

# COMMON-SENSE REALISM AND THE UNIMAGINABLE OTHERNESS OF SCIENCE

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## Abstract

*Bas van Fraassen endorses both common-sense realism — the view, roughly, that the ordinary macroscopic objects that we take to exist actually do exist — and constructive empiricism — the view, roughly, that the aim of science is truth about the observable world. But what happens if common-sense realism and science come into conflict? I argue that it is reasonable to think that they could come into conflict, by giving some motivation for a mental monist solution to the measurement problem of quantum mechanics. I then consider whether, in a situation where science favors the mental monist interpretation, van Fraassen would want to give up common-sense realism or would want to give up science.*

## 1. The Potential Tension

Bas van Fraassen is a common-sense realist:

Constructive empiricism is set squarely within a common sense realism that was foreign to much of the empiricist tradition. . . . The common basis I assume is language in which reference is unproblematic to trees and mountains, people and books . . . (van Fraassen 2003, p. 479)

What van Fraassen is getting at is that he holds that the everyday macroscopic objects that we think exist actually do exist. He rejects skeptical hypotheses: he does not think that he is being deceived by an evil demon; he does not think that everyday objects are a figment of his imagination; he does not think that he is a brain in a vat (even a recently envatted brain).

Van Fraassen also takes science seriously — he recognizes that science can give us new knowledge about the world (just not the unobservable aspects of the world). Recall his statement of constructive empiricism: it holds in part that “Science aims to give us theories which are empirically adequate”, where (roughly) “a theory is empirically adequate exactly if what it says about the observable things and events in the world, is true” (van Fraassen 1980, p. 12). Commentators generally emphasize the anti-realist aspects of van Fraassen’s beliefs about science,

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where he holds that science does not aim to give us truths about unobservable aspects of the world. But what I want to focus on in this paper is the *realist* aspect of van Fraassen's beliefs about science. He holds that science does aim to give us truths about observable aspects of the world.

I want to raise two questions about this. First, could science suggest that the observable aspects of the world are such that common-sense realism is false? If so, how should a constructive empiricist like van Fraassen handle this?

Let's start with an easier question: how would scientific realists handle this? As van Fraassen defines it, scientific realism holds in part that "Science aims to give us, in its theories, a literally true story of what the world is like" (van Fraassen 1980, p. 8). Note that the official doctrine of scientific realism does not settle the question of whether scientific realists would actually favor science over common-sense realism — it is simply a claim about the aim of science, not about what we should actually believe. Nevertheless, it's part of the scientific realist stance to take what science tells us about the world seriously. Scientific realists would be inclined to favor the pronouncements of science over the pronouncements of common sense, even when the pronouncements of common sense are fundamental ones about the nature of the everyday world around us.

Now, let's turn to the question of how van Fraassen should deal with the possibility that science could tell us that common-sense realism is false. Van Fraassen is inclined to be more skeptical than the scientific realists are regarding the pronouncements of science:

[some metaphysical concepts] pale beside the unimaginable otherness of closed space-times, event-horizons, EPR correlations, and bootstrap models. Let realists and antirealists alike bracket their epistemic and ontic commitments and contribute to the understanding of these conceptual enigmas. But thereafter, how could anyone who does not say *credo ut intelligam* ['I believe so that I may understand'] be baffled by a desire to limit belief to what can at least in principle be disclosed by experience? (van Fraassen 1985, p. 258)

Here we see van Fraassen being skeptical regarding the pronouncements of science regarding these "unimaginable" aspects of reality. But there is an implicit assumption in van Fraassen's discussion here. Van Fraassen is assuming that the unimaginable aspects of reality are not disclosed by experience. He clearly has in mind *direct* disclosure by experience; he does not think that the indirect evidence scientific realists cite for event-horizons, for example, counts as the event-horizons being disclosed by experience. In other words, van Fraassen is assuming that the unimaginable aspects of reality are not *observable*.

But in principle, this need not be the case. Science could end up developing in such a way that it has unimaginable consequences for what we observe. More precisely, the majority of scientists could end up endorsing a theory which entails that common-sense realism is false. What I would like to do in the remainder of this paper is, first, to suggest one way that science could end up developing this way, and second, to discuss what a constructive empiricist like van Fraassen might want to say about this possibility. I will argue for the first point in some detail, because it is important to establish that this possibility is a live option given contemporary science — this makes the discussion of the second point more than just purely academic.

