and matter, are representation-dependent in structure, and if that is the case, then we cannot explain how we came to be creatures with representational capacity by appeal to chemical interactions, energy transfer, cause and effect, space-time, gravity, or matter, because whatever explains our capacity to represent is prior to the representations.

 So, if dynamic nominalism were right, then we would be cut adrift in our attempts to scientifically explain human beings. Whatever scientific model we were to construct of the world could not contain *ourselves*, which means that dynamic nominalism results in a kind of *super*-*naturalism* about the human mind: it is the removal of human thinking from the realm of the causal, spatiotemporal, chemical, biological, etc.

**7. Simple capacities? Independent representations?**

Even if it is granted that the existence of representations entails the capacity to represent, it might be objected that it does not follow that those capacities are structured; they might be simple and, if so, then the existence of even highly structured representations does not entail the existence of representation-independent structure.[[11]](#footnote-11) To evaluate this objection, it must be asked whether it is plausible to suppose that representational capacities are structureless simples. There are a number of reasons to think not.

First, the sheer complexity of our representations and representational activities counts against the proposition that the capacities are simple. For example, space-time is represented scientifically, through formulas such as Einstein’s field equation for generally relativity,

(GR) $R\_{μν}-\frac{1}{2}Rg\_{μν}=\frac{8πG}{c^{4}}T\_{μν}$

but also through paintings, drawings, poems, movies, computer programs, Cartesian grids, and mechanical devices such as planetariums. More generally, we represent concrete objects but also abstractions such as justice or the human spirit. Further, our representations change through time, as for example our representation of gravity evolved from Newton’s Law to (GR). We also, of course, act in light of our representations – how we perform experiments is guided by them, for example. How could such a wide array of systematic and dynamic activity be generated by something that is without structure?

 Secondly, the capacity to engage in some forms of representation depends on the capacity to engage in others. For example, the ability to represent space-time in terms of equations such as (GR) requires the ability to represent things mathematically. The latter, however, can exist without the former: one can engage in all sorts of mathematical representation without having the ability to understand (GR).[[12]](#footnote-12) But this suggests that there are different kinds, or at least degrees, of representational capacities, which implies that they are not simple.

Thirdly, our capacities to represent can be destroyed, in whole or in part. For example, brain damage can cause one to lose some representational abilities or suffer overall diminishment, as in the case of repeated concussions. Similarly, capacities can be increased, not only by learning but also by evolution: humans have, so far as we know, developed from earlier life forms that could, at best, form simple representations, so the capacity to form scientific representations can arise from simpler mechanisms. How can any of this be the case if capacities are structureless simples?

 The general problem is that there is no way to explain how representational structure could arise from structureless simplicity. The dynamic nominalist might object that it is not *absurd* to suppose that our representations, capacities, or minds arose from the structureless; such a process could never be explained – it is just a brute fact – but that doesn’t entail that it could not occur.

The problem with this reply is that it cuts both ways. If our representations are produced, somehow, from something structureless, then the structureless can, inexplicably, give rise to structure. If, so, then there is no reason to suppose that Hacking’s structureless, autonomous world could not also give rise to such complexities as Minkowski space-time, chemical elements, biological kinds, and so on. If the structureless can give rise to structured representations, then it can give rise to the structured elements of reality defended by any realist, and since the process is mysterious and beyond explanation in any case, the dynamic nominalist cannot provide any justification for rejecting some structures in favour of others. So, this response robs the dynamic nominalist of any grounds for believing that all structure can arise *only* in relation to representations.

Put another way, the dilemma is this. If there is an explanation for the existence of representations, then dynamic nominalism cannot provide one; if, on the other hand, there is no such explanation, then the restriction required by dynamic nominalism – there is only representation-dependent structure – cannot be justified. In either case, dynamic nominalism lacks rational support.[[13]](#footnote-13)

In addition to the foregoing, there is a conceptual worry with this objection because it requires us to accept the existence of something that is both (i) a *capacity* (rather than something else) and (ii) structureless. But (ii) would leave us with no ground for asserting (i) because something without structure cannot have the features of a capacity, or anything else for that matter. So, the suggestion appears to be internally unstable.

Perhaps the objector will push further and insist that representations do not depend for their existence on anything else. They are *ontologically independent*, in which case the fact that we represent does not entail that we have the capacity to represent, so we cannot conclude that representation-independent structure exists from the assumption that there are representations.

