

# Scientific Realism and Basic Common Sense

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## Scientific realism

For the scientific realist, the aim of science is to arrive at the truth about the world. Scientific progress consists in progress toward that aim. The world that science investigates is an objective reality that exists independently of human cognition. We interact with the world by means of action, but we do not create it. Nor does the world depend on human mental activity.

The result of successful scientific inquiry is knowledge. Scientists discover facts about unobservable entities whose behaviour is responsible for that of observable entities. They propose theories which refer to unobservable entities in order to explain observed phenomena. Empirical evidence provides reason to believe that theories which refer to unobservable entities are true. Scientific knowledge is not restricted to the realm of the observable. It extends to the underlying nature of reality by identifying unobservable causes of observed phenomena.

## **Eddington's tables**

The realist position that I have just sketched reflects an attitude of epistemic optimism. According to scientific realism, science produces knowledge of an independently existing world. As science progresses, it increases the amount of truth that is known about the world. While allowing that science is fallible, the realist endorses a robustly anti-sceptical view of science.

But while realism provides an optimistic assessment of scientific knowledge, an important question remains about the nature of such knowledge. Is science an extension of common sense, or does the advance of science lead to the overthrow of common sense by scientific theory?

To bring the question into focus, I will use a famous example due to Arthur Eddington. Eddington began his Gifford lectures in the following terms:

I have settled down to the task of writing these lectures and have drawn up my chairs to my two tables. Two tables! ... One of them has been familiar to me from earliest years. It is a commonplace object of that environment which I call the world ... It has extension; it is comparatively permanent; it is coloured; above all it is substantial ... Table No. 2 is my scientific table ... My scientific table is mostly emptiness. Sparsely scattered in that emptiness are numerous electric charges rushing about with great speed ... There is nothing substantial about my second table. It is nearly all empty space ... my second scientific table is the only one which is really there - whatever 'there' may be.<sup>1</sup>

Eddington's words, the "scientific table is the only one which is really there", suggest that the solid table of common sense does not in fact exist. Only the insubstantial "scientific table" is real. Thus, the example of Eddington's table is a case in which science overthrows

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<sup>1</sup> Eddington, 1933, xi-xiv.

common sense. The table of science is real. The table of common sense is an illusion to be eliminated by science.

Eddington may be right that there is a conflict between the scientific and the commonsense *descriptions* of the table. But the contrast between two tables is misconceived. There is only the one table that is revealed in ordinary experience. The nature of the table may be explained by science. Indeed, the scientific explanation of the solidity of the table may displace the explanation provided by common sense. But Eddington's "scientific table" is the very same table as the table presented by common sense. There is no further scientific table in addition to the table of common sense.

### **The ambiguity of 'common sense'**

Unlike Eddington, I wish to preserve common sense. Science goes beyond common sense, but does not discard it. Rather than overthrow common sense, science explains it. Common sense provides our grounding in the world. It is the foundation upon which scientific realism rests.

But the notion of common sense is ambiguous. I say that science goes beyond common sense and that common sense provides a foundation for scientific realism. This may be understood in different ways depending on how common sense is understood. To avoid misunderstanding, I will now seek to clarify the notion, starting with what I do not take common sense to be.

Common sense is sometimes taken to be practical skill. Tradesmen and technicians have different practical skills. But common sense is more basic than any specific practical skill. It is shared by those who possess different practical skills. Indeed, it is shared by those who lack practical skills.

Common sense is sometimes identified with beliefs that are widely held within a culture. No doubt, commonsense beliefs *are* widely held within a culture. But there are many widely held beliefs that are not commonsense. Throughout history, people have been committed to a variety of beliefs that defy common sense. So common sense cannot be the same thing as widely held belief.

By contrast with practical skill and widely held belief, I wish to focus on a more basic form of common sense. David Armstrong speaks of “bedrock common sense”.<sup>2</sup> Alan Musgrave has suggested to me that the expression “instinctive belief” may be more appropriate than ‘common sense’. Whatever form of words we adopt, I wish to speak of a basic form of common sense that is distinct from practical skill and widely held belief. I will call it “basic common sense”, though I shall often just say “common sense”.

### **Common sense and commonsense realism**

The idea of common sense trades on two different meanings of the word ‘sense’. We can use the word ‘sense’ to speak about the sensory modalities, such as sight, hearing or smell. But equally it may be used to signify sound practical judgement, as in having good sense.

