

PUTTING REALISM IN PERSPECTIVISM

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ABSTRACT

This paper examines what exactly amounts to the view commonly known as ‘perspectivism’, sometimes also known as ‘perspectivalism’. Of the various possible conceptions of perspectivism, four are singled out for closer inspection. Each makes clearly separable claims of varying strength. Their strength is judged against how much doubt they throw on key claims made by the view’s presumed arch-nemesis, namely realism. It is argued that the first two offer no serious challenge to realism. To be precise, it is argued that the first one is blatantly false, while the second is true but utterly harmless. Things are less clear cut with the other two conceptions of perspectivism. If true, they appear to present a more serious challenge to realism. It is argued that considerable doubts hang over their truth as to date arguments raised in their support are far from compelling. Even so, these conceptions cannot be summarily dismissed. Indeed, under more reasonable construals, they need not be for realism to survive and thrive. This is because claims these conceptions make in the name of perspectivism turn out to be easily coupled with realism.

1. Realism: The Arch-Enemy of Perspectivism

Perspectivism has (nearly) always been conceived of as a form of anti-realism. That is to say the view's chief foe has generally been thought to be realism. In order to properly assess perspectivism we could therefore benefit from throwing first some light on what exactly this foe stands for and how it is motivated.

If our best bet for obtaining knowledge of the world around us is through scientific as opposed to non-scientific (e.g. folk) theories, models, etc., then it is a scientific kind of realism that we should be concerned about in our assessment of perspectivism. And indeed it is this kind of realism that has witnessed the most intense development in contemporary philosophy. Although numerous versions of scientific realism are on offer, e.g. entity realism, structural realism and semi-realism, our focus here is on what these views have in common. Three sufficiently general claims that most realists endorse are identified. The first two empower realists to produce inferences of a desirable kind.

Success implicates truth: Successful scientific representations (theories, models, etc.) tend to provide true or at least partially true descriptions about objective features of the observable and/or the unobservable world.¹

Success cuts nature at the joints: Successful scientific representations tend to cut the world or nature at the joints, or, at the very least, provide non-negligible clues about these joints.

¹ By 'partial truth' I mean here to exclude negligible claims to truth.

While the first claim is supposed to help realists produce inferences about the objective features that populate the world, the second is supposed to help them produce inferences about the natural kinds or categories that at least some objective features are thought to be arranged in. For quite a few realists the second claim is an essential component of realism.² And, of course, if scientific representations can cut nature at the joints this presupposes that nature has joints. That brings us to the third claim.

Nature has joints: There are natural or objective categories in the world that form a unique structure, the so-called ‘natural-kind structure’.

To the first three claims we can add a condition for the bare minimum that needs to hold for scientific realism to come out true:

Threshold condition: So long as something (non-trivially) true / partly true can be said about the objective features of the observable and the unobservable world this is sufficient to establish a weak scientific realist position.³

² Bird and Tobin (2008) thus characterise the relationship between realism and natural kinds as follows: “... it is a corollary of scientific realism that when all goes well the classifications and taxonomies employed by science correspond to the real kinds in nature”. For a contrasting view see Dupré (1993), who argues for realism but denies that nature can be cut at the joints.

³ The reference to the *unobservable* world is there to distinguish scientific realism from empiricist anti-realist positions like constructive empiricism. More on this notion can be found in Section 7 below. Also, notice that the threshold condition can be met even if the success implicates truth claim, at least in its current form, does not hold.

Finally, it is important to list two operative assumptions that frame the subsequent discussion.

Assumption 1: The world exists independently of our conceptions of it. Having said this, it is up for discussion whether we can say anything at least partially true about it and even whether it has natural joints.

Assumption 2: The world provides input for our perception, cognition and instruments. Having said this, it is up for discussion whether we can discriminate the input coming from the world and that coming from other sources.

No rational debate can be had on any topic without some common ground between the disputing parties. The above assumptions play precisely this grounding role. In so doing, they sideline extreme forms of anti-realism.⁴ In what follows, we focus on the potential challenges different forms of perspectivism may pose to realism and its claims, while paying particular attention to the conditions under which the threshold condition can be met.

⁴ Among these extreme views I include various forms of idealism, social constructivism and relativism. A well-known example of the former is Berkeley's idealism, which clearly denies mind-independence: "... all the choir of heaven and furniture of the earth, in a word all those bodies which compose the mighty frame of the world, have not any subsistence without a mind" (1710: Part I, §6). Such extreme views are typically sketchy in details and, anyhow, lack proper motivation.

2. A Taste of Things to Come

Before we turn to an in-depth exploration of the space of different kinds of perspectivism it is helpful to try to get some admittedly loose grip on the view. Let us begin with the concept of a perspective. The concept is traditionally associated with vision, denoting how the appearance of things changes according to the relative position of the observer. Discussions of perspectivism clearly go beyond this narrow construal of a perspective. It is commonly assumed that not only vision but also all the other sensory modalities are perspectival in nature. Moreover, it is commonly assumed that knowledge and concepts are likewise perspectival. As a first approximation then the main assertion perspectivists make is that our epistemic access to the world is inextricably perspectival. As one would expect, belief in this claim brings with it doubts over whether we can ever uncover objective features of the world. This makes perspectivism a firm favourite with anti-realist leaning philosophers, though, as we shall shortly see, some realists have also toyed with the idea.

Perspectivism in an identifiable form goes back at least to Nietzsche ([1882] 2001), though arguably and depending on how we construe the notion of a perspective the view may go as far back as the pre-Socratics. Protagoras, in particular, denounced objectivity with the famous phrase ‘man is the measure of all things’. His view is most ordinarily branded as a form of relativism. What is of relevance here is that it is not always easy or possible to distinguish perspectivism from views like relativism. Some versions of conventionalism, constructivism, contextualism and, as already mentioned, relativism make remarkably similar and sometimes identical claims to perspectivism. Everything depends on how narrowly or broadly we understand the operative notions, i.e. what counts as a perspective, a convention, a construction, a context and a basis for

relativisation. Take relativism. If the basis for relativisation is restricted to whatever we associate with a perspective, the resulting form of relativism is equivalent to the corresponding form of perspectivism.

A good starting point in discussing how perspective influences science is Giere (2006). For Giere, both scientific theorizing and scientific observation (which includes human perception as well as the output of instruments) are laden with perspectives. According to him, there are two dimensions to the role perspectives play in science. First, they determine the focus of the scientific investigation. Second, they contribute content to the results of the investigation. Here's a telling passage concerning this two-dimensional role in the case of the output of instruments:

Here we can distinguish two dimensions to the perspectival nature of claims about the output of instruments. First, like the human visual system, instruments are sensitive only to a particular kind of input. They are, so to speak, blind to everything else. Second, no instrument is perfectly transparent. That is, the output is a function of both the input and the internal constitution of the instrument (2006, p. 14).