## **2. Mental Monism as a Solution to the Quantum Measurement Problem**

The quantum-mechanical measurement problem arises because the standard quantum dynamics (the Schrödinger equation) and the standard quantum semantics (the eigenstate-eigenvalue link) make predictions about systems that seem to be incompatible with our experience. It is often said that, in order to solve the measurement problem, either one must modify the standard dynamics (as is done by GRW theory, for example), or one must modify the standard semantics (as is done by modal interpretations, for example). Dualistic interpretations, however, modify neither the standard dynamics nor the standard semantics. Dualistic interpretations solve the measurement problem by postulating the existence of non-physical minds, and by giving a dynamics for these minds which ensures that the probabilities for experiences of measurement outcomes match our experience. Dualistic interpretations have been postulated by David Albert and Barry Loewer (1988), as well as Euan Squires (1990). I will briefly describe these dualistic interpretations, and then I will argue that the interpretations are better viewed as supporting not dualism, but mental monism.

According to the standard dynamics of quantum mechanics, a brain can, for example, end up involved in a superposition, where in one branch of the superposition the brain has the physical structure correlated with the experience of an alive cat, while in the other branch of the superposition the brain has the physical structure correlated with the experience of a dead cat. According to the standard semantics (i.e. the eigenstate-eigenvalue link) the brain is neither in the state of experiencing the alive cat, nor in the state of experiencing the dead cat. Unlike all other solutions to the measurement problem, dualistic interpreta-

tions hold that the standard dynamics and semantics of quantum mechanics give the correct state of the physical universe. The key move dualistic interpretations make is to hold that this is not a *complete* description of the universe. In addition to the physical universe, there exist non-physical minds which always have definite, non-superposed beliefs.

Albert and Loewer's single-mind interpretation holds that for each observer there is a single non-physical mind. These minds evolve in such a way that the probabilities for the experiences they have are given by the standard probabilistic rule of quantum mechanics, Born's rule. Albert and Loewer specify, though, that each mind in existence evolves independently. This means that you could look in the box and have the experience of the cat being dead, while I could look in the same box and have the experience of the cat being alive. When I see that the cat is alive, and ask you what you saw, I will hear you say that the cat is alive, but in fact that testimony isn't associated with a mind; I'm speaking to (in Albert and Loewer's terminology) a "mindless hulk."

To avoid this unhappy consequence, Albert and Loewer prefer the *many-minds* interpretation to the single-mind interpretation. Here, each observer is associated with an infinite number of minds, where each mind evolves independently, in accordance with Born's rule. This *probably* solves the mindless hulk problem — there is a probability zero chance that one is ever interacting with a mindless hulk, because (going back to our previous example) there is only a probability zero chance that each mind will evolve in such a way that it has the experience of a dead cat. Note, though, that it is not impossible that one is interacting with a mindless hulk — just as it is not impossible that a fair coin can be flipped an infinite number of times and land Heads every time (setting aside issues about whether it is possible to flip a coin an infinite number of times). Also, in addition to not completely solving the mindless hulk problem, the ontological profligacy of the many-minds interpretation is unappealing.

For these reasons (and others), I prefer Squires' dualistic interpretation to both the single-mind and many-minds interpretations. Squires' interpretation is like Albert and Loewer's single-mind interpretation, with the emendation that the minds evolve in a correlated fashion. In other words, all the minds are associated with a single branch of the universal wave function of the universe — so if my mind has the experience of the cat being alive, your mind will also have that experience.

Now, we come to a key point. I want to argue that the most natural ontology for these interpretations turns out to be not dualism, but mental monism. Any physical state of the universe does no work in the dualistic interpretations. Men-

tal states do not supervene on, or emerge from, physical states. Interactionist dualism is false, because there is no interaction between the physical and the mental: the quantum state evolves in accordance with Schrödinger's equation, while minds evolve in accordance with some incompletely specified mental dynamical equation. One can obtain evidence that the physical state of the universe is irrelevant to dualistic interpretations by noting that proponents of dualistic interpretations do not bother to specify a semantics for the quantum state; they do not say what the physical ontology of their interpretation is. (Because of this I have taken them to endorse the standard semantics of quantum mechanics, the eigenstate-eigenvalue link, but nothing hinges on this.) Intuitively, we believe that the physical state of the universe is relevant to what mental states people have: we think that the reason a competent observer believes that a particle is  $x$ -spin up (for example) is that the particle really is  $x$ -spin up, or at least that the pointer on a good measuring apparatus points to 'up'. On the single-mind and many-minds interpretations with the standard semantics, though, that need not be the case: the observer will believe that the particle is  $x$ -spin up and that the pointer points to 'up', but if the particle isn't in an  $x$ -spin eigenstate, those beliefs are false.

