Pan-Perspectival Realism Explained and Defended[1]

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Abstract

Conventional scientific realism is just the doctrine that our theoretical terms refer. Conventional antirealism denies, for various reasons, theoretical reference and takes theory to give us only information about the word of the perceptual where reference, it would appear, is secure. But reference fails for the perceptual every bit as much for the perceptual as for the theoretical, and for the same reason: the world is too complicated for us to succeed in attaching specific referents to our terms. That would appear to leave us with a kind of latter day, representational idealism: All we have are representations. I argue that our representations tell us about an independent world without securing reference by showing that the world is very like the way it is represented in a range of different, often complementary modeling schemes. Though never exact, these representations are of something extra-representational because they present the world modally as going beyond what is represented explicitly.

1. Preliminaries. Some terminology: Some reserve the term 'vague'[2] for words that are sorites susceptible. That would leave out clearly vague terms such as 'dead' and 'pregnant'. I will use 'imprecise' for vague in the intuitive sense that does not have this restriction[3]. I will use 'inexact' for terms that are either inaccurate and/or imprecise. 'Precise' and 'exact' are the complementary terms.

Assumption that perception is a kind of or inherently incorporates representation:[4] Perception has the key marks of representation. It transfers

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[1] The present paper is my effort to further articulate the perspectival realism that Giere develops in his (2006).

[2] Use of quotes: I use single quotes to indicate mention of a word or expression. I use double quotes to indicate statements or statement fragments. I also use double quotes as "shudder quotes"

[3] In discussions of vagueness, many use (im)precise as I do. For example, Williamson (1994) uses "precise" as the antonym of "vague" throughout the book.

[4] Burge (2010, pp. 379-419) gives exhaustive arguments summarized in this paragraph.

and facilitates the manipulation of information. Perception is "about" things – it has intentionality. Perception has correctness conditions - perception, just as representation more broadly, can misrepresent. So I will count perception as being a kind of or as inherently incorporating representation. There is a critical contrast with cases more familiarly counted as representation, such as pictures. When perceiving, e.g., a physical object, we don't undergo a perceptual process of perceiving representations of, in the example, physical objects. Rather the representation involved in the experience of perceiving a physical object is an integral component of experience itself.

Method of semantic alter egos:[5] In practice, any sufficiently precise statement will not be completely accurate and so will be false (or fail of presupposition): Consider, for example, "John is six feet tall, precisely". But if a statement is not too inaccurate we can turn it into a statement with no inaccuracy, and so true, by making it sufficiently imprecise: "John is six feet tall, close enough". Conversely, a true imprecise statement, if made sufficiently precise, will become not completely accurate, and so, strictly speaking, false.   I call a false precise statement and its imprecise true counter part, as just illustrated, semantic alter egos. The idea here sketched for statements applies to representation very broadly.

Statement of conventional scientific realism: We have referring terms, such as 'cow' and 'atom'. Realism about cows and atoms is just the claim that 'cow' and 'atom' have referents, or non-empty extensions.[6]

Take home message: Perceptual and theoretical knowledge are in the same epistemic boat with respect to the limitations of model-based knowledge. Each gives us inexact – that is not both completely precise and completely accurate – knowledge of how things are. But these nonetheless count as understanding of how things are (really)[7]

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[5] See my (2011, to appear a, to appear b) for much more detail.

[6] This terse statement ignores some wrinkles that I have smoothed out in my (to appear, d). None of the refinements will affect what is said here.

[7] The parentheses around 'real' flag that the term is, strictly speaking, redundant. It is included nonetheless because it is just such use of 'real' that encourages its mysterious aura. I here follow John Austin's sage advice: If you are confused between a duck and a decoy I can tell you: No, no! THAT is the decoy and THAT is the *real* duck. See Austin (1962, p. 70)

2. Referents and theoretical pluralism. We take ourselves to have independent perceptual access that fixes the extension of 'cow'. (I'll use cows as a running example.) Then for issues of dynamics we can idealize cows as point particles or spheres. ("The spherical cow approach to problem solving involves the stripping away of unnecessary detail…." (Harte (1988, xiii)) There is a way in which we can call this a weak and unproblematic sort of pluralism: For various practical purposes we can describe cows in various simplified, far from completely accurate ways.