This is a very useful conception of the way in which perspectives play a role in science. Henceforth we can refer back to these dimensions as *focus* and *contribution* respectively.

Giere models his view, which he calls 'scientific perspectivism', on colour vision and in particular on how visual perspectives change the appearance of colour. Of special note here is his notion of inter-subjective objectivity. Visual perspectives of coloured objects are, in his view, paradigmatic examples of the inter-subjectively objective. By this he means that "most people generally see the same objects as similarly colored in similar circumstances" (2006, p. 14). But he quickly moves to dispel the idea that this is a capitulation to an objectivist view of the world. As he notes in the sentences that follow: "Whether colors are objective in the stronger, more technical, sense of objectivist realism remains to be seen. I will argue they are not" (2006, p. 14). Giere does

not think of himself as an anti-realist. Indeed, from time to time he calls his view ‘perspectival realism’. In his own words:

Colors are real enough, but, I will be claiming, their reality is perspectival. And it is perspectival realism that provides us with a genuine alternative to both objectivist realism and social constructivism... Perspectivism makes room for constructivist influences in any scientific investigation. The extent of such influences can be judged only on a case-by-case basis, and then far more easily in retrospect than during the ongoing process of research. But full objectivist realism (“absolute objectivism”) remains out of reach, even as an ideal. The inescapable, even if banal, fact is that scientific instruments and theories are human creations. We simply cannot transcend our human perspective... (2006, pp. 14-15).

Alas, Giere never satisfactorily explains in what sense colours or any other things can be ‘real enough’ or ‘inter-subjectively’ objective but not ‘absolutely’ objective. If something being ‘real enough’ just means that there is inter-subjective agreement about it, then this is obviously not sufficient for reality or objectivity. After all, most humans agree on the existence of souls, yet that’s not sufficient reason to establish that souls are any more real than a fictional character. If ‘real enough’ means something stronger than mere inter-subjective agreement then Giere needs to tell us what this exactly amounts to and how it is different from plain or, as he calls it ‘absolute’, objectivity.⁵

⁵ There is some evidence that he means something stronger. This is suggested by his rejection of (strong) social constructivism and the addition of the suffix ‘objectivism’ to his inter-subjective view. But saying that his view is a form of objectivism or realism doesn’t help explain in what way it falls short of being the kind of objectivism or realism that endorses knowledge of objective features of the world.

It is not quite clear if, when all its consequences are taken into account, Giere's view can be admitted into the realist club. The problem lies with an unresolved tension in his work. On the one hand, he dismisses the idea that science can provide true or at least partially true descriptions about *objective* features of the world.⁶ In doing so, he denies the success implicates truth claim and, more importantly, he denies that the threshold condition can be met. Indeed, since on his view not even objective features of the macroscopic world can be revealed, it is more anti-realist than the constructive empiricism of van Fraassen (1980). On the other hand, some of Giere's proclamations inadvertently leave the door open for objective knowledge. Let me explain. Giere, like other perspectivists, espouses a relativised notion of truth. As he puts it: "For a perspectivist, truth claims are always relative to a perspective" (2006, p. 81). This relativisation tricks Giere into thinking that objective truth, truth about objective features of the world, is forever beyond our reach. But it need not be so. Take his sky colour example: "So even the claim that the sky is blue is not an absolutely objective truth. Rather, the sky appears blue to normal human trichromats" (2006, p. 123). It is of course true that from the perspective of a normal human trichromat the sky appears blue. But *this* truth does not change when considered from the perspective of everyone else, i.e. normal non-humans and normal human non-trichromats, who is cognitively competent with respect to the given task.⁷ Or, rather, it better not change if these others have a genuine interest in conveying what *we* normal human trichromats really judge the colour of

⁶ Kidd (2011) concurs in his comparison of Nietzsche's perspectivism with Giere's: "As with Nietzsche, knowledge of the nature and structure of objective reality is ruled out and claims to possess it are criticised [as] being indicative of gross 'hubris' (Giere 2006, p. 95)" (p. 7).

⁷ By cognitive competence I mean, among other things, that the individuals involved have the ability to acquire the concepts at issue, which in this case include the concepts sky and blue.

the sky to be. For no amount of investigation and evidence-gathering into the way we, normal human trichromats, perceive and conceptualise colours is able to undo the colour attribution we call 'blue' to the sky.⁸ Thus, even though the assertion 'The sky is blue' is not objectively true, the assertion 'The sky appears blue to normal human trichromats' is as good a candidate for objective truth as any.⁹

3. A Silly Form of Perspectivism

We begin our survey of perspectivist views with a rather silly form of perspectivism. Giere's brief discussion of this form of perspectivism is instructive. In explaining what scientific perspectivism is not, he quite rightly makes the following remarks:

In common parlance, a perspective is often just a point of view in the sense that, on any topic, different people can be expected to have different points of view. This understanding is usually harmless enough in everyday life, but it can be pushed to the absurd extreme that every perspective is regarded as good as any other... I therefore need to make it clear at the start that a *scientific* perspectivism does not degenerate into a silly relativism (2006, p. 13) [original emphasis].

We can call this form of perspectivism 'the great leveller', even though there is nothing really great about it. That all perspectives are equally good, regardless of their content and the purpose for which we use them,

⁸ Such evidence must of course meet certain standards. For a discussion of the kinds of standards I have in mind see Section 7 below.

⁹ For further discussion of Giere's view see Brown (2009). He compares Giere's view to the views of Feyerabend, Peirce and Dewey. Giere (2009) provides a reply to some of Brown's concerns.

is demonstrably absurd.¹⁰ For example, suppose that we want to get rid of a stomach ache that a doctor has diagnosed as being caused by a bacterial infection. Suppose further that a specific combination of drugs can indeed cure the infection. If we take the above view seriously, then catching a bus, reading a book or picking our nose is as good as any other action we take since any perspective is equally good. Surely this is absurd.¹¹ Notice that no assumption needs to be made here about whether or not the theoretical underpinning of why the combination of drugs works is accurate. All that needs to be assumed is that some courses of action and their associated perspectives are more successful than others and that indeed some are completely irrelevant to, and ineffectual in, bringing about the desired effects.