It is true that the quantum state is relevant to the evolution of mental states; the probabilities for the evolution of mental states supervene on the quantum state. But I maintain that this does not give sufficient evidence that the quantum state corresponds to something physically real. One can instead take the quantum state to be part of the dynamical equation for minds. The dynamical equation for minds would then establish the probabilities for the evolution of mental states.

I will now consider an objection to that proposal. The objection begins by stating that, according to the proposal, the dynamical equation for minds would constitute the fundamental law of nature, but that law of nature would change with time, corresponding to the change of the quantum state with time. The objection maintains that laws of nature are meant to hold for all time, not to change over time.

My first reply is that this objection assumes that there are laws of nature, but this position has been cogently if controversially argued against by van Fraassen (1989). My second reply is that, perhaps laws of nature do exist, but perhaps it turns out that laws of nature do after all change with time. If that is what our best physics tells us about laws of nature, then that is the philosophical view we should accept.

For those who reject the first and second replies, my third reply is that it need

not be the law itself which changes over time. The law can simply incorporate a free parameter corresponding to the quantum state, and the value of that parameter can change with time. One may object to the proposal in the third reply by pointing out that it is meaningless to talk about this free parameter changing if nothing in the world corresponds to the change in parameter. In reply, one can postulate the existence of a property of the mental world as a whole, or of some part of the world, such that the value of that property corresponds to the value of the parameter in the dynamical equation for minds.

I conclude that, on the dualistic interpretations, the physical world is otiose. Thus, there is not sufficient reason for proponents of these interpretations to postulate the existence of the physical world; the most reasonable ontology of these interpretations is not dualism, but mental monism.

### 3. Implications for Common-Sense Realism

Even if I am wrong to hold that the most reasonable ontology for these interpretations is mental monism, I hope to have at least shown that mental monism is *a* reasonable ontology for these interpretations. Thus, I hope that I have shown that mental monism is a live option for how to best understand quantum mechanics.

If mental monism is true, then common-sense realism is false. At least, this is the position I hold — someone like Berkeley would disagree. Berkeley holds that his idealist view (where all there are are minds) is nevertheless a common-sense view — Berkeley holds that common sense isn't committed to there being things made of matter. Here is a brief argument against Berkeley's view. One normally thinks of tables and chairs as being mind-independent objects — or at least, the stuff that composes the tables and chairs exists in a mind-independent way. To say that all there are are minds thus either entails that tables and chairs don't exist, or requires a radically revisionary account of what tables and chairs are. Without the details of such a radically revisionary account, it seems that reference to tables and chairs (and trees and mountains) is problematic, contrary to van Fraassen's understanding of common-sense realism. One way to see that reference is potentially problematic is to consider whether, under the assumption that mental monism is true, you and I can refer to the *same* table. Given that the table is (at best) an idea in our minds, what establishes that you and I have the same idea, and hence are referring to the same table? While there is potentially a lot to be said here, what I have said at least gives the flavor of how the debate

would occur. Henceforth I will assume that mental monism is in conflict with common-sense realism.

Given that mental monism is a live option for how to understand quantum mechanics, what should someone like van Fraassen, who endorses both constructive empiricism and common-sense realism, say? Should van Fraassen recognize that common-sense realism might be false? Or should van Fraassen reject the possibility that mental monism is true?

Note that van Fraassen cannot use his scientific anti-realism to reject mental monism, since van Fraassen is only a limited anti-realist about science. For people who are *complete* anti-realists about science (like instrumentalists), the tension between science and common sense is easily resolved — science doesn't tell us truths about the world, so we should stick with common sense. But van Fraassen isn't a complete anti-realist — he thinks that science aims at truths about the observable world. Since mental monism entails various truths about the observable world (truths at variance from what's entailed by common-sense realism), it seems that van Fraassen has to take the mental monist picture seriously as potentially giving a correct scientific description of the observable world.