 Note, first, that this is not Hacking’s view. His writings make it clear that he considers representations to be dependent upon us. For example: ‘I act under my descriptions, which use words that my community projects’ (Hacking 1993, p. 297) or ‘Projectibility does not need a record of past usage… It needs communal usage’ (Hacking 1993, p. 305). Here we see scientific terms and descriptions as dependent upon the *usage* of scientists. He writes further that nominalism ‘says that only *our modes of thinking* make us sort grass from straw, flesh from foliage’ and that it denies ‘only that [mind independent reality] is intrinsically sorted in any particular way, independent of how *we think* about it’. (Hacking 1983, p. 108; emphases added), implying that scientific representations are the result of scientific practice and thought. There are examples along these lines throughout his work, so his general view of representations is that they are the (dynamic) *products* of human thought and activity, partly rooted in language use.

Secondly, the idea that representations exist independently of anything else is a form of idealism, so whatever implausibility one finds in that view will transfer to dynamic nominalism. Moreover, even if one is willing to accept idealism, this way of rescuing dynamic nominalism in fact *undercuts* it. For, if representations exist independently of human activities and capacities, then structure exists independently of anything we think or do, which means that it is false that the world ‘in itself’, i.e. independently of human beings and their activities, lacks anything we could conceivably call structure. This objection, in other words, re-introduces ‘inherent structurism’, just of an idealistic kind, so it is of the wrong conceptual shape to rescue the core of dynamic nominalism.

Finally, note once again that if it is granted that representational structure exists independently of human thinking, then there appears to be no way of ruling out *other* forms of independent structure, such as Minkowski space-time, molecules, etc. If we take this objection seriously, then we must accept that something such as (GR), but not something such as a water molecule, could exist independently of our scientific activities. Without further argument, this seems both implausible and *ad hoc*.[[14]](#footnote-14)

I conclude that there is no convincing defence of dynamic nominalism by appeal to simple capacities or ontologically independent representations.

**8. Realism or nothing**

Perhaps a more serious objection to the argument is that it appears to misrepresent Hacking’s position which is, it might be argued, merely a moderate kind of nominalism that only rejects realism about the categories used to classify *human beings* into allegedly fixed kinds. Consider that Hacking writes, on the one hand, that:

Dynamic nominalism remains an intriguing doctrine, arguing that numerous kinds of human beings and human acts come into being hand in hand with our invention of the ways to name them. (Hacking 2002, 113)

On the other hand, he asks, ‘How can our words fit the earth and heavens, if there are not, prior to us, grass, trees, and stars?’ (Hacking 2002, 48); and asserts, ‘I think that many categories come from nature, not from the human mind’ (Hacking 2002, 106); and,

A century ago I would have said that consumption is caused by bad air and sent the patient to the Alps. Today, I may say that TB is caused by microbes and prescribe a two-year course of injections. But what is happening to the microbes and the patient is entirely independent of my correct or incorrect description… The microbes’ possibilities are delimited by nature, not by words. (Hacking 2002, 108).

It might seem, therefore, that Hacking defends a more restricted nominalism that grants the existence of some natural kinds but entails that in many cases, mostly having to do with how we evaluate people, scientists impose rather than discover. Recall that, after all, he scores himself 4/5, not 5/5![[15]](#footnote-15)

 This is an important observation, but it raises a deeper question about the understanding of Hacking’s overall position. In one of his early works on natural kinds, he objects to the idea of a *fixed* and *unique* taxonomy of kinds (Hacking 1991), while in his most recent work on the subject he explicitly rejects their existence: ‘There is no such thing as the class of natural kinds’ (Hacking 2007, 205). Something is going on here. If there are no natural kinds, then in what sense can *any* categories come from nature, whether or not they are fixed? How can the possibilities of microbes be delimited by a nature that has no kinds?

 One way to approach this interpretive difficulty is through Hacking’s ‘entity realism’ captured by his famous phrase ‘if you can spray them, then they are real’ (Hacking 1983, 23), referring to the ability of laboratory scientists to alter the charge on a niobium ball by spraying it with either electrons or positrons. Perhaps Hacking accepts realism about the *individuals* in our world while rejecting the classification of them as fixed, unique, or given by nature:[[16]](#footnote-16)

The world that does not change is a world of individuals. The world in and with which we work is a world of kinds. The latter changes; the former does not. (Hacking 1993, 306)

This suggests that there is no unique, fixed, or natural taxonomy of kinds because, in nature, there are only bare individuals, so any classification of the individuals will be relative to our theories.

