Subject and Object in Scientific Realism

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1. Introduction: Subject and Object

Dimitri Ginev and I once worked together on a project entitled "Analytic vs. Hermeneutic Perspectives on the Philosophy of Science".[1] In the course of our discussions, one topic often came to the fore. Dimitri argued that the scientific realist position that I endorse is wedded to an untenable dualism of subject and object. This dualism gives rise to a number of characteristic problems that disappear once the dualism is renounced. In this paper, I return to the topic in order to consider what a scientific realist might say about the dichotomy of subject and object.

I will begin with some remarks about terminology. As I understand the subject-object distinction, the contrast is between the knowing subject and the known object. On the one hand, there is the subject who possesses knowledge. On the other hand, there is the object that is known to the subject. Though much is known to the subject about their own mental states, in the cases of interest the known object is in the "external world" outside the mind. I do not restrict the knowing subject to humans, since I regard knowledge as a natural phenomenon. At least some non-human animals possess knowledge. I tend not to employ the traditional expression "external world", since I think of the knowing subject as immersed in the world rather than separated off from it. Nor do I think of knowledge as restricted to "objects" in any strict sense, since there may be knowledge not just of objects, but of

[1] This was the title of a collaborative research project which brought Dimitri to the University of Melbourne as visiting scholar in 1997.

properties, relations, facts, events, regularities, laws of nature, etc. I have a slight preference for the expression 'epistemic agent' rather than 'subject', since I think of knowers as active participants rather than passive subjects. My realism has a pragmatist orientation, since I take realism to be grounded in practical interaction with the objects in our immediate surroundings.[2]

The notion of an object is connected with the notions of objectivity and of an objective world. As a realist, I hold that we inhabit an objective reality that in large part exists independently of thought, language and conceptualization. Against the sceptic, I hold that we are able to have genuine objective knowledge of this mind-independent reality. But this epistemologically optimistic view brings with it a number of characteristic problems, most importantly, that of explaining how knowledge of such a mind-independent reality is possible. How are we able to bridge the epistemic gap between the subjective realm of belief and the objective extra-mental world? This is the place where Dimitri's concern about the subject-object dichotomy gets its grip. The suite of epistemological and metaphysical problems that must be addressed by the realist simply disappears if one denies that there is an epistemic gap between mind and world because there is no subject-object distinction to open up the gap.

In what follows, I will first characterize the scientific realist position that I adopt. I will then address the question of the nature of scientific knowledge from a realist point of view. Next I will consider the question of how to locate the knowing subject within the

[2] Though my pragmatist orientation starts at the ground level of practical interaction with everyday objects, it extends to the theoretical knowledge found in the sciences. Although I do not follow Hacking in his restriction of scientific realism to entity realism, I am persuaded by his talk of intervention that we must take seriously scientists' practical interaction with the world in the context of experimental science (Hacking 1983). I also hold that a pragmatist orientation is of relevance to meta-methodological considerations about the warrant of the rules of scientific method (cf. Rescher 1977).

context of scientific realism. After that I will consider the place of mind in an objective world. I will close with some general remarks on the topic.

2. Scientific Realism and Common Sense

As classically understood, scientific realism is the view that the aim of science is truth. Given that the aim of science is truth, scientific progress must consist in progress toward that aim. Because science is successful, we may be confident that science has made considerable progress toward the aim of truth. The aim of truth need not be thought of in terms of one true and complete theory of the world toward which science advances.[3] Instead, the aim may be to build up an increasing store of truths of a singular as well as a general nature that are known about the world. With the advance of science, considerably more truth is known now than was known previously. Rather than convergence on one true theory, progress might better be thought of as continued increase in the amount of truth that is known about the world.[4]

For the realist, truth must be a correspondence relation between what we believe about the world and the way the world is. Truth cannot be an epistemic notion, such as

[3] I find the idea of "one true and complete theory" of the world next to incomprehensible. Would such a theory contain a complete enumeration of all of the facts throughout the entirety of space and time? It is difficult to imagine a theory of that kind, let alone conceive of one. Hacking raises doubts not only about such a theory but about the idea of a complete description of anything (Hacking 1983, p. 94). I discuss the issue in somewhat greater detail in my (2008, pp. 261-2).