But generally for the theoretical,[8] plural approaches are the only access we have. For example, what is the extension of 'atom'? When we talk of atoms, are we discussing the atoms of Democritus? Dalton? Rutherford? Bohr? Contemporary chemical theory?... Some quantum field theorists insist that there are no particles of any kind.[9] From a quantum field theoretic point of view, atoms as individuals are as simplified and inaccurate as spherical cows.

An extension for 'mass' is just as problematic. Is this supposed to be the mass of Newton? of special relativity? In special relativity the distinction between mass and energy breaks down, and in the general theory mass/energy cannot be precisely located. In quantum field theory mass becomes a running "renormalization parameter" that varies with the strength of an interaction.

At least in important cases, having nailed a referent doesn't seem very plausible. At best we approach the world of theory with a pastiche of often complementary modeling approaches. Generally there are important interconnections among these theoretical perspectives: There is a limit relation between relativistic and Newtonian mass. For atoms also there are bridges, but the situation is much more complicated, as it is for the relations between quantum and classical mechanics. Realists would have it that at some point in the development of mature theories reference gets fixed, and further theorizing refines the details of how we understand the properties of these fixed referents. But when we look at cases such as that for terms such as 'atom' and 'mass' such convergence on the properties of a fixed ontology becomes at least

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[8] The exposition in this paper suffers from an obvious "physics bias" for what will count as "theory". I am confident that a great deal of what I say here will apply much more broadly. The theoretical term from economics, 'gross national product' provides a beautiful example. See Hoover, (2001), pp. 80-1 and ch 3 passim. A further limitation is that the argument of this section, and elsewhere, is only by leading examples. A comprehensive treatment is a much larger project.

[9] E.g., see Davies (1984)

controversial.[10]

3. Theoretical knowledge of the world. Despite the difficulties just enumerated the common attitude is to think of ourselves as postulating some ultimate (that is the uniquely correct) ontology that our models approximate in the kind of way that we approximate cows as point particles and spheres. I submit that what we can safely retain from this picture is that, when adequate in practice for some robust domain of phenomena, theory provides sound though imperfect ways of understanding some aspects of the world. In particular, within the domain of any modeling scheme we can use the principle of semantic alter-egos to express ourselves with a terminology that allows conventional tools of reference, including quantification.[11]

To explain how this works in a little more detail, one option is to use true, imprecise statements that operate trouble free as long as they are precise enough for the proposed application. So, taking 'atom' as suitably imprecise, one will count "Material is composed of particles called 'atoms' " as true.[12] But for certain interests in the material world, appeal to atoms falters or fails. It fails outright if the subject is plasmas. How about solutions? Are ionized atoms atoms? Well, only in the way that a sliced up apple still counts as an apple. This is just the point that when used in the spirit of this example 'atom' is imprecise.

Alternatively, we can switch to an idealized precise representation. Statements understood as taking atoms to be very specific kinds of particles will be false, or will fail of presupposition. But they will still function as truths just where the imprecise alter-ego functioned adequately. In particular, for subjects for which the particle idealization is adequate, the tools of reference will serve us well despite the circumstance that their application is operating within what is, strictly speaking, a false idealization.

On this way of presenting the scientific knowledge that we have in practice it becomes apparent that the initial appeal to a postulated ultimate ontology is entirely dispensable. We can retreat, not to atheism, but to agnosticism. With no independent access, as we take ourselves to have in case of ordinary objects of

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[10] I argue this in detail for the case of physical quantities (mass, length…) in my (to appear c) and the case of atoms in my (to appear d).

[11] By "tools of reference" I understand referring terms and quantification that I take to be conditioned by the applicability of identity. See my (2001, 267-9) for discussion of the essential connection between tools of reference and identity. I will elaborate a little more below.