 This may be right, but it is hard to see how it rescues dynamic nominalism. First, if we assume that there is a world of individuals but not kinds, then no kinds come from nature after all, so Hacking’s view reduces to the stronger one attacked in the foregoing.

Secondly, in order for an entity to exist as an *individual*, it must at least fall under the category ‘individual’, and by hypothesis this must be prior to any human act of classification. Consider that it is possible for a world to consist of non-individuated matter, or *stuff*, rather than individuals. For example, the beer inside a large vat is not composed of a certain, definite number of naturally distinguished, individual *beers*. We could divide the contents of the vat into the number of glasses or cases of beer it would fill, but this is obviously an artificial classification, not a natural one. So, it is possible for there to exist substances that are not naturally composed of a number of individuals[[17]](#footnote-17) of that substance (see Laycock 2006). Logically, this could be the case ‘all the way down’; there is no guarantee that reality is ultimately composed of individuals.[[18]](#footnote-18) Since there is a difference between a world of *things* and a world of *stuff*, being a realist about individuals requires being a realist about at least one classification, ‘is an individual’. Accordingly, realism about individuals without realism about (at least some) kinds is not a coherent position.[[19]](#footnote-19)

The entity realist[[20]](#footnote-20) may nevertheless remain dissatisfied. To see why, consider Barry Stroud’s observation that there are some ‘propositions whose acceptance is indispensable to any conception of a world at all’ so must ‘still be believed after metaphysical reflection’, but ‘their “success” or “survival”, or their having “passed” the metaphysical test, would show only that they are still believed’ (Stroud 2011, 140), not that they are true:

Even if there is something that everyone thinks, it does not follow that it is true. Nor does the truth follow from the fact that everyone has to think it, or cannot avoid thinking that it is true. (Stroud 2011, p. 134)[[21]](#footnote-21)

Any proposition essential to coherent thought will be immune to rejection by rational inquiry, being presupposed by it, but this immunity does not imply that the proposition gets mind-independent reality right, because the immunity might merely be the result of a constraint in our modes of thinking.

One of Stroud’s examples is relevant here:

Accepting evaluative judgments to the effect that such-and-such is reason to believe or to do a certain thing is indispensable not only in making sense of others as thinkers but *in any thinking* by which anyone comes to believe or do something for reasons. (Stroud 2011, p. 155, emphases added).

The very act of believing something renders the existence of reasons immune to rational rejection because to believe just is to take something as a reason, and this would include the belief that there are no reasons. This leaves any metaphysical inquiry into the existence of reasons unsatisfying: impossible to reject but also impossible to vindicate.

 It is certainly the case that my argument against entity realism rests on the proposition *that reality can be rationally explained/comprehended*, since it assumes that incoherent representations must be rejected; the same applies to my arguments in section 7 against simple capacities and independent representations, which assumes that arbitrary distinctions are similarly unacceptable. But could it be that this proposition is no more than a constraint on thought, not on reality itself? Perhaps the argument only shows that we must *believe* that reality is rationally intelligible, not that this is in fact true, so any reasoning that rests on this assumption is ultimately unsatisfactory for Stroudian reasons.[[22]](#footnote-22)

 The response to this is as follows. If it is legitimate to investigate the world by means of rationally compelling, perhaps even indubitable, principles, then dynamic nominalism must be rejected because it cannot be rationally justified. If, on the other hand, it is not legitimate to appeal to such principles, then we cannot rationally justify any theory of the world. Either way, dynamic nominalism cannot be justified. So, we are rationally compelled to accept realism about mind-independent structure or no theory at all.[[23]](#footnote-23) This will suffice for present purposes because it shows that dynamic nominalism lacks the conceptual resources to stand up to inherent structurism, and that is my goal here.[[24]](#footnote-24) Put another way, dynamic nominalism does not offer stable middle ground between realism about inherent structure and radical doubt about the possibility of rational investigation itself. There is no third way here; it is *realism or nothing*.

**9. Inherent structurism as meta-ontological realism**

One of Stroud’s philosophical goals is to show that transcendental arguments are incapable of responding to skepticism. Even if it were true that any coherent thought of the world requires the belief in persisting objects (Strawson 1959), or other minds (Shoemaker 1963), this would only prove, Stroud argues, that we must believe in such things, not that they exist (Stroud 1968).