Common sense is typified by our unreflective awareness of the world around us, and by the routine way in which we deal with objects in our immediate vicinity. Observation and knowledge derived from observation play a central role in common sense. But common sense goes beyond mere observation. It is common sense to believe that ordinary objects do not disappear while we are asleep and reappear

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<sup>2</sup> Armstrong, 2004, 27.

just as we awake, though this is not something that we could observe to be the case.<sup>3</sup>

Realism about the everyday world is part and parcel of common sense. The world of common sense is a world of material objects of all shapes and sizes, with a multitude of properties. We acquire more or less immediate knowledge of such things by means of our sensory experience of those objects.<sup>4</sup> The material objects that we encounter in everyday experience are independently existing things with which we interact causally by means of bodily movement and action. But though we interact with such objects, they lie beyond the control of our minds. Mere thought alone cannot bring about change in the world of objects. The commonsense world is also a world in which misperception and illusion have their place in the ordinary course of events without giving rise to scepticism. A robust sense of reality provides us with a reasonable degree of practical certainty that things are by and large as they appear to us.

Common sense gives rise to a body of beliefs about the objects in our environment, the nature of our interactions with these objects,

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<sup>3</sup> Equally, it is common sense to disregard such sceptical scenarios as being brains in a vat, or deceived by an evil demon or created *ex nihilo* five minutes ago, though we could not show such scenarios to be false by empirical test. In my view, such commonsense rejection of scepticism about the external world may be upheld on broadly naturalistic and Moorean grounds. But as my main concern in this paper is the relation between science and common sense, I will not pursue the issue of scepticism about the external world in greater detail in this context.

<sup>4</sup> At this point, the question may arise of whether there is anything more to common sense than belief arrived at on the basis of direct perceptual experience of objects in our immediate vicinity. In my view, common sense is more than perceptual belief and is not to be identified with such belief. In addition to belief derived from experience, common sense involves an attitudinal component which is manifest in the way we interact with the ordinary objects in our immediate environment. Common sense is imbued with a thoroughly realist attitude to the everyday world, and is not restricted to the dictates of immediate sensory experience. I make this point in response to a referee who presses for a more positive delineation of what I take to be involved in basic common sense.

and the means by which we may acquire knowledge of such things. On the whole, we may assume that this body of beliefs is true. This is not because commonsense beliefs are guaranteed to be true. Like all beliefs, they are fallible. But they have a strong presumption in their favour. Common sense has a prior claim on our belief. Beliefs based on common sense occupy a central place in our belief system. As such, they are only to be rejected after less pivotal beliefs have been considered for rejection. Given their privileged status, any challenge to common sense is to be met with suspicion. Any such challenge faces an uphill battle, since we know in advance that it is likely to be mistaken.<sup>5</sup>

### **Science versus common sense**

What I have said about the special status of commonsense beliefs may strike some as unscientific.<sup>6</sup>This concern forms the basis of an important objection that I wish to address in some detail.

The objection may be stated as follows. Throughout the history of science, progress has been made by the elimination of commonsense beliefs in favour of scientific theories which show common sense to be mistaken. Thus, to place common sense in a protected position is to create obstacles to thoroughgoing critical inquiry of the kind that enables science to progress in the first place.

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<sup>5</sup> My claim that the bulk of our commonsense beliefs may be regarded as true is distinct in substance from Davidson's claim that most of our beliefs are true. My point is not based on a principle of charity. Nor is it based on the idea that successful linguistic communication may only proceed on the basis of a shared body of beliefs (e.g. Davidson, 1984). As a realist, I take reality to be independent of thought. Hence, in principle, all of our beliefs might be false. But, as a matter of contingent fact, our commonsense beliefs are by and large true.

<sup>6</sup> Or even unphilosophical: one philosopher reacted to my position by saying that philosophy begins with the rejection of common sense.

This objection is well-conceived as a point about widely held beliefs. There is nothing about being widely held, as such, that grants widely held beliefs any special epistemic privilege. However, the objection misses the mark with respect to the basic form of common sense that I have in mind here. The objection rests on two mistaken assumptions that I will now identify and reject.

### **Common sense needs no protection**

The first assumption relates to the idea that common sense requires protection from the critical scrutiny of science.