[12] See my (2011, to appear a, to appear b) for a great deal of detail.

perception, the postulation plays no real role in the argument. We conclude: For the theoretical, pluralistic knowledge – knowing the world bit by bit, sometimes in very different, complementary ways, always well enough but never with both perfect precision and accuracy - is what knowing the world *is.*

On this recharacterization, the method of semantic alter-egos applies just as it did before. Using the imprecise side, we are coy about just what atoms are supposed to be while specifying ways of using the term that are effective for a robust domain of phenomena – chemical, statistical mechanical…. Thinking of our theories this way, they give us imprecise truths: material is composed of atoms, water is H_2O, etc.[13] Or we can treat our terms as precise but idealized, with the same rules of application that were in play when thought of as imprecise. The idealizations are effective for those phenomena for which those rules are effective. In particular, where the idealizations do not lead us astray we can unproblematically use the familiar tools of reference though, strictly speaking, we are operating under a false idealization.

To think of our successful theoretical accounts in this dual way we have, in effect, let go of any explicit appeal to an ultimate ontology. We don't have to think of 'atom' as having been attached to specific things but we just haven't yet figured out exactly what they are. Remember, some field theorists think that there are no particles of any kind! On the present way of thinking about theoretical knowledge, it is misguided to maintain that we have access either to an ultimate ontology of atoms (or particles of some other sort, perhaps quarks and gluons) or to an ultimate ontology of fields. Instead we say: In these ways the world is like this idealization, in those ways like that idealization, where the "is like" is precisely what is absorbed into the statements themselves when interpreted with the imprecise side of the semantic alter-ego duality. Chemists know that, when it comes to chemical phenomena, the world is very like one populated by atoms and molecules, Quantum field theorists know that, when it comes to quantum field theoretic phenomena such as superposition of different numbers of quanta, the world is very like one filled with a quantum field.

More below on how to reconcile this attitude with our proclivity for thinking in terms of an ontology.

4. **What we have applied to the theoretical applies, and in the same way, to the perceptual.** In section 2 I used the hedge, *we take ourselves to have*, when I spoke of independent perceptual access to things like cows. But access to objects of perception is just as imperfectly model bound as access to theoretical objects. Let me illustrate with the case of physical objects. I need to be specific: Here I have in mind what I will call, *physical objects, strictly speaking*.

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[13] See my (to appear a, MS page 4) for why "Water is H_2O" is, at best, an imprecise truth.

Physical objects so understood are, or are supposed to be, referents of referring terms to which we need to apply Quine's familiar maxim: No entity without identity! (1957-8, 20) Let's call the rock that I held in my hand on Monday, 'a', and the one you held on Tuesday, 'b'. a=b? For physical objects, strictly speaking, "a=b" will always have a truth value, at least if both terms refer. There will always be a fact of the matter. Or that is the way things are supposed to work. But there will never be any such fact of the matter. Any such would be undermined by the ubiquitous failure of determinate spatial and temporal boundaries. Quantum theories cast into doubt whether there are any identity bearing physical objects at all.

For such reasons we have no access to physical objects, strictly speaking. What has gone wrong is that the world is too complicated for any effort to attach the terms, 'a', and 'b', to any one specific thing. NB! I am not claiming that there are no physical objects, strictly speaking. But if there are, like Lewis's 1,001 cats,[14] the world is complicated beyond our ability to pick out one specific object as the referent of a term as opposed to indefinitely many others. Perhaps there are physical objects, but if so we can't get specific ones attached to our referential terms. Or, perhaps, some other ontology is "ultimately" right. Or – perhaps – we are better off not thinking in terms of some "ultimate" ontology at all.

Yet we do take ourselves to see, we talk about, and we use the tools of reference for physical objects. How does that work? The quick and dirty explanation is that we have (or nature has for us) idealized away the failure for identity to apply. The method of semantic alter egos facilitates a more detailed understanding. On the one hand we can use the physical object language,[15] recognizing it not to be precise, so that we don't expect identity strictly to apply. Is what I held in my hand yesterday the same as what you hold now? Well (for this example, say), yes; but if some philosopher starts asking pesky questions about whether it is the exact same thing that is in question we expect to have to

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[14] Lewis's example in his (1993): There are many prospective referents for 'Tibbles', depending on how many hairs we include in the prospective referent. I reject Lewis supervaluationist solution because it depends on the notion of "appropriate precisification" of a term, which just reintroduces the initial problem and because things are so much more complicated than in Lewis's simple example that we could not begin to specify any plausible range of candidate referents. This was the point of the appeal to quantum mechanics, end of last paragraph. See my (to appear c) for detailed examination of some specific examples.