[4] Unfortunately, my way of thinking about progress in terms of increase in truth falls foul of the same problem that confronted Popper's notion of verisimilitude, viz., any addition of new truth will be accompanied by new falsehoods. While I recognize that there may be formal difficulties which confront the notion of an increase of truth, I am optimistic that a technically adequate account of the notion will be developed. For present purposes, I remain content with the intuitive idea that we now know a great deal more truths about the world than we did at an earlier stage in the history of science.

coherence or ideal justification, since that would lead to an idealist metaphysics (cf. Musgrave 1997). Because realism stands opposed to idealism, the realist requires a notion of truth that is non-epistemic. Truth does not depend upon what we believe, or on what we are justified in believing. The truth of claims about the world depends upon the way that the world in fact is. The idea that truth is a correspondence relation captures the idea that the truth of a claim about the world depends upon the world in fact being the way that the claim says that the world is. Of course, more needs to be said about the exact nature of correspondence. For my part, I favour a construal of correspondence in terms of causal relations of reference along the lines once proposed by Hartry Field (1972). But it is entirely possible that a more minimalist construal of the correspondence theory of truth is compatible with realism. What is essential is that the notion be a non-epistemic one.

According to the scientific realist, scientific investigation is not restricted to observable features of the world. It extends to aspects of the world that are not open to direct inspection by our unaided senses. As scientists seek to explain observed phenomena, they develop scientific theories. In the process, they often postulate the existence of unobservable theoretical entities whose behaviour gives rise to phenomena at the observable level. Evidence for theoretical entities is typically indirect, involving explanatory considerations as well as confirmation of the observational consequences of the theory that posits the entities. Discourse about theoretical entities is not to be reduced to discourse about observable entities. Scientific talk about theoretical entities is to be taken literally as discourse which genuinely refers, or purports to refer, to unobservable entities that actually exist in the objective world. A theoretical term (e.g. ‘phlogiston’, ‘aether’) may fail to refer if the entity to which it purports to refer does not in fact exist. Nor is the reference of a theoretical term tied uniquely to the theory in which the term is introduced. It is possible for the same term to

be employed by different theories to refer to the same thing. Indeed, different theories may refer to the same theoretical entity even if they do not employ the same term.

I have always understood scientific realism in what I take to be the classical sense as committed to the idea that the aim of science is truth. However, I have been persuaded by Stathis Psillos that it may not be necessary to take a thesis about the aim of science as an essential ingredient of scientific realism.[5] The aims of science may vary historically, and from one science or group of scientists to another. Instead of arguing that all of the potentially competing aims of science must somehow be subservient to the overriding aim of truth, the realist may instead adopt an epistemological approach. On this view, the realist need not be committed to the thesis that truth is the one paramount aim subserved by all other scientific aims. Instead, we may think of scientific realism as primarily an epistemological thesis. According to this epistemological thesis, science not only can but routinely does produce genuine knowledge of the objective world which it investigates. The advantage of adopting this epistemological construal of scientific realism is that it retains a robust commitment to scientific knowledge while avoiding the need to defend the view that all scientific aims must subserve the paramount aim of truth, or that all scientific activity ultimately serves a single aim.

The standard argument for scientific realism is the "no miracles" argument that realism is the only way to explain the success of science without appeal to a miracle. This argument is usually thought of as an inference to the best (or perhaps the only) explanation of the success of science. I have myself employed a version of this argument at the meta-

[5] I am grateful to Stathis Psillos and the members of his seminar for discussion of this issue and other topics relating to scientific realism while I was a visitor at the University of Athens. Psillos's statement of scientific realism involves metaphysical, semantic and epistemic components, with no mention of the aim of truth (see Psillos 1999, p. xix). I had always found this puzzling. But I now recognize that a robust form of scientific realism may be articulated without reference to the aim of science.

methodological level to argue for a realist theory of scientific method on which the rules of method are to be conceived as reliable means to arrive at truth (e.g. Sankey 2000). But there is one reason why I prefer not to overemphasize the "no miracles" argument. It seems to me that the attempt to establish realism by this route overlooks the extent to which science is grounded in the practical activity of scientists, who as agents interact with the world around them.[6] This issue brings me to the topic of common sense and its relation to science.