4. An Innocent Form of Perspectivism

For the remaining forms of perspectivism to be discussed shortly, we turn to the concept of scientific representation. There are two principal reasons for this move. First, since we have already restricted our attention to (what potentially amounts to) *scientific* knowledge, we need a concept

¹⁰ Speaking of purposes, Giere explicitly incorporates these into his account of representations: “*S* uses *X* to represent *W* for purposes *P*” (p. 60). Needless to say that, for Giere, specific purposes are important in determining the focus and perhaps even the contribution of a given perspective. In what follows I take a somewhat different approach to this matter by discussing variations in focus and contribution directly, i.e. without reference to purposes. I do so without denying that specific purposes are at least partly responsible for determining these variations. Although that is an interesting topic, it is one for another paper.

¹¹ Not even communication would be possible if this form of perspectivism were true, let alone successful interaction with our environment.

that is capable of acting as a vehicle for such knowledge. Many, presumably competing, vehicles have been proposed over the years, e.g. theories, models and sentences. What they all have in common is that they can be used to *represent* (what potentially amounts to) objective features of the observable and/or unobservable world. The concept of scientific representation – henceforth just representation – thus bypasses the thorny issue of choosing the correct vehicle of scientific knowledge. Second, as we shall shortly see, nothing prevents representations from incorporating both the focus and contribution dimensions of a perspective. In other words, perspectives can be embedded into representations.

Without further ado, let us consider the next form of perspectivism:

- (1) For any target system Φ (with two or more features) there exist different representations, each of which encodes different features of Φ .

This, in and of itself, is an innocent (and trivial) form of perspectivism. Provided the representations are accurate, each one helps us attain a more complete account of the target system. In other words, the representations are complementary. This means that there is no conflict between such representations. Take two representations, one encoding feature x of a target system Φ_l , the other feature y of the same target system. Then the following two statements can be true at the same time:

- (a) The target system Φ_l has property F (in feature x).
- (b) The target system Φ_l does not have property F (in feature y).

Notice that if (a) and (b) are (non-trivially) true / partly true and at least one of the said features is unobservable then realism triumphs for the

simple reason that the threshold condition gets satisfied.¹² Also notice that, as it stands, (1) is consistent with the other realist claims, namely the success implicates truth claim, the success cuts nature at the joints claim and the nature has joints claim.

5. Contribution

That different representations can encode different features of one and the same target system is more or less a consequence of our ability to selectively turn our attention towards some things but not others. This is what we earlier called the *focus* of a perspective. The wrong focus may lead us to draw inaccurate or even false conclusions about the objective features of a target system. This poses a threat to realism but one that is typically not so difficult to neutralise. In scientific research, focus may be expanded, contracted or shifted in order to discover or fine-tune regularities that are otherwise hidden from view. A more clear and present danger to realism is provided by the *contribution* a perspective (with a given focus) makes to the content of a representation. After all, the contribution of a perspective has the power to potentially alter, not merely select, the input of a given target system, turning the content of the corresponding representation into something that may continue to strongly mislead us about that target system's objective features even after a change in focus. A perspective's contribution presents a challenge not only to realists but also to empiricist anti-realists, for the supposition is that such contributions can also be found in purely observational representations.

¹² Strictly speaking the condition gets satisfied if at least something (non-trivially) true / partly true can be revealed about objective features of *both* the observable and the unobservable world.

Those who assume that perspective-contributions are inextricable from our representations take contributions to somehow have a distorting effect on representations. But this crude conception of a perspective-contribution brushes over some important questions that have a bearing on whether or not representations can tell us anything about the world. For example: Do all perspective-contributions distort? Are the levels of distortion always high? And do perspective-contributions distort all parts of representations equally? I think it is fair to say that perspective-contributions need only worry the realist if it can be convincingly argued that they always distort the input to such a degree that *nothing* can be uncovered about the world's objective features. Only then would we be in a position to assert that the threshold condition cannot be met and hence that realism is not viable. I, for one, am not familiar with any such argument.¹³ *At most* what can be argued for is that in cases where we have no specific reason to think that a perspective distorts we should take to fence-sitting. But in those cases it is not perspectivism that carries the day but scepticism!¹⁴

To illustrate the claim that it is not clear whether a contribution necessarily distorts or distorts in a bad way consider for a moment an example involving gamma-ray detectors. Qua humans we are incapable of detecting gamma rays with our unaided senses. That's why we build

¹³ Giere is steadfast in his belief that there are always contributions that cannot be purged: "Careful calibration can reduce but never eliminate the contribution of the instrument" (2006, p. 14). And again: "Any particular instrument [or sensory organ] interacts with only narrowly defined aspects of the physical world, and then never with complete transparency. Some contributions by the instrument [sensory organ or theory] to the output cannot be eliminated" (2009, p. 223). Disappointingly no argument is given for why this is presumably the case.

¹⁴ I am not so much endorsing scepticism here – indeed I think scepticism has its own demons to exorcise – as pointing out that perspectivism of a sort that challenges realism is far from a foregone conclusion.

special instruments or detectors. These are supposed to do two things. First of all, they are supposed to reliably detect features that the systems they target possess – in this case gamma rays. Secondly, they are supposed to ‘translate’ these detections into something we humans (with our unaided senses) are capable of detecting, i.e. an image, a sound or, more accurately, a set of numerical data. To the extent that they achieve their designer’s aims, detectors act as amplifiers and/or transformers preserving the structure of the original features of the object. What is of interest to us here is that the contribution made by a detector in amplifying and/or transforming a ‘signal’ is a desired, nay, *an essential*, part of their design, for without this contribution we would not be able to detect the said target systems! Although there are arguments to the effect that these contributions are often and largely harmless – for example, citing the fact that instruments whose construction methods, internal mechanism and theoretical presuppositions are independent end up producing the same results – what I want to convey here is the much weaker point that perspective-contribution does not on its own entail distortion. Thus, even if we cannot transcend perspectives, as Giere likes to think, that doesn’t mean that perspectives are devoid of correct and separable information about objective features of the world.

Very similar issues arise in relation to the theory-ladenness of observation, roughly the claim that the content of observation is affected by theoretical presuppositions. Theory-ladenness is sometimes advanced as a lethal objection to realism. But once again crucial questions concerning its presumed lethality remain unanswered. Do all theoretical presuppositions distort the content of observations? Are the levels of distortion always high? And do theoretical presuppositions distort all parts of the content of observations equally? The realist need only lose sleep over theory-ladenness if there is a convincing argument to the effect that theory always distorts observation to such a degree that the latter is unable to tell us anything about the world’s objective features. As with perspectivism, I am not aware of any such argument. Similar remarks

apply to other forms of ‘theory-ladenness’, including the so-called ‘cognitive penetrability’ of perception.¹⁵ The parallel between theory-ladenness and perspectivism should hardly be considered a surprise. That’s because our construal of perspectives has been broad enough to include theoretical presuppositions and the ‘contributions’ these make to observation. In a sense then, claims about theory-ladenness can be viewed as special cases of the more general perspectivist claims.