 In light of this, it is worth noting that my argument against dynamic nominalism is not intended to serve as a reply to the skeptic about objects or other minds, nor do I think that it falsifies the kind of skepticism that questions the very possibility of rational inquiry. Rather, it shows that if we assume that the most rationally compelling account of reality is the best one, then we must reject dynamic nominalism.

 If this is correct, then there remains an important epistemological question: if inherent structurism is right, is it possible to gain knowledge of the world’s structure? I do not think that the argument against dynamic nominalism entails an affirmative answer on its own. In fact, by insisting that the mind and the (rest of the) world are ontologically independent of each other, inherent structurism includes a gap that the skeptic might exploit.[[25]](#footnote-25) In the end, we may be in a position of knowing *that* there is inherent structure without knowing *what* it is, just as I am currently in the position of knowing that ibuprofen has the molecular structure to cure my headaches without knowing what that structure is.[[26]](#footnote-26)

Here is another way to look at the situation. Traditionally, scientific realism consists of three core ideas: the ontological proposition that reality is (largely) independent of human thought; the semantic proposition that truth is some kind of correspondence relation between thought and independent reality; and the epistemic proposition that we have good reason to believe that current science is roughly true. The argument against dynamic nominalism presented here is concerned only with the first. What we can justifiably believe, I have argued, is a general, or, *meta-ontological* proposition, that the world contains mind-independent structure of some kind or other.[[27]](#footnote-27) More is needed to conclusively justify any particular belief about that structure. I think that this is to be expected, as there is little reason to believe that an ontological theory will, in general, answer epistemological questions. Inherent structurism doesn’t entail that we can answer our most pressing skeptical worries, nor does it entail that we cannot. We must, accordingly, build our knowledge of the world piece by piece, one step at a time, using scientific, mathematical, logical, and whatever other methods are available. We may succeed, or we may not.

**10. Representing the non-representational**

One final objection is that I have nevertheless misunderstood Hacking because what he in fact proposes is nothing more than the obvious proposition that all structure that we are capable of representing is, and must be, found in representations. Surely that cannot be denied.

Well, Hacking explicitly defends a stronger claim. Moreover, since it is trivial that *representational* structure is representational, this interpretation would render dynamic nominalism of little interest. The real question is whether *all* structure is representational, and I have argued that it is not. Note further that even if it were true that all structure *accessible* to us is representational, it would not follow that all representations are *of* representational structure. Compare: even if it is true that all vision makes use of eyes, it doesn’t follow that all we can see is eyes. So, I think Hacking is right to focus on the stronger proposition, even if it fails.

**11. Conclusion**

Ian Hacking has given us one way to think about contemporary nominalism, namely as the denial that representation-independent reality has structure. I have argued that this position conflicts with his observation that human inquiry has a history, i.e. that various material and social forces shape and alter the way we investigate reality. To be the kinds of creature capable of creating and engaging in historically contingent modes of inquiry requires that we have a structure or nature sufficient for that kind of activity and that structure is logically, causally, and temporally prior to the content of any representation. Given this, there is also an important sense in which the contingency claim is incorrect: logically conflicting theories cannot be equally good representations of the same part of reality. I conclude that the dynamic, contingent history of scientific theories poses no threat to realism about mind-independent structure.[[28]](#footnote-28)