Some philosophers hold that there is a conflict between science and common sense. Some also hold that where there is a conflict between science and common sense, it is common sense that must give way to science. On this view, common sense is outmoded theory, which is to be rejected with the advance of scientific inquiry. If the view that science leads to the overthrow of common sense is combined with a scientific realist outlook, we arrive at the view that what science tells us about the world is correct and the commonsense view is to be rejected as false. Hence, some scientific realists adopt an eliminativist view of common sense on which our ordinary commonsense descriptions of the world are to be rejected in favour of the descriptions provided by our best scientific theories.

But this is to throw the baby out with the bath water. In my view, we are to be realists about the ordinary everyday objects with which we interact on a daily basis.[7] Though we are

[6] In drawing attention to the importance of scientists' practical interaction with the world for realism, I follow Hacking. I have argued elsewhere that Hacking's experimental argument for realism is in fact an inference to the best explanation of the success of scientific practice (Sankey 2012). Thus, contrary to Hacking, the argument is not fundamentally different in form from the standard argument for scientific realism. Despite this, I think that Hacking is right to emphasize the importance of actual scientific practice in the case for scientific realism.

[7] Some realists may argue for the existence of ordinary things by means of an inference to the best explanation of experience. This may have made sense in the context of a sense data version of indirect realism (cf. Russell 1959, pp. 22-3). But I think that the warrant for belief in such things is more direct than this. We directly perceive objects and their properties. Such direct perception provides the belief in such objects and properties with their warrant.

prone to error and may be subject to illusion, much of what we ordinarily take ourselves to know of the world immediately around us is true. As I write these words, my computer is indeed on the desk before me, the window is open and there is a tree outside in the courtyard. To deny these things would be to reject the dictates of common sense in favour of a scepticism about the external world for which no compelling reason may be provided. Rather than eliminate common sense, we should take common sense as our "epistemic base" in the words of David Armstrong (2004). What Armstrong calls the "Moorean truths" of common sense are not to be rejected. They are to be taken as our epistemic starting-point.

On the view that I propose, science is to be viewed as an outgrowth of common sense. The rules of scientific method are in many cases a more rigorous application of procedures employed as part of our ordinary everyday epistemic interaction with the world. Most importantly, observation by means of our senses plays a crucial epistemic role in both common sense and science. It is true that beliefs that have formed part of common sense are on some occasions rejected. But what more generally occurs is that phenomena known to common sense are explained by science. In such cases, science does not reject common sense. It provides us with an explanation of phenomena of which we have experience in our commonsense interaction with the world around us.[8]

The point is important for the epistemology of scientific realism. If we are able to take much of commonsense belief to be well-grounded, then less emphasis may be placed on the "no miracles" argument. To the extent that science is an outgrowth of common sense, the epistemic credentials of science derive from its basis in common sense rather than from a tenuous abductive argument that the success of science is best explained by realism. I have

[8] I distinguish between widely held beliefs and basic common sense. Beliefs widely held in a culture may come and go. But the beliefs of basic common sense (e.g. beliefs about our immediate surroundings based on sense experience) are far more resistant to change. I discuss the relation between science and basic common sense at greater length in my (2014).

no doubt that such reasoning plays a role in ordinary common sense. But it seems to me that practical interaction with the world in experimental settings provides stronger vindication of claims about theoretical entities than recourse to the "no miracles" argument suggests. I am strongly inclined to the view that sense perception and embodied action bring scientists into causal contact with theoretical entities with which they interact in experimental settings.[9] The point is greatly reinforced if one takes into account the pervasive use of instrumentation in laboratory settings to extend perception and to control and manipulate entities not detectable by the naked eye.