[15] As the wording is meant to suggest, there are close analogies to Carnap's (1950) "frameworks". My approach builds on Carnap's by working out the repercussions of the imprecision of language.

allow some latitude, some imprecision, when we say "the same". This is the imprecise side of the semantic alter-ego duality. Or we can, equivalently, idealize away the failure of strict identity and use the idealized model of persisting, specific physical objects thought of as the referents of our referring terms. We count this precise but not completely accurate way of thinking about the world as accurate, full stop, because it is accurate enough for just about every purpose outside the philosophy seminar room. This is the precise semantic alter ego.[16]

More below on how nonetheless, or in what sense, this counts as taking physical objects to be real.

Let's consider another case of things we learn through perception, the color of objects. My car is red. Your car is blue. Note that I have, unproblematically, written in a way that attributes colors, such as red, blue,.. as intrinsic properties of the objects that we see. Yet we know from contemporary color science that color phenomena are deeply relational.[17] How does this work? If we hold all but one term of a relation constant we treat the relation as an intrinsic, one place property. Weight provides a familiar example. Strictly speaking, weight is relational: Your weight on the moon is much less than on the earth. But since we use the term so consistently on the surface of the earth we treat the second term of the relation – the body to which we are attracted by gravitation – as constant. As a result we think of and treat weight as an intrinsic, non-relational property. Likewise, though in a much, much more complicated way, for color. Where environmental parameters are sufficiently stable, experience of color likewise gives us colors as intrinsic properties of the objects we see. In so doing our experience has simplified, idealized if you will, a much more complicated situation, but in a way that gets us by just fine in just about every practical way.

The human perceptual system is designed, not to get things exactly right, but to provide simplified, manageable representations that are adequate to our

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[16] The "accurate, full stop" for the precise semantic alter ego corresponds to the truth of the corresponding imprecise cousin, on a sensible way of thinking about truth. Thus this thinking provides an entrée into an account of truth of imprecise statements that is very different from accounts in the contemporary vagueness literature. There is a great deal of work on this approach to truth in my (2011, to appear a, to appear b) and on the repercussions for theories of vagueness in my (to appear b and c)<

[17] And as clearly appreciated by the natural philosophers of the early modern period. See Giere, (2006, Ch. 2) for an excellent survey of this problem. Snowden et al (2012, Ch. 5) provides more detail.

everyday needs. We know a lot in our current (still idealized and not completely accurate) theory of color vision about what goes on when we see colors "out there". Similarly when we see physical objects there is an enormous amount of massaging of the visual input.[18] Throughout our perceptual system the premium is balancing efficiency with getting things right enough for our practical ends.

5. The perceptual and the theoretical are on the same epistemic footing. We can put the upshot of the last section by saying that our perceptual system constructs for us models of an exceedingly complex environment that simplifies enormously, that cuts corners with outright distortions, all in ways that get us by with representations that are accurate enough generally to meet our practical needs. All this can again be summarized using the duality of semantic alter egos. Our perceptual system constructs for us representations of which we can say that they are simplified idealizations that yet tell us accurately enough the things we need to know about our environment; or, equally, we can say that the world is sufficiently like the ways our perception represents it in respects that matter to us to meet our practical needs. The prior formulation gives us false, "accurate enough" idealizations; the latter imprecise truths about what the world is like.

Through the eyes of section 2, the perceptual and the theoretical appeared to be on an entirely different epistemic footing. For the theoretical we have no independent access to the purported referents of theoretical terms. We have only the plural accounts, what the world is like, what this modeling technique gives us in these respects, like what that modeling technique give us in those respects. So we postulated an ultimate ontology, but then realized that such an ultimate ontology played no role in the argument so that talk of an ultimate ontology could be left aside. For the perceptual we thought we had independent access to the needed referents – the objects of perception. But in section 4 we discovered that perception is itself inexact model bound. When it comes to fixing reference, the perceptual fails as completely as does the theoretical.