6. A Small Detour: Carnap’s Deflationism

Carnap famously argues that disputes concerning metaphysical issues are cognitively insignificant. He motivates this view with a distinction between internal and external questions:

... we must distinguish two kinds of questions of existence: first, questions of the existence of certain entities... within the framework; we call them internal questions; and second, questions concerning the existence or reality of the system of entities as a whole, called external questions (1950, p. 206).

The frameworks Carnap refers to are linguistic. Scientific claims (and their posits) are always formulated within such frameworks. Metaphysical claims (and their posits) are intended to be framework-free – i.e. external to or independent of frameworks. The problem with metaphysical claims is that there is no external or independent standpoint from which one may issue judgement over ontological matters. Thus

¹⁵ Even if all perception is penetrated by high-level cognition that doesn’t entail that the content of perceptual states is irrevocably spoiled and therefore unable to inform us about the world.

while internal questions – e.g. do Higgs bosons exist? – are legitimate and can be answered “either by purely logical methods or by empirical methods” (p. 206), external questions – e.g. do material objects exist? – are illegitimate for their evaluation is supposed to transcend frameworks: “An alleged statement of the reality of the framework of entities is a pseudo-statement without cognitive content” (p. 214).¹⁶ To be precise, the only external questions that can legitimately be answered in Carnap’s view concern pragmatic issues such as choosing the most convenient linguistic framework vis-à-vis certain goals.

Why the detour you may ask? Because it is instructive to compare Giere’s perspectivism towards science and Carnap’s deflationism towards metaphysics. The two projects diverge in a bunch of ways. For example, whereas Carnap’s project is intended as a way out of metaphysics, dismissing realism and anti-realism as cognitively insignificant, Giere’s project is intended as a more sensible metaphysics, a type of hybrid realist/anti-realist view that takes the much neglected idea of perspectives into account. Of course, what matters most for our comparison is the convergence between the two projects.¹⁷ Both relativise questions of

¹⁶ In the case of Higgs bosons the question obviously needs to be answered by empirical methods. It is currently in the process of being answered, if only tentatively, in the affirmative at CERN.

¹⁷ Giere is not only aware of the convergence but also draws on it to justify his own view:

For a perspectivist, truth claims are always relative to a perspective. This is not so radical a view as it might sound. It was long a doctrine within Logical Empiricism, and analytic philosophy generally, that scientific claims are always relative to a language... And the choice of language is pragmatic, not itself a matter of truth or falsity.

My claims on behalf of perspectivism are not much different. Only rather than focusing on language, I focus on the physical characteristics

ontology to their own special notions, *perspectives* and *linguistic frameworks* respectively. More specifically, both insist that there is no external or independent standpoint from which one may issue judgement over ontological matters.¹⁸ If true, it appears to put a damper on realism.

There is a rather trivial sense in which the ‘no external standpoint’ claim is true. It is hard to deny the fact that our attempts to know the world invariably involve linguistic frameworks, concepts, instruments, sensory modalities and the like. But what does this entail for the realism debate? I submit nothing much. For nothing in *this* sense of external standpoint is inconsistent with the view that some linguistic frameworks or, to go back to our operative notion, some representations, are better than others at correctly encoding objective features of the world. Indeed, this sense of external standpoint is consistent with the more demanding view that there is one correct and all-encompassing linguistic framework or representation and, moreover, that we are converging towards it. To be clear, the points about consistency do not of course establish the superiority of realism over various forms of anti-realism. They do however demonstrate that the unavailability of an external vantage point does not automatically mean the demise of realism.

of instruments (including the human visual system) and principles defining generalized models (2006, p. 81).

The only difference between his comparison and mine is that he does not single out Carnap but rather connects his view to the Logical Empiricist and analytic philosophy movements.

¹⁸ See also Kidd (2011) who attributes this view to Nietzsche: “... what is denied to us is our ever identifying how reality is independently of our ‘perspectives’, for our cognitive capacities are ‘far too little’ for us to ‘even be entitled to *make* that distinction’ (Nietzsche [1882] 2001, §354)” (p. 4). No argument is provided to support this view.

What would be good (but, surely, defeasible) reason to believe that we are converging towards the correct linguistic framework for doing science or the correct representation for a given target system, even if we can never quite get there? Well, finding out that no matter how many different (but adequate) linguistic frameworks or representations we explore, we keep coming across some of the same (non-trivial) traits and structures. For example, if a linguistic framework always needs to contain a concept of scale to be adequate for the purposes of doing sophisticated science and if a representation of gravitational phenomena always takes the form of an inverse-square law (or a form very much like it) to be adequate in its predictive accuracy then we have good reason to believe that there is some convergence towards correctness. Thus, the point that there are always alternative linguistic frameworks or representations that are just as adequate as the ones we currently possess, if true, is not even remotely close to being a knock-down objection to realism, for the crucial question is whether the alternatives are truly in competition with each other and in all respects. Otherwise put, if the alternatives or parts thereof are mere reformulations of one and the same underlying set of traits or structure then this is nothing the realist needs to worry about.¹⁹ It is worth noting, if only in passing, that physics is increasingly becoming a project of trying to find the most universal formulations of its subject matter. A famous example is Einstein's principle of relativity postulate, which demands that physical laws remain invariant with respect to all inertial frames of reference.

¹⁹ We return to this issue in the next section.

7. A Not-So-Innocent Form of Perspectivism

Consider next a more sinister form of perspectivism:

- (2) For any target system Φ there exist genuinely rival representations, each of which encodes the same feature(s) of Φ equally well according to core standards of evidence evaluation.

The first thing to note is that both (1) and (2) can hold at the same time. The divergence between them is that in (2) it cannot be said that the different representations are complementary since they are encoding the same feature(s). Take two representations both encoding the same feature x of a target system Φ_i equally well according to core standards of evidence evaluation. If the representations are indeed genuine rivals then there must be some claim on which they conflict, say about whether the system has property F in feature x . Obviously, the following two statements cannot both be true at the same time:

- (c) The target system Φ_i has property F (in feature x).
 (d) The target system Φ_i does not have property F (in feature x).

This form of perspectivism appears to challenge most of the key claims made by realists, save for the nature has joints claim. To be precise, if it is true that genuinely rival representations (meeting core standards of evidence evaluation) can always be formulated, then there appears to be no way to single out correct representations from their inconsistent rivals and hence no way to identify any objective features the world possesses. That ultimately amounts to a failure to satisfy the threshold condition. Also, if it true that our criteria for what counts as a successful representation line up with the core standards of evidence evaluation then

both the success implicates truth claim and the success cuts nature at the joints claim are undermined. That is to say, a scientific representation's success no longer licences inferences to the truth or partial truth of its content and it no longer licences inferences to its ability to cut nature at the joints.