3. Is Scientific Knowledge Justified True Belief?

The title of this section intentionally follows the title of Edmund Gettier's famous paper (1963). However, I will not pose or attempt to solve scientific versions of Gettier's problem. My question is instead whether the idea that knowledge is justified true belief may serve as an appropriate suggestion about the nature of scientific knowledge.

As traditionally understood, knowledge may be analysed in the following terms:

S knows that P if and only if:

(1) S believes that P

(2) S is justified in believing that P

[9] Here I must issue a promissory note. I wish to combine a direct realist theory of perception with a scientific realist account of theoretical entities. In perception, we causally interact with observable entities. The observable entities are made up out of unobservable theoretical entities. Given the perceptual interaction with observable entities, we thereby causally interact with the theoretical entities of which they are made. Perception therefore causally connects the observer with unobservable entities that make up observable entities. I recognize that more must be said to justify the move from perception of observables to causal interaction with unobservables. But this is the direction in which I think that scientific realism might usefully be developed in order to better ground it in scientific practice.

(3) ‘P’ is true

This is the traditional analysis of knowledge as justified true belief, against which Gettier presented two counter-examples. It is not without interest in the present context that the analysis refers to S. Though ‘S’ might stand for Smith or perhaps someone, I take it that ‘S’ is meant to refer to a subject who holds the belief that P. But it is not entirely clear that such an analysis of knowledge or indeed reference to a subject is appropriate for scientific knowledge.

In the first place, we sometimes speak of scientific knowledge where we do not mean to refer to specific belief-states of individual human knowers. We may use the expression ‘knowledge’ to refer to a body of knowledge rather than to specific states of knowing. We might, for example, speak of the knowledge found in a specific field of science. Or we might wish to refer to the entire corpus of scientific belief. When we use the expression ‘scientific knowledge’, we might be using the word ‘knowledge’ in the strict sense of justified true belief, so that individual scientific beliefs must be both justified and true in order to count as knowledge. But it would not be an inappropriate use of the expression ‘scientific knowledge’ to use it in such a way that it refers not just to those scientific beliefs that are true and justified, but in addition to scientific beliefs that are well-grounded though not true. Indeed, scientific knowledge might be taken to include outmoded theories which are no longer accepted but continue to have some applicability in restricted domains. Thus, the expression ‘scientific knowledge’ may be employed to refer to beliefs that are justified but in fact false, as well as to beliefs that are known to be false. In short, there seems to be a usage of the expression ‘scientific knowledge’ that does not work with a strict understanding of knowledge as justified true belief.

In the second place, there is a potential tension between the idea that knowledge is justified true belief and a scientific realist view of the truth-status of contemporary science. Few if any scientific realists take themselves to be committed to the truth of all claims that may be found within current science. Rather, scientific realists typically take the view that our best scientific theories are to be accepted as true or approximately true. It is crucial for realists to allow that theories may be approximately true, since realists need not hold that the end of science is near. Though some particularly well-established scientific claims may be true, much of contemporary science may later be revised or profoundly altered. For this reason, scientific realists tend to see science as advancing toward the truth, so that our best contemporary theories are to varying degrees approximations of the truth rather than true *simpliciter*. But if a theory should be taken to be approximately true, rather than true, it is hard to see how belief in the theory might constitute knowledge in the sense of justified true belief. After all, the traditional analysis of knowledge does not say that 'P' is approximately true.