My personal opinion is that one should admit that it is possible that mental monism is true, and hence one should admit that it is possible that common-sense realism is false. I endorse this line of thought because I think that skepticism is possibly true — I think it's possible that I'm being deceived by an evil demon; I think it's possible that I'm a brain in a vat. My position is that one can make comparative probabilistic judgments here, and it is reasonable to assign a low probability to the mental monist hypothesis, and the other skeptical hypotheses. (I also grant that it can be reasonable to assign a high probability to the mental monist hypothesis, as long as one's other opinions are structured accordingly. I, like van Fraassen, am sympathetic to many aspects of subjective Bayesianism.)

But what does van Fraassen think? Brief personal communication did not yield a definite answer. From his published writings, one can gather reasons to think that van Fraassen would want to admit the possibility that common-sense realism is false, but one can also gather reasons to think that van Fraassen wants to take common-sense realism as an unrevisable aspect of his epistemology.

Here is evidence that van Fraassen would admit the possibility that common-sense realism is false. Van Fraassen suggests that even simple perceptual judgments are not infallible: "even in endorsing a simple perceptual judgement, . . . I am sticking my neck out" (van Fraassen 1980, p. 72). It is clear from context that this "sticking one's neck out" analogy refers to going beyond what one is epistemically certain of. It seems from this passage that van Fraassen would admit that

a simple perceptual judgement, as of a tree or mountain, is potentially revisable. It is worth noting that van Fraassen here is probably just talking about individual perceptual judgements, such as when one misperceives a stick as a snake. However, this certainly raises the possibility that perceptual judgements tout court are revisable.

There are other places though where van Fraassen talks of common-sense realism as a basic starting point that should not be given up. For example, he writes:

we can and do see the truth about many things: ourselves, others, trees and animals, clouds and rivers — in the immediacy of experience. (van Fraassen 1989, p. 178)

This makes it sound like we know that common-sense realism is true, and *outré* considerations from quantum mechanics cannot lead us to give that up.

Here is more evidence that van Fraassen treats common-sense realism as an infallible starting point — though there is some ambiguity, as I will discuss. Consider this recent passage:

Common-sense realism, and a rejection of the demands posed by traditional metaphysics and ‘defensive’ epistemology, are not themselves part of a special philosophical position, but just a refusal to submit to contrived, unrealistic demands. Common-sense realism is enough, no metaphysics is needed, to reject sceptical problems. (van Fraassen 2007, p. 371)

In this passage van Fraassen seems to be treating common-sense realism as a basic starting point, not subject to revision — any request for revision is contrived and unrealistic. But van Fraassen goes on, just after the quoted passage, to perhaps temper this a bit:

We have the ever constant task of managing our opinion, but always as already at sea, starting from where we are. True: when doubts arise, reliance on our own opinion is definitely a decisive attitude, and subject to self-scrutiny. Critical reflection on what we have is in order as well, but for that too we must and do rely on resources we count as reliable though defeasible: our memories, the testimony of others, new experience in settings we seek or construct to test our ideas. (van Fraassen 2007, p. 371)

I am not completely sure what to make of this second passage: I'm not sure whether it's legitimate to read it as tempering the strong adherence to common-sense realism that is found in the first passage, or if it is taking up a different issue. I include the second passage in part to ensure that I am not quoting the first passage out of context. I also include the second passage to highlight van Fraassen's remark that we rely on defeasible resources. Even if van Fraassen did not intend this, perhaps this passage can provide justification for the idea that common-sense realism itself is a defeasible resource.

The aim of my paper has been to highlight a potential tension that has not been appreciated before, the potential tension between common-sense realism and an adherence to what science says about observables. The aim of this paper has not been to resolve the tension. Thus, I leave van Fraassen (and the reader) with a puzzle: what should one do if common-sense realism and science come into conflict?<sup>1</sup>

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## Keywords

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### Resumo

*Bas van Fraassen apoia tanto o realismo de senso comum — aproximadamente, a concepção de que os objetos macroscópicos ordinários que supomos existir realmente existem — e o empirismo construtivo — aproximadamente, a concepção de que o objetivo da ciência é a verdade acerca do mundo observável. Mas o que acontece se o realismo de senso comum e a ciência entram em conflito? Afirmo que é razoável pensar que poderiam entrar em conflito, dando alguma motivação para uma solução monista mental ao problema da mensuração na mecânica quântica. Então considero se, em uma situação em que a ciência favoreça a interpretação monista mental, van Fraassen iria abandonar o realismo de senso comum, ou se preferiria desistir da ciência.*

### Palavras-chave

Bas van Fraassen, mecânica quântica, monismo mental.

### Notes

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