The key to understand this form of perspectivism is what we earlier called the *contribution* of a perspective. Here's why: The rival representations possess divergent content. But, by supposition, such representations are targeting the same features of a system, i.e. they have the same focus. That means that their content divergence could not be originating in the features of the target system itself. Hence, the contribution must be made by the representations, each representation offering a different perspective on the target system.

As already mentioned, the problem facing the realist with this form of perspectivism is that, if true, there appears to be no way to distinguish the correct representations from the incorrect ones. This is tantamount to a form of underdetermination. The ability of rival representations to encode one or more features of a target system equally well underdetermines that target system's correct representation. One may wonder what the rationale is behind the clause that a representation 'encodes features equally well according to core standards of evidence evaluation'. Lest we tumble into the absurd view that any representation is as good as any other and for whatever purposes – recall the discussion in Section 3 – we need to weed out obviously inadequate representations. The clause is designed to do precisely that by setting a hurdle of core evidential standards, i.e. the minimum and most defensible conception of standards one would expect evidence to meet, over which absurd and other inadequate representations cannot jump.

To better understand this clause it is helpful to consult traditional forms of underdetermination. Two theories encode observable features *equally well* when they have exactly the same observational

consequences.²⁰ Such theories are dubbed ‘empirically equivalent’. The truth of their non-observational consequences is not determined by the truth, if present, of their observational ones. More generally, in any form of underdetermination there is something that does the determining, henceforth ‘the determiner’, and something that remains undetermined. For the supporters of a specific form of underdetermination, the corresponding determiner is deemed to possess incontrovertible or at least strong epistemic merits because it presumably conforms to incontrovertible or at least strong evidential standards. Were it not considered to conform so, more would remain undetermined than the given form of underdetermination demands, thereby defeating the whole point of endorsing that form of underdetermination. The determiner in the case of traditional underdetermination is observation. Realists and empiricist anti-realists alike take observation to possess strong epistemic merits.²¹ And, although they do not often argue for this, observation is assumed to be epistemically meritorious because it satisfies nearly incontrovertible standards of evidence evaluation.

The difference between the traditional and the perspectivist-inspired forms of underdetermination is that in the latter even those parts of a representation that deal with observable posits are presumably up for grabs. More precisely, if for any observational target system there exist genuinely rival representations that encode the same features, then even

²⁰ Needless to say, theories encoding features equally well need not also encode them well. A theory encodes observable features well when it is able to entail only (or at least mostly) true observational consequences about them. Observational consequences are those whose content concerns purely observable posits, their properties and relations, where what is observable is determined by what we can detect with our unaided senses. For more on the notion of observability see van Fraassen (1980).

²¹ That’s not to say that they think that every single observation is epistemically meritorious.

observational content is underdetermined and empiricist anti-realist views are also in trouble. So the perspectivist conception we find in (2) of what it means to encode features well, and by extension of what it means for two representations to encode features equally well, could not be identical to the one stemming from traditional forms of underdetermination. That is to say, the determiner in (2) could not presumably take the form of observations. What form could it take then? An answer to this question would be easier to come by if we knew what the pertinent standards were. That's precisely the issue we turn to now.

There are at least two standards of evidence evaluation that we have compelling reasons to legitimately call 'core' standards. The first concerns the consistency of the output of a source of evidence. Other things being equal, a source of evidence for the same type of target system must under the same type of circumstances produce the same or sufficiently similar output.²² Imagine for a moment that a given source of evidence did not meet this standard. There would then be no reason to think that the source can teach us, *even in principle*, anything about the world, for there would be no correlations between, on the one hand, what we target in a given type of circumstances and, on the other hand, the source's evidential output.

Meeting the first standard is important but it is clearly not enough. To wit, the output from a given source of evidence may be consistent without it containing any true information about the system being targeted. That's why we need a second standard, if not to provide sufficiency for the presence of some (non-trivial) truth content, at least to improve our

²² I imagine that the *ceteris paribus* clause can be discharged by explicitly specifying a small number of qualifications. Here's one. Some processes we deem natural may be chancy – think of the half-life of atoms. We must thus require that the output be the same or sufficiently similar not necessarily at the level of a single datum but at least at the level of an amply large collection of data.

chances of acquiring some such content. The second standard identified here concerns the vital role evidential output plays in our interactions with and predictions of the world. Other things being equal, the output of a source of evidence must be such that, were it utilised, it would help us to successfully interact with and predict the world.²³ Once again, it is instructive to imagine what would happen if our source of evidence did not meet this standard. There would then be no reason to think that the source can teach us, *even in principle*, anything about the world, for we would lose what appears to be the only obtainable hint of the potential veridicality of its output. After all, we are much more likely to successfully interact with and predict the world if the evidence at our disposal has a greater degree of veridicality.²⁴

It should come as no surprise that observation, as a source of evidence, satisfies both of these standards.²⁵ Other things being equal, observations of the same type of target system under the same type of circumstances produce the same or sufficiently similar output. And, other things being equal, observations are such that when utilised they help us to successfully interact with and predict the world. What does this mean for the perspectivist form of underdetermination outlined earlier? It means that, provided no other standards are core to evidence evaluation (and no non-core standards need to be taken into account), those parts of

²³ As with the first standard, I imagine that this *ceteris paribus* clause can also be discharged by explicitly specifying a small number of qualifications.

²⁴ Successful interaction or prediction can of course be driven by non-veridical output. It's just that, other things being equal, the greater the degree of veridicality the higher the chances that the given interactions or predictions will be successful. A notable qualification, by no means the only one, is that we are not restrained from acting on the veridical output.

²⁵ As noted earlier, the claim is not that all instances of observation possess strong epistemic merits, e.g. think of mirages, but that, other things being equal, a randomly selected observation is likely to possess such merits.

representations that deal with observable posits are not up-for-grabs as originally remarked. In such a case the perspectivist form of underdetermination collapses to traditional underdetermination. But suppose that there are core standards other than the ones we already mentioned or suppose at least that there are non-core standards that need to be taken into account. The collapse is avoided only if observation fails to satisfy such standards. Needless to say that to show that this is indeed the case and hence to maintain that their form of underdetermination is truly distinct from traditional forms, the view's advocates must propose and motivate reasonable standards that observation is unable to meet. It remains to be seen whether such standards exist.