There may perhaps be some way to reconcile the justified true belief analysis of knowledge with the idea that our best current theories are to be accepted as approximately true.[10] But I would tend to approach the matter in another way. Given that many contemporary theoretical claims about the world may only be approximately true, they are strictly speaking false. Hence, such claims do not constitute items of scientific knowledge. However, they may well be grounded in the rules of scientific method in a way that provides them with a sound epistemic justification. Such claims will therefore constitute justified

[10] One way may be to say that approximately true claims should be understood as approximations that are in fact true. For example, the claim that I am exactly six feet tall is false, though it is approximately true that I am six feet tall. We should understand the latter as the claim that I am approximately six feet tall. That approximate claim is true.

beliefs for the scientists who hold them on an appropriate basis. Thus a significant proportion of the current corpus of scientific belief may constitute justified belief rather than knowledge.

However, this is entirely consistent with saying that some, perhaps even a significant proportion, of the current corpus of scientific belief does constitute knowledge in the sense of justified true belief. All that is required is that appropriately justified beliefs are in fact true. If such scientific beliefs are true, given that they are justified, they constitute knowledge. So the corpus of contemporary scientific belief may contain not only justified beliefs, but also a significant body of knowledge in the strict sense of justified true belief.

Of course, one may ask: "How does one know that one has scientific knowledge?" In the case of any particular purported item of scientific knowledge, how does one know that that item constitutes an item of knowledge rather than mere justified belief?

Part of the answer to this question is that in very many cases one does know that one knows. If we reject scepticism, we hold that knowledge is possible. There will be cases in which our epistemic justification is of the sort that, given that we reject scepticism outright, it is clear that we do have knowledge. I am thinking particularly of cases of immediate observation where we are able to inspect objects directly to determine their properties. In such cases, the only temptation to say that we do not have knowledge is the temptation to concede to the sceptic that we do not have epistemic access to the external world. But that is a temptation that we may justifiably resist.

In other cases, we may know without knowing that we know. Here, I am thinking of those cases where we may not have a high level of confidence in a theoretical claim about unobservable states of affairs because it fails to have strong evidence in its favour. In such cases, if the theoretical claim is in fact true, and if our justification for the claim is well-grounded in the norms of scientific method, then we have knowledge. We may not be

confident of our knowledge. In a sense, therefore, we may fail to know that we possess the item of knowledge. But we do not need to know that we know in order to have knowledge. It suffices that the conditions for knowledge stated by the justified true belief analysis of knowledge be satisfied. There is no need to know that the conditions are satisfied, though in some cases we may know this.[11]

4. The Subject in Scientific Realism

What, then, are we to say of the subject-object distinction for scientific realism? As we have seen, the realist is committed to the existence of a mind-independent reality that objectively exists "outside the mind". If the realist wishes to endorse the view that scientific knowledge may be justified true belief, it appears to follow that the realist is committed to the existence of a knowing subject. With the exception of knowledge of our own mental states, therefore, knowledge requires a knowing subject and a known object outside the mind. Thus, it appears that the realist must adopt the dichotomy of subject and object that Dimitri sought to challenge. Is this such a bad thing?

[11] In saying that we may know that we know, the possibility of a regress arises. If we know that we know, where knowledge is understood as justified true belief, the question arises of the status of this second-order item of knowledge. Presumably, it too must be a justified true belief. But if the second-order item of knowledge is a justified true belief, how is the item of second-order knowledge justified? Presumably, appeal must be made to a third-order item of knowledge, namely, that we know that we know that we know. In this way, the assumption that we may know that we know leads to an infinite regress. To avoid the regress, I suggest we follow Roderick Chisholm in adopting a stance of epistemic particularism. The question of what we know is prior to the question of how we know. We identify particular items of knowledge independently of the question of what criteria these items of knowledge must satisfy in order to be knowledge. If the process of justifying an item of belief gives rise to a regress, this does not impugn the status of the item of knowledge. Of course, this may beg the question against the sceptic. But, as Chisholm admits, this may be unavoidable (see Chisholm 1973, p. 37).