As a result we see that conventional anti-realism is based on a mistake. It took for granted that we can be conventional realists about objects of perception and use that as an instrumentalist platform for the theoretical: theories were said to provide guides to the (real!) world of the perceptual but not otherwise to tell us what there is or how things work. But the instrumentalist platform of objects of perception collapses. It suffers the same fate as the theoretical. If as the antirealists urge, the theoretical, with no independent access to what is described by our inexact models, gives us no knowledge of what those models are about,

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[18] The classic source for this kind of theory of human vision is Marr (1983). See Snowden et al (2012) for a contemporary survey.

perception also gives us no knowledge and we know nothing. We had better turn this thinking around[19] and conclude that the theoretical does give us knowledge, qualitatively on the same footing as the knowledge we plainly get at the level of perception.

This diagnosis illuminates what has gone wrong with worries about a perceptual/theoretical divide. We know that any such distinction is extremely fluid, a fact that is a fatal, though generally ignored, problem for conventional anti-realism. It is a virtue of the present diagnosis that it entirely sidesteps this issue. Conventional anti-realism requires an in-principle difference in epistemology for the theoretical and the perceptual. Such a difference would provide the needed boundary between the two. The present account not only does not need such a boundary, it explains why there is none to be had. Both levels work by giving us a panoply of what things are like, with no independent reference fixing mechanism. Contropositively, that we move so fluidly between many cases of what counts as theoretical and what counts as perceptual is a symptom of the epistemological confluence that the present account outlines.

6. Are we then left with a representational idealism?[20] Does the foregoing show that all we have are representations, the representations provided by theory together with the representations constituted by perception? A kind of latter day representational idealism?

No, or at least not if "representational idealism" is understood as "just one representation (idea) after another". That would neglect the intricate structure that the world presents to us. This is a central reason that the sense data theory failed.[21] We can't reduce physical object talk to talk about representations. Our experience of physical objects can't be understood as a sequence of picture-like representations, like a catalogue of photos in *A Photo Tour of Chicago*. (Heeb et. al., 2005). Postulation of physical objects is required for the coherence of experience. Our experiences is shot through with potentiality, what would

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[19] Yes, in this and a great many other ways, the present account is deeply Kantian.

[20] The following owes enormously to discussions with Bas van Fraassen (whom I have not at all persuaded.)

[21] One wonders if there may here be a thoroughgoing connection with Kant's refutation of idealism that depends not just on our awareness of the temporal ordering of past experiences but on the causal laws from which observed regularity arise. See just below for connection with physical possibility. I am not aware of any discussion of this suggestion in the literature and am not myself competent to elaborate or evaluate it.

happen if you looked at an object from another angle, if you picked it up….[22] An adequate theory of perception of physical objects must be understood as a complex symbolic process involving efferent as well as afferent considerations.[23]

We have to work with a postulation of external physical objects. Traditionally, this is taken to show that physical objects are real. The present alternative suggestion is that treating the world with the idealization of physical objects gets an excellent grip on much that we care about that we would otherwise miss.

Let me expand on my claim that there is a middle ground between restricting ourselves to percepts, sense data, or the like; vs. supposing that in perception we have identified discrete objects of reference about which one can always ask, is "this one" the very same object as "that one". Just as we postulate, for example, atoms, nature sets us up as postulating physical objects. That is, in theorizing we operate with a model building scheme that includes a referential structure with the term "atom". Likewise, nature builds us with a model building scheme that operates with representations with the form of having specific things as referents, for example "The Eifel Tower" or one or another corresponding percept or idea. Both the theories we construct and the schemes that we develop in experience take things like "atom", or ones idea of the Eifel Tower as open-ended nodes with complicated and evolving connections with like referential nodes. Focusing now exclusively on the case of our ideas of physical objects, nature equips us with expectations for related perceptual experiences when perceptual conditions are altered, expectations that are further enriched as our store of experiences expands. The connections are not at all limited to actual or anticipated experience but becomes increasingly embedded in a complex store of knowledge Thus we have much more than one percept after another. We have a fabulously rich store of interconnections between actual, prospective, and possible shifts in circumstances and more broadly with other ways in which we think about the world.[24]

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[22] This is the point of possible contact with the role of laws in Kant's refutation of idealism, given the intimate connection between laws, on the one hand, and possibility and potentiality on the other.

[23] See Noë (2006) for a thorough exposition.