The collapse claim is not exactly good news for those who are tempted to champion perspectivism as it is construed in (2). But aside from the issue of the originality of this form of perspectivism, there is also the issue of the truth of the traditional underdetermination thesis, an issue that is a long way from being settled. Indeed, there may be some decidedly bad news in the horizon. The two core standards are satisfied not only by observation in the narrow sense of human perception but also by observation in the broad sense which includes the output of scientific instruments. Supposing for argument's sake that these are the only core standards of evidence evaluation, we are led to choose a determiner that is epistemically stronger than the one employed in traditional underdetermination. As a consequence, the perspectivist-inspired underdetermination does not after all collapse to traditional underdetermination because, if the aforementioned core standards are adopted, the resulting determiner is capable of determining more and hence permits only a weaker form of underdetermination. And since instruments that satisfy the core standards can target features of systems that are unobservable to our unaided senses, this removes a major

obstacle to the acquisition of knowledge about the unobservable world and hence to the potential satisfaction of the threshold condition.²⁶

To make matters worse for the perspectivist form of underdetermination canvassed here, there is the outstanding issue of identifying genuine from non-genuine rival representations. Let me explain. If (2) is going to be true, representations better have genuine rivals. If they do not, i.e. if there is no real disagreement between them, then there is no real underdetermination. A naïve approach to this issue may view incompatibility to be sufficient for rivalry. Quine (1975) laid this approach to rest when he pointed out that we can produce an empirically equivalent but incompatible version of a theory just by switching around all instances of two terms – e.g. electron and positron. Such a theory is of course merely a notational variant of the original, not a genuine rival. A natural question to ask at this point is whether it is always easy to discern mere notational variants of a theory from those that truly diverge in content. In the electron-positron case we can establish the superficiality of the variance between what we provisionally take to be two distinct theories with a straightforward mapping between their posits. The mapping is isomorphic (with meaning preservation) and covers the entirety of both theories, i.e. no posit in either theory remains unmapped. We can think of this type of mapping as a transformation function that changes the names of posits but leaves everything else intact.

²⁶ If the standards are indeed core, then empiricists ought to accept them in which case they need to drop their endorsement of traditional underdetermination and opt instead for the weaker form of underdetermination outlined here. Realists have long been arguing against the narrow construal of observation and indeed of evidence, adding not just the output of instruments into the evidential mix but also a bunch of extra-empirical virtues, e.g. unity, simplicity and explanatory power.

To this type of transformation function we can add another one that is a bit more involved. Realists often like to point out that some theories contain idle posits, i.e. posits that make no direct or indirect contribution to the success of the given theory. Since realists attempt to infer something about the truth content of a theory from its success, they can safely neglect these posits and any statements that make use of them. To be more accurate, since a posit may itself possess some idle and some non-idle features, the realists can safely neglect only those features of a posit that are idle and, as before, any statements that make use of them (see Votsis and Schurz 2012). An analogous move in our context would see us neglect idle posits or idle features of posits in mappings.²⁷ Thus, even though strictly speaking two empirically equivalent theories, at least one of which contains idle posits or posits with idle features, may be genuine rivals, we may find that once we remove the idle parts the theories are isomorphic (and matching in meaning) and hence mere notational variants of one another.²⁸ We can think of this type of mapping as a transformation function that removes the idle parts before making any name changes to the non-idle parts, leaving everything else about the latter intact.

Perhaps there are other, more involved, types of transformation functions that reveal a mere notational variance between theories. If such exist, we can collect them in a class together with the two we already mentioned. Any theories that are empirically equivalent but that cannot

²⁷ Two points seem pertinent here. First, unobservable posits may play a part in the success of a theory, e.g. by contributing to the calculation of specific values of observable quantities that are then shown by independent measurement to be correct or largely so. Second, to check whether this contribution indeed takes place we may remove or replace a given posit from the calculations to find out if the specific values are affected and to what degree.

²⁸ Empirical equivalence can here be understood also in the broad sense of observation.

be transformed into mere notational variants by the functions found in this class qualify as genuine rivals.²⁹ If all theories have such genuine rivals or at least if it is never clear which of them do and which don't, then the realists appear to be in trouble. *Mutatis mutandis*, the same holds for representations.

We can now sum up the main points of this section. *Prima facie*, the form of perspectivism articulated in (2) appears to challenge most of the key claims made by realists. If one digs deeper, however, things are not as clear. Whether the brand of underdetermination in (2) is distinct from more traditional brands depends on what we take to be the core standards of evidence evaluation since these decide what plays the role of the determiner. I suggested two standards that seem absolutely central to evidence evaluation, namely consistent output and help in successfully interacting with and predicting the world. Since observation meets both standards it seems that perspectivist underdetermination collapses to traditional underdetermination. And since it is not a *fait accompli* that the thesis of traditional underdetermination is true, this should give pause to those who think that realism is dead and buried. Far from that being the case, realism can be given a new lease on life with the help of two arguments. The first recognises that the two core standards are met not only by human perception but also by the output of instruments. Provided these are indeed the only core standards of evidence evaluation they lead us to a determiner that, aside from replacing the earlier collapse claim with one that is even more undesirable, is in principle strong enough to satisfy the threshold condition. The second argument raises additional difficulties with the view that there exist genuine rivals to any representation by taking into account the different ways in which representations that appear to be genuinely distinct turn out to be mere notational variants. Neither argument is, of course, decisive in settling the issue of how much underdetermination really exists, but they certainly

²⁹ See previous footnote.

raise the stakes of what it takes to make a compelling case for different versions of anti-realism, perspectivist versions included.

8. A Downright Dangerous Form of Perspectivism

We finish our survey of perspectivist views with a more radical form of perspectivism:

- (3) For any target system Φ there exist genuinely rival representations, each of which encodes the same feature(s) of Φ equally well according to core standards of evidence evaluation, even though Φ is not uniquely structured.

What sets (3) and (2) apart is the clause that target systems are not uniquely structured. In analysing (2) we operated under the assumption that the uniqueness of a target system's structure is not in doubt. Here this assumption is explicitly rejected. The contrary assumption is admittedly difficult to wrap one's head around. Having said this, it is worth considering what would motivate some to endorse it. Here's a passage from Giere who, though perhaps not endorsing it, tries to motivate its plausibility:

It is, I admit, difficult to imagine circumstances in which scientists would feel obliged to limit the maxim of presuming a unique structure behind a given phenomenon. That would require something like concluding that different samples of the same radioactive isotope had different half-lives and that no further explanation of this difference was possible. Nevertheless, this failure of imagination does not justify

elevating the maxim of presuming a single structure to the world to the status of a metaphysical doctrine (pp. 34-5).