Here it is important that realism be placed in the context of epistemological naturalism rather than within the context of a traditional Cartesian epistemology. In the *Meditations on First Philosophy*, Descartes employs the method of hyperbolic doubt to identify the basis of epistemic certainty.[12] On the basis of reflection upon what it is possible to doubt, Descartes came to the view that one thing that can be known for certain is that the doubting subject, a thinking thing, exists. An evil demon might create a massive illusion in which everything we believe is false. No things, bodies or general properties exist. It is not just that the senses deceive us. We have no senses. Reflection on the possibility of such an illusion may lead us to doubt everything that we believe. We thus find ourselves in a situation in which we doubt everything. But, if we doubt, then we exist. For we must exist in order to doubt. Having recognized that inability to doubt his own existence was something that he clearly and distinctly perceived to be the case, Descartes took clear and distinct perception to be a criterion of epistemic certainty. But he did not take clear and distinct perception of external objects to guarantee the existence of external objects. To guarantee the veridicality of beliefs about external objects, Descartes appealed to a non-deceiving God. This led him into the infamous Cartesian circle. He employs clear and distinct ideas to argue for the existence of God. He then appeals to God to guarantee the veracity of clear and distinct ideas.

In the case of Descartes, the distinction between subject and object is the source of a profound epistemological challenge that cannot be met. It is impossible to start with mental states known directly to the mind of the knowing subject, and then to mount a compelling

[12] Apart from naturalistic misgivings about scepticism, I find the method of hyperbolic doubt to be a highly dubious method indeed. It assumes that doubt may be generated "for free". It assumes that we may choose to doubt without specific reason for doubt. For discussion of the dubious nature of Cartesian doubt, see Rescher's discussion of doubt based on sensory error in Descartes (Rescher 1982).

case for the existence of an external world based solely on intrinsic features of these mental states available to the knowing subject by reflection or introspection. Thus, the subject-object dichotomy lies at the heart of Cartesian epistemology and the traditional problem of scepticism about the external world.

But, if we reject Cartesian epistemology in favour of a naturalistic epistemology, the situation is altered. Instead of the internal mental states of the knowing subject, we should start with the basic commonsense claims (the "Moorean truths") about the world around us that Armstrong calls the epistemic base. We reject scepticism about the external world in favour of genuine knowledge of the ordinary everyday things that surround us. The standards of epistemic justification and knowledge are the standards of common sense and science, rather than the standard of introspective epistemic certainty bequeathed to us by the Cartesian sceptic. If we approach the question of knowledge on the basis of such a non-Cartesian naturalistic approach, then the subject-object dichotomy is less of a threat. We are not confronted with the impossible task of rebuilding the external world on the basis of mental states to which we have direct epistemic access. We are instead grounded in the world immediately around us to which we have epistemic access by way of our senses. There is no great gulf between mind and world because we are in the world and we interact with it.

This, by the way, is why we should discard the phrase 'external world'. It is an expression that reflects the Cartesian predicament in which we seek to show that the world outside of our minds fits with the contents of our minds. The expression 'external world' goes hand-in-hand with the Cartesian sceptical dichotomy of subject and object, and should be rejected as we reject the Cartesian basis for that dichotomy. But this is no reason to think that we must renounce the dichotomy of knowing subject and known object. Provided only that the subject is a living embodied agent practically engaged with the objects in their immediate vicinity, no threat is posed by the dichotomy of subject and object.

5. Mind in an Objective World

As we have seen, the realist holds that we inhabit a mind-independent, objective world. It is this world of which science provides theoretical knowledge. The idea of mind-independence gives rise to a further aspect of the subject-object dichotomy, which also arose in conversation with Dimitri. What is the place of the human (or any other) mind in this mind-independent reality? If the world is mind-independent, does this mean that there are no minds? Is there any place for the knowing subject in an objective reality?

Few modern-day scientific realists would have much sympathy for Cartesian dualism.[13] The idea of mind as a categorically distinct substance unable to causally interact with physical substance has little currency in the modern scientific world-view. Minds are a naturally occurring part of a thoroughly physical world. Hence, scientific realists may be materialists or physicalists who deny that there is any *sui generis* mental stuff. Contemporary philosophical discussion of the mind-body problem explores such questions as whether mental states reduce to, supervene upon, or are to be eliminated in favour of brain states.