The point that common sense has a privileged status does not entail that commonsense beliefs are to be protected from critical scrutiny. On the contrary, they are subject to sustained critical scrutiny. Commonsense beliefs are put to critical test on countless occasions each and every day.<sup>7</sup>Our practical interaction with the world vindicates a commonsense view of the world every day of our lives. The point is not that commonsense belief requires protection from critical scrutiny. As Michael Devitt argues, commonsense beliefs are among the most highly confirmed beliefs in our belief system precisely because they are subjected to critical scrutiny on a regular basis.<sup>8</sup>

The point that common sense is vindicated in practical interaction with the world may be set within an evolutionary naturalist context. Commonsense beliefs survive because they have survival value. They have survival value because they are for the most part true. Our

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<sup>7</sup> Sundar Sarukkai has pointed out that our commonsense beliefs are not tested with the same degree of rigour as scientific theories. I agree in part. Scientific tests differ in degree of rigour rather than kind. Moreover, the test of practical application in daily activity may be seen to have a fair degree of rigour once one takes into account that the measure of practical success is our continued survival.

<sup>8</sup> Devitt, 2002, 22.

species could not have survived if the majority of the commonsense beliefs on which we base our everyday interaction with the world were false. False belief does not systematically lead to successful action. Though action based on false belief may succeed, the risks to survival increase where action is based on false belief. Common sense both promotes survival and is the result of a process of natural selection. Our survival constitutes evidence of the reliability of common sense. Thus, so far from needing protection from critical scrutiny, the role of common sense in promoting survival shows that it has both withstood and emerged from the critical scrutiny of evolution itself.<sup>9</sup>

### **Explanation, not elimination**

The second assumption is that in order for science to progress, common sense must be overthrown and eliminated.

If common sense is understood as widely held belief, scientific progress may well lead to the overthrow of common sense *in that sense*. But, if common sense is understood as basic common sense, then it is simply not clear that overthrow is what typically occurs in science. Scientific investigation leads to new insights into the nature of phenomena that are known to common sense. But in many cases science does not eliminate common sense at all. Rather, science explains commonsense phenomena.

Let me illustrate the point with an example from the history of astronomy. The geocentric idea that the Earth occupies a fixed

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<sup>9</sup> The sentiment expressed in this paragraph reflects a broad sympathy to an evolutionary naturalist approach to epistemic justification. I recognize, though, that some caution is necessary in expressing this attitude for reasons articulated by Stich (1990, chapter 3). Mere survival does not entail the truth-conducive nature of our belief-forming processes, since there may be processes which promote survival that do not lead to truth.



position at the center of the Cosmos, and that the heavenly bodies revolve around the Earth, receives support from everyday experience. It appears to us that the Sun rises every morning and crosses the sky each day, setting in the evening. At night, the stars, the planets and the moon become visible, and move across the sky in much the same way as the Sun traverses the sky each day. But heliocentric astronomy teaches us that these appearances are misleading. The apparent movement of the Sun and other heavenly bodies is due to the rotation of the Earth upon its axis, combined with the movement of the Sun and other bodies. It is not the Sun that rises and sets. The Sun comes into view as the Earth rotates. The rotation of the Earth brings the Sun into view each day.

Geocentric astronomy has a basis in commonsense experience. Because geocentric astronomy was rejected in favour of heliocentric astronomy, one might think that heliocentrism entails the overthrow of common sense. Heliocentrism shows common sense to be false, which leads us to reject common sense.<sup>10</sup> But it is not clear that this is what happens at all. Our commonsense experience remains exactly as before. The sun appears to rise, traverse the sky and set each day, and the objects in the night sky appear to behave in a similar manner. The appearances do not change. Neither does commonsense experience.<sup>11</sup>

What changes is what we think happens. Our understanding of what takes place is altered. Heliocentrism explains why commonsense experience is the way that it is. It does not show that commonsense

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<sup>10</sup> We find a suggestion along these lines in T.S. Kuhn's discussion of the case. Kuhn takes heliocentrism to be a "violation of common sense", since its adoption requires us to reject the evidence of our senses that the earth is immobile (1957, p. 43).

<sup>11</sup> This is to reject one version of the claim that observation is theory-dependent. N.R. Hanson uses the example of Tycho Brahe and Kepler looking at the sun as it appears at dawn (Hanson, 1958, chapter 1). I agree that they may describe what they see in different theoretical terms. But, considered at the level of basic experience, I see no reason to suppose that there is any difference in how the sun's movement appears to either Brahe or Kepler.

experience is false. It explains why we have the experience of heavenly bodies moving across the sky. At least in this case, science does not eliminate common sense. It teaches us how to understand commonsense experience. The assumption that science eliminates common sense, rather than providing an explanation for such experience, may therefore be rejected as erroneous.

Of course, a single case of science preserving common sense does not show that it always preserves it. But there is no reason to suppose that the present case is in any way an exception. Conformity with empirical evidence is a standard requirement for theory-acceptance in science. Because it is primarily observational, empirical evidence typically forms part of or is at least available to common sense. To the extent that this is so, conformity of theory with evidence ensures that science preserves common sense.