And here's another from Frigg, who despite not being an avowed perspectivist, appears to lean the way of Giere:

... a target system does not have a unique structure; depending on how we describe the system it exhibits different, non-isomorphic structures. If a system is to have a structure it has to be made up of individuals and relations. But the physical world does not come sliced up with the pieces having labels on their sleeves saying 'this is an individual' or 'this is a relation'... Because different conceptualisations may result in different structures there is no such thing as the one and only structure of a system (2006, pp. 57-58).

But what does it mean for target systems to lack a unique structure? Well, the straightforward implication is that systems are polymorphous, i.e. they somehow possess more than one structure at the same time.³⁰ To ward off misinterpretation, the point here has nothing to do with the dynamical aspects of target systems. A system may of course be such that it constantly evolves, e.g. the expanding universe. The point rather is that even if we take a small enough time-slice of a system, such that no evolution takes place within it, that system would not possess a unique structure.

³⁰ Perhaps a form of perspectivism can be formulated whereby systems have no structure at all. They are, so to speak, amorphous. I challenge anybody who takes this view seriously to provide a half-decent motivation for it. Also, on the face of it, the view that systems are polymorphous leaves open the possibility that they are panmorphous, i.e. that they possess all possible structures. Again I extend a challenge to anybody who takes this view seriously to provide a half-decent motivation for it.

I expect that, like me, most readers will find this sort of perspectivism hard to digest. To help with the digestion we need an example. Luckily Frigg offers one.³¹ Take the tetrahedron-shaped methane molecule (see Figure 1).

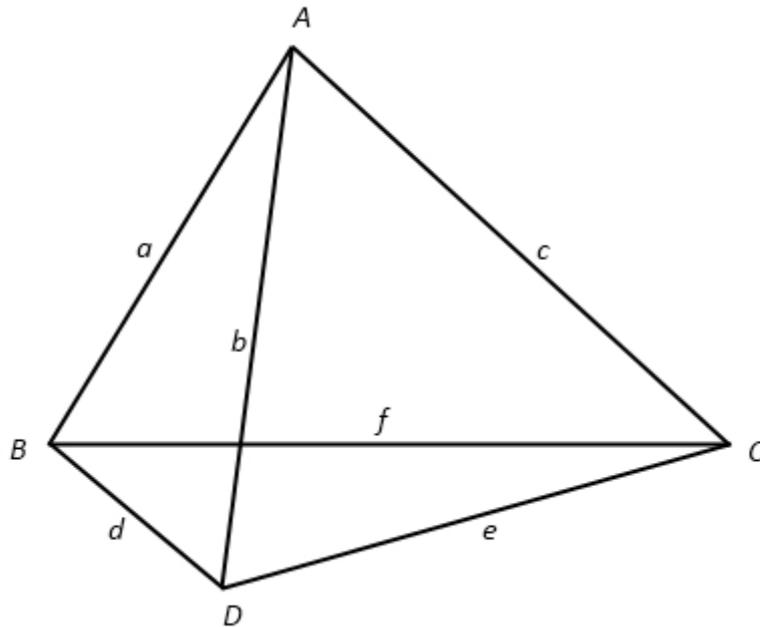


Figure 1. The posited tetrahedron shape of methane molecules.

Frigg correctly notes that the molecule can be represented in two non-isomorphic ways. First, by taking the vertices as the model's objects and the edges as the model's relations, namely $U = \{A, B, C, D\}$, $S_{xy} = \{(A, B), (A, C), (A, D), (B, C), (B, D), (C, D)\}$ where U is the domain of objects and S_{xy} is the relation 'x is connected to y by a straight line'. Second, by taking the edges as the model's objects and the vertices as the

³¹ The example originates with Rickart (1995).

model's relations, namely $U' = \{a, b, c, d, e, f\}$, $Ixy = \{(a, b), (a, c), (a, d), (a, f), (b, c), (b, d), (b, e), (c, e), (c, f), (d, e), (d, f), (e, f)\}$ where U' is the domain of objects and Ixy is the relation 'x intersects with y'.

Frigg's intended victim in that paper is the semantic, and, in particular, the structuralist conception of the representation relation. According to this conception, theories are sets of models or structures and a structure S represents a structure S' of a target system T if and only if S is isomorphic to S' . If, as the example above seems to show, there are two equally good representations of a target system and these are non-isomorphic to one another, then it is no longer the case that we can identify the target system's structure by isomorphism since there are more than one isomorphic mappings to choose from. Beyond its intended victim, however, the example appears to have another victim in sight. Frigg professes that the methane molecule itself has no unique structure. As he puts it, "there is no such thing as *the* structure of methane" (p. 58) [original emphasis]. And he doesn't stop there as he maintains that "this is by no means a peculiarity" of the particular example.³² In fact, he headlines the relevant section of his paper with the description "The Chimera of the One and Only One Structure of Reality". This is a direct challenge to the nature has joints claim. For if nature had joints then presumably its objective categories would form a unique structure.

The first thing to note here is that there is no argument for the view that nature has no joints, that it is not uniquely structured. Rather there is an argument for the view that some – not even most – systems can be given non-isomorphic representations. But this last view is compatible with the view that target systems are uniquely structured. It may, after all, be the case that the source of our inability to provide unique representations is epistemic, e.g. we can never have access to all the information needed to make a choice between non-isomorphic

³² Though to be fair to him it is not clear exactly how prevalent he considers this non-uniqueness of structure to be.

representations. Similar things can be said in reply to Giere. He doesn't argue for the view that non-uniqueness holds but rather tries to motivate the claim that although it is difficult to imagine a polymorphous world that's not sufficient reason to dismiss it. Now it is true that any deficiencies we have in the imagination, intuition or conceptualisation department should not stand in the way of endorsing certain views. Even so, that does not warrant the whimsical endorsement of views simply because they defy the limits of our imagination, intuition or conceptualisation. Besides there are numerous defiant views that are incompatible with each other and they obviously couldn't all hold at the same time.

The second thing to note is that the view that physical systems can be given non-isomorphic representations can be challenged. Let us consider the methane molecule example once more. Methane (CH_4) is a compound molecule with four hydrogen atoms and one carbon atom held together by covalent bonding. In covalent bonding, a compound molecule's constituent atoms bond with each other by sharing pairs of valence electrons. In the case of methane four bonds are created, one for every hydrogen atom bonded to the carbon atom. Thus four electrons from the carbon atom and four from the hydrogen atoms (one from each) are involved, making a total of four pairs of bonded electrons. The geometry of a molecule can be calculated using the successful Valence Shell Electron Pair Repulsion Theory (VSEPR). According to this theory, since electrons have the same charge the bonded electron pairs repel each other. The consequence of four bonded electron pairs trying to stay away from each other is a tetrahedral geometry. Why this is the case is better understood if one considers how one could build a methane molecule by

sequentially adding anion hydrogen atoms to a cation carbon atom.³³ Olmsted and Williams (1997) offer a neat explanation along these lines:

The first anion can approach from any direction. To stay as far away from the first as possible, the second anion approaches from the opposite side of the carbon cation, generating a linear array. The third anion approaches this structure from one side and repels the two existing C – H bonds to make a triangular array. The fourth anion approaches from above or below the plane of the existing bonds and repels the three existing C – H bonds. This converts the triangular array into the tetrahedral shape of methane (1997, p. 366).