Still, there is a sense in which the scientific realist should not be committed *qua* scientific realist to a physicalist outlook. If our best scientific theory were to propose that mind consists of mental substance entirely distinct from physical substance, then the realist should endorse this view. The non-material mind might be thought of as a theoretical entity whose existence was postulated to explain certain phenomena. Though we may now think

[13] Here a brief terminological note is in order. I take Cartesian dualism to be a position in the philosophy of mind according to which mind and matter are distinct substances. This metaphysical view is distinct from the epistemological distinction between (knowing) subject and (known) object. At least some of the time, Dimitri seems to use the expression "Cartesian dualism" to apply to both positions (e.g. forthcoming). But I suggest that the positions are distinct, and neither stand nor fall together.

that there is no such entity, substance dualism may well have been an appropriate position for the scientific realist to adopt at the time of Descartes.

Despite this, there is a sense in which the question of the relation between mind and matter is not the point at issue with respect to mind-independence. The crucial question relates to the ontological status of things outside the mind, such as mountains and rocks, tables and chairs. The question is whether such things exist in their own right, independently of mental activity, or depend for their existence on mental activity. Such things as rocks and mountains do not depend for their existence upon any mental states that we might have. Naturally occurring things such as mountains and rocks existed before humans ever formed beliefs or concepts relating to them. They continue to exist whether or not we think that they do. Artefacts such as tables and chairs are built by humans and so depend for their existence *qua* tables or chairs upon human intention and activity. But their existence *qua* physical objects does not depend upon human thought, experience or conceptual activity.

One might still wonder about minds. Surely minds cannot exist in a way that is independent of the mental. It makes no sense to say that minds are independent of mind. If anything is mind-dependent, the mind surely is. Or is it?

Here it seems to me that the correct response may be somewhat counter-intuitive. Trivially, no mind may exist without itself. Still, in the relevant sense of mind-independence, minds do in fact enjoy a mind-independent mode of existence. I do not need to believe that I have a mind in order to have one. Nor do I need to possess the concept of a mind in order to possess a mind. A young human child may have a mind before developing sufficient mental capacity to be able to recognize that they have a mind. Similarly, non-human animals may have a mind or be capable of having mental states though they may never be able to acquire the conceptual apparatus required for them to know that they have a mind.

An individual who possesses a mind need not recognize that they do. Nor must their possession of a mind be recognized by anyone else. The fact that one has a mind does not depend on the recognition that they have a mind by someone else. If an individual possesses a mind, this is an objective fact about them that does not depend on anyone thinking or saying that they have a mind. Their having a mind is, in the relevant sense, a mind-independent fact about them.

Given this, I do not think that the subject-object dichotomy is undermined by the realist commitment to the existence of a mind-independent reality. The realist is primarily concerned to insist that the world that exists beyond the human mind does not depend in any way for its existence on the mind or mental activity. But the mind has a place within this reality as a naturally occurring possession of certain kinds of organisms.

6. Conclusion

The scientific realism that I favour is a scientific realism that is grounded in our immediate interaction with the world. Rather than place undue weight on an inference to best explanation of the success of science, I emphasize practical aspects of scientists' interaction with the world. But this is not some narrow empiricism of the present moment, since the evidence available to our senses is the basis on which we build the scientific world-picture. Science may be an outgrowth of common sense. But it has taken us a tremendous distance beyond that which is immediately accessible to us in experience.

The dichotomy of subject and object does not loom large in contemporary discussions of scientific realism. There are no doubt interesting explanations for this which turn on the fact that scientific realism tends to be pursued within the tradition of analytic philosophy. Still, it seems clear that the scientific realist can engage with the issue. In particular, there

seems to be no need for the scientific realist to abandon the dichotomy of subject and object. Nor does the dichotomy pose a challenge for the scientific realist. Provided that the realist abandons the project of traditional Cartesian epistemology in favour of a naturalistic approach to epistemology, subject and object may be retained within a thoroughly realistic outlook on the world.

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