### **Objections to the primacy of common sense**

We have now seen why the special status accorded to common sense need not be seen as unscientific. Common sense need neither be dogmatically protected from critical scrutiny nor typically overthrown by scientific advance. Still, it might be thought that appeal to common sense remains problematic. I will now consider a pair of objections to the primacy of common sense. The first challenges the *epistemic* primacy of common sense. The second challenges its *ontological* primacy.

## Common sense as false theory

It is sometimes said that common sense is false theory passed down to us by primitive ancestors. Because common sense is false theory it is to be rejected as erroneous, rather than granted privileged epistemic status.

I mentioned before that commonsense beliefs are fallible beliefs with no guarantee of truth. Even so, the assimilation of common sense to outmoded theory is to be resisted. This is why it is important to distinguish common sense from widely held belief. Beliefs to which members of a society or historical epoch are committed may be rejected in another society or epoch. But common sense operates at a more basic level than such transitory commitments. The common sense enacted in practical engagement with the everyday world is the natural endowment of humankind, and may be shared with some species of non-human animals. It is not something that passes in and out of social and historical fashion. It is a precondition for successful practical interaction with the world.<sup>12</sup>

## Atoms and the void

But while there is no need to regard basic common sense as false theory, the ontology of common sense is also open to challenge.

The world of the commonsense realist is the world of ordinary middle-sized things with which we causally interact in our daily lives. But it may be objected that there are no ordinary things. All that exists

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<sup>12</sup> I hesitate to say that basic common sense is a human universal. But it is clear that my view tends in this direction. One reason that I hesitate is that common sense is fragile. Brain damage may remove some elements of common sense.

are the elementary micro-level entities discovered by modern physical science. There are no rocks and mountains, tables and chairs. There are just “atoms and the void”.

The objection is not the sorites point that there are no ordinary things because things have vague boundaries.<sup>13</sup>The objection is that there are no ordinary things because they are made up out of micro-level entities. But this rests on a mistaken view of the relationship between a thing and its parts.

Ordinary material things are themselves composed of more basic components, such as molecules, atoms, and elementary particles. To think that ordinary things do not exist because they are composed of microscopic entities is to assume that a thing that is made out of other things is not itself real. But the fact that a thing is made out of other things does not mean that it is not real. A computer assembled from component parts is still a computer. Unassembled computer components do not constitute a computer until they are put together to form one. The computer only exists once its component parts are assembled in a particular way. The ordinary things of common sense exist despite being composed of myriads of particles too small to see.

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<sup>13</sup> With regard to the sorites point, I have only a rather flat-footed response to make. There is a problem of vagueness in relation to where objects begin and end. This is a genuine metaphysical conundrum. But this does not alter the fact that we must still take objects into account in practical affairs. It may not be clear precisely where the boundaries of an approaching tram or bus lie. But we had best step out of its path if we wish to avoid injury to ourselves. This response to the problem seems to me to suffice for the purposes of commonsense realism, though perhaps not for the purposes of deeper metaphysical theory.

## Common sense as basis for scientific realism

To conclude, I propose that we treat common sense as both an epistemic and an ontological basis for scientific realism.<sup>14</sup>

For the scientific realist, science discovers the truth about observable and unobservable aspects of the independently existing world. But science itself starts from common sense. And common sense embodies a realist view of the objects of everyday experience. Occasionally science may conflict with common sense. But science does not lead to the overthrow of common sense. Rather, science explains why commonsense objects appear as they do. It explains why in some cases the commonsense appearance of things is misleading. But commonsense realism survives as the basis for our ongoing interaction with the world. Given common sense, scientific realism is the most natural position to adopt as an interpretation of scientific inquiry into the world around us.<sup>15</sup>

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<sup>14</sup> In speaking of an epistemic and ontological basis for scientific realism, I consciously follow Armstrong, who speaks of our "epistemic base" (1999, p. 77).

<sup>15</sup> Ancestral versions of this paper were presented at the University of Hyderabad, the National Institute of Advanced Studies (Bangalore), the University of Otago, Université Catholique de Louvain, the University of Melbourne, La Trobe University and the Rotman Institute of Philosophy workshop at Grand Bend, Ontario. I am grateful to my interlocutors on these occasions for feedback which I have attempted to take into account in preparing the final version of the paper. I am also grateful to the anonymous referees of this journal whose comments led to improvements in the paper.

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