Thus if we were to add an additional anion hydrogen atom (and hence create another bond) to the mix the resulting geometry would be an octahedron since the last added atom would be furthest away from the others if it approached the carbon atom from the opposite direction of the second-to-last added anion hydrogen atom. For those interested, the same tetrahedral geometry characterises the phosphate and sulphate compounds since they also have four bonded pairs of electrons.³⁴

In VSEPR the bonded hydrogen atoms occupy the vertices of the tetrahedral shape. Since hydrogen and other atoms are conceptualised as objects in the background theory of the physical sciences, with great explanatory and predictive success one might add, this privileges the vertices-as-objects structure.³⁵ By contrast the edges have no physical

³³ An anion is an atom with net negative charge, i.e. having more electrons than protons. A cation is an atom with net positive charge, i.e. having more protons than electrons.

³⁴ Internal structure then separates methane, phosphate and sulphate compounds.

³⁵ Only a minority of philosophers of science, namely the ontic structural realists, question the view of atoms as objects but then again these philosophers question the very idea of objecthood.

object corresponding to them. Even if we de-idealise the model of an atom, e.g. by conceiving of electrons quantum-mechanically as wavefunctions with certain probability densities, there is still nothing physical corresponding to the edges of the methane molecule's tetrahedral shape. It is thus safe to conclude that the clearly successful background theory of the physical sciences comes down decidedly on the side of the vertices-as-objects conceptualisation. Indeed, more direct evidence in favour of this conceptualisation is on hand. Spectroscopic measurements of methane molecules confirm their tetrahedral geometry, the crucial character of which is that the distribution of mass is detected at the centre (where the carbon atom rests) and at the vertices (where the hydrogen atoms rest) – see Olmsted and Williams (p. 365). The punch-line is that all the indications point to one of the two non-isomorphic structures being the correct one. Thus neither the structuralist conception of the representation relation nor the nature has joints claim appear to be in danger from this example.

Hard-core perspectivists will surely claim that the whole of physical science can be reconceptualised so as to turn the edges of the polyhedral shapes of molecules into objects. Unless this reconceptualisation is actually carried out, I see no reason why we should take this claim as anything more than hand-waving. Indeed, I would like to go further and argue that even if such a reconceptualisation could be realised, it would still leave the realist largely unperturbed. Consider the methane molecule example again. Each of its two models belongs to a different isomorphism class. Now take the class of the two isomorphism classes. That class allows us to put non-trivial constraints on the methane molecule's structural specification and hence to infer something about its structure.³⁶ For example, we can infer that at a surface level of analysis, the compound is composed of either four or six objects. Crucially for the

³⁶ Since the constraints are structural this already takes care of the objection to the structuralist view of the representation relation.

realist, this inference satisfies the threshold condition since the methane molecule is an unobservable posit. And obviously this strategy generalises to other kinds of molecules.³⁷

We can push the envelope even further. The threshold condition would be satisfied even if the world itself were polymorphous, so long as something (non-trivially) true could be said about its polymorphous features. Granted, the satisfaction envisioned in this last scenario would come at the expense of the nature has joints claim and the success cuts nature at the joints claim. But that would just tell us that these two claims are not strictly speaking required by a bare-bones form of realism, paving the way for the adoption of weaker versions of them. For example, it could be maintained that nature has polymorphic joints, i.e. there may be more than one structure that a given system somehow instantiates but each such structure has its own joints. We can see these joints in action, whose existence is independent of the question of whether or not the world is polymorphic, by noting that once some initial ontological choices are made the details of that ontology become fixed or unique. In the case at hand, once we fix our domain of objects, U or U' , we determine the precise shape of the relations, Sxy or Ixy respectively, and vice-versa.

Let us sum up the main points of this section. The form of perspectivism advertised in (3) is intended as a direct challenge to key realist claims including the nature has joints claim. It attempts to challenge that claim by asserting the polymorphic nature of systems, i.e. that they somehow possess more than one structure at the same time. As a potential example of such a system we considered Frigg's methane molecule. The molecule can be represented by means of two non-isomorphic models, one that takes vertices as objects and the other that takes edges as objects. Alas for the perspectivist sympathiser, the

³⁷ Similar manoeuvres can be performed by appeal to the notion of homomorphism. For more on this approach see Bartels (2006).

challenge from this example can be dismissed on the basis that the background theory in physical science as well as direct evidence from spectroscopic measurements provides a clear preference for the vertices-as-objects model. Even if it can be shown that the whole of physical science can be reconceptualised such that the edges of polyhedral shapes of molecules somehow become reified, a claim that is highly suspicious without the requisite demonstration, the realist can still satisfy the threshold condition by being able to assert some (non-trivially) true things about the structure of the given molecules. Perhaps a more convincing case can be made in support of (3), but for now the strong brand of perspectivism it puts forth remains the stuff of fiction. Finally, it was suggested that the realist may still have some wriggle room even in the case that the world turns out to be polymorphous.

9. Conclusion

Over the course of this paper, we had the opportunity to explore silly, innocent, not so innocent and downright dangerous forms of perspectivism. I argued that the first two are nothing to worry the realist about and that the latter two are riddled with problems, casting a long sceptical shadow over their plausibility. Beyond this, I argued that to the extent that the latter two forms of perspectivism contain a grain of truth, there are good indications that under certain conditions they are reconcilable with realism. Of course, this may require some concessions but nothing that would put the beating heart of realism, namely the threshold condition, at stake. That's how one puts realism in perspective, or, if you like, perspective in realism.

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Acknowledgements

I am indebted to the late Bernard Williams whose course at the University of California (Berkeley) on Nietzsche first exposed me to, and got me excited about, perspectivism. I would also like to thank two anonymous referees as well as several of the participants of the Perspectivalism workshop for their fruitful feedback. Moreover, my sincerest thanks go to Erik Weber and Jan Willem Wieland who skilfully organised the workshop at the University of Ghent in January 2012. Finally, I gratefully acknowledge the German Research Foundation (Deutsche Forschungsgemeinschaft) for funding my research into some of the ideas that made their appearance in this paper.

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