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1. Let me note that I do not accept this assumption, but denying it is beside the point here as I aim to reject a kind of neo-Kantianism even if its assumptions about mental self-transparency hold. [↑](#footnote-ref-1)
2. See also, Hacking 1991 (especially page 111). [↑](#footnote-ref-2)
3. He is also concerned by how often philosophers fail to take heed of this. [↑](#footnote-ref-3)
4. For more examples, see Hacking (1983), and Hacking (2014, 171). [↑](#footnote-ref-4)
5. Take it as granted that our representations are historically conditioned and contingent. [↑](#footnote-ref-5)
6. I offer responses to objections to this in section 7. [↑](#footnote-ref-6)
7. A possible objection: the existence of representation merely entails that we must *accept* or *represent* the existence of mind-independent capacities, but the necessity of accepting or representing something does not entail that the something in question exists (see, e.g., Stroud 2011). I consider this kind of objection in section 8 below. [↑](#footnote-ref-7)
8. It is possible for truly distinct representations to be equally good if each is a representation of *independent* parts of reality; e.g. a theory of atomic behaviour can be distinct from a theory of marine mammal migration, and each be perfectly good at representing their aspects of nature without being notational variants of each other. Thanks to an anonymous referee for insisting on this clarification. [↑](#footnote-ref-8)
9. This assumes, of course, that no part of the world can have two distinct, incompatible structures; i.e. reality is logically coherent. More on this in section 8. [↑](#footnote-ref-9)
10. *Should* *be* because relativizing predicates to times allows us to avoid the paradox of change (Hinchliff 1996) which otherwise threatens any contingent proposition. For example, an apple is first red, R(a), then not red, ~R(a), which appears to add up to a contradiction, R(a) & ~R(a). The solution is simple: the predicates should be temporally relativized, R(a, *t1*) and ~R(a, *t2*), which do not conflict with each other. So, predicates are, typically, relations to times. For further discussion see Mozersky (2015) or Oaklander (2014). [↑](#footnote-ref-10)
11. Thanks to an anonymous referee for raising this objection. [↑](#footnote-ref-11)
12. Presumably this was the case for everyone prior to 1915, when (GR) was finalized. [↑](#footnote-ref-12)
13. None of this is to insist that *all* classification schemes are correct, accepted on sufficient evidence, the result of unbiased investigation, and properly motivated. Since we are fallible and finite creatures, we certainly make all kinds of mistakes, and as a result we might face a lengthy process of scientific revision. Nonetheless, the fact remains that *some* taxonomy precedes – logically, temporally, and causally – our human schemes [↑](#footnote-ref-13)
14. Might the objector push further and propose that *we ourselves* are representations who construct empirical reality? I am inclined to reject this sort of absolute idealism out of hand since it conflicts so deeply with the scientific account of human beings, but even if we entertain it, I don’t think it will help. One the one hand, suppose that we are the representations of something else. If so, then we can run the above arguments to show that either (i) this something else has structure, in which case dynamic nominalism is false or (ii) it is structureless, in which case structure can arise from the structureless, which means that non-representational structure could as well. On the other hand, it may be supposed that we, as representations, exist independently of, so without explanation in terms of, anything else. The problem here, again, is that if representational structure can exist independently, without explanation, then so can other kinds of structure and we lack grounds for restricting structure to the former. [↑](#footnote-ref-14)
15. I am grateful to an anonymous referee for raising this argument/objection. [↑](#footnote-ref-15)
16. Thanks to an anonymous referee for this suggestion. [↑](#footnote-ref-16)
17. The very awkwardness of this phrasing suggests how foreign it is to our way of thinking to suppose that ‘stuff’ is the sum of individual units of that stuff. [↑](#footnote-ref-17)
18. For example, quantum mechanics employs statistical methods – Bose-Einstein and Fermi-Dirac – that don’t distinguish between individuals in determining possible states of a system, suggesting that there may be no discrete entities at the fundamental, physical level (see Ladyman and Ross, 2007). [↑](#footnote-ref-18)
19. This argument was prompted by comments of an anonymous referee, to whom I am grateful. [↑](#footnote-ref-19)
20. That is, the realist *merely* about entities. [↑](#footnote-ref-20)
21. See, also., Stroud 1968. [↑](#footnote-ref-21)
22. Thanks to an anonymous referee for drawing this objection to my attention. [↑](#footnote-ref-22)
23. Equally badly: we accept realism or any theory at all. [↑](#footnote-ref-23)
24. The goal, here, is not to show that reason can be justified independently of rational principles. Whether or not that is possible, it is a topic for another occasion. [↑](#footnote-ref-24)
25. For example, by appealing to our cognitive limitations; see, e.g., Chomsky (2016). [↑](#footnote-ref-25)
26. This is reminiscent of Davidson’s argument that the possibility of having a false belief in any given case does not entail the possibility of being mistaken in all cases (e.g. Davidson 1974). [↑](#footnote-ref-26)
27. To be precise, we must believe that or reject the possibility of rational inquiry altogether. [↑](#footnote-ref-27)
28. For helpful questions, comments, and suggestions, I would like to thank James R. Brown, Bernard D. Katz, three anonymous referees, as well as audiences at Carleton University, Queen’s University, and the 2017 annual meeting of the *Canadian Society for the History and Philosophy of Science*. Thanks also to the students in my metaphysics and philosophy of science seminars at Queen’s. I am especially grateful to Henry Laycock, for ongoing insight and clarity, and Crawford Elder, whose (2011) was an inspiration for much of my thinking on these topics. [↑](#footnote-ref-28)