[24] Strictly speaking, the foregoing paragraph is speculation that, however, demonstrates by example that there is a possible middle ground between a referential ontology of physical objects with strict identity conditions, on the one hand, and an idealism of percepts, sense data or the like on the other. However, it is to be added that it is easy to see material such as that presented in the references of notes 18 and 23 as ways of filling in my sketch.

All this gets encapsulated by thinking in terms of concrete objects of reference – identity bearing physical objects. There are two sides to this encapsulation that we must bear in mind. On the one hand, when we look closely enough we discover that it is a simplification of a still more complicated reality. On the other hand, the fact that this way of thinking about things works for us with such fabulous reliability grounds the attitude that such constructions[25] count as a grip on the word independent of us, a grip that counts as a representation that is richly accurate in respects that are important to us. Following Goodman (following Kant), yes, we make our world. But we can't make just any world. The constraints on the world we make are so extreme that, once made, the made world counts as an excellent account of how things are independent of us.

But do physical objects exist?? If "physical objects exist" means "Just as in our idealizations" the answer is "no". But if "physical objects *don't* exist" is understood as "physical objects are an illusion hiding behind some entirely different ontology such as deceiving demons," again, "no". Let me give a simple, stylized example that will illustrate, in its own idealized way, how thinking in terms of idealized physical objects can function to present information about the world in a very faithful way.   The example is a kind of "proof of concept" illustration, not a concrete proposal for how things actually work.

Suppose a simple world that is a plenum, filled with continuous "stuff". This stuff is distributed continuously but with wildly varying density. Some places are almost a complete vacuum. In certain spatial volumes there is a much higher density that have continuous but very steep gradients at the boarders. These volumes of stuff can move around – in particular we can move them around. For almost any practical purpose in such a world nothing is lost with the simplifying idealization of imagining discontinuous boundaries that would enable the applicability of identity. These would be the idealized physical objects. Within small margins it makes no practical difference where these boundaries are supposed. This simplification gets almost anything we care about "right enough".

In the real world nature sets us up, as an integral aspect of experience, to model the world as populated by physical objects. In the spirit of the example, while nature's model is far from exact, it is "right enough" in respects that matter to us to count as knowing about how things are (really!)

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[25] While the view has constructivist elements, these are Neo-Kantian, not anything like contemporary social constructivism. They are Kantian in their attitude towards, in Kantian terms, the phenomena. They are Neo-Kantian in that they are not assumed to be ~~fixed~~ unalterable or in any way tied to any a priori analysis of the nature of reason or perception

In these respects the theoretical is on a par with the perceptual. Models are not "freeze-frame", picture-like representations of the actual. They involve intricate complexes of the counterfactual, of the potentiality for other ways things will be or might have been.[26] To cover these we can't work effectively by treating theory as a sequence of descriptions or picture-like representations. Every bit as much as the perceptual, successful models on the theoretical side of things must be thought of as faithfully reflecting an independent world with a range of constructed ontologies that give us a mock up of how things work that is simple enough for us to grasp.

A salient difference: in the case of the theoretical nature does not set us up with a preferred modeling scheme from which, as in the case of perception of such things as physical objects and colors, it is very hard to move one's attention. But in the present context this difference is irrelevant. For both the theoretical and the perceptual we are concerned with systems that are successful for a robust range of phenomena of importance to us, thereby giving us an excellent grip on the way the world is.

7. Pan-perspectival realism. In the respects explained, the theoretical and perceptual are on the same (inexact) footing. This is the *pan*. Both give us various always not completely exact knowledge of the world. This is not in principle but in practice because the world is far too complicated for us to get things exactly right. We get more knowledge by using a variety of models or modeling schemes, often complementary, each giving us understanding from one or another "angle". This is the *perspectival*.[27] When successful, a perspective can give us robust, though not exact, understanding of some domain of phenomena, adequate to some practical and/or theoretical ends. This counts as knowledge of how the world is (really). This is the *realism*.

References

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[26] This is where the lawlikeness of science is embedded. For an examination of the close relation among models, regularities, and laws as traditionally conceived see my (2004)

[27] Giere: "According to this highly confirmed theory (or reliable instrument), the world seems to be roughly such and such. There is no way legitimately to take the further objectivist step and declare unconditionally: 'This theory (or instrument) provides us with a complete and literally correct picture of the world itself'." (2006, p. 6)

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