

[Manuscript version. Final paper published in Bueno, O., Darby, G., French, S. & Rickles, D. (eds.) *Thinking about Science, Reflecting on Art: Bringing Aesthetics and Philosophy of Science Together*. Routledge.]

Epistemology as fiction

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1 Introduction

In *A Neurocomputational Perspective*, Paul Churchland poses a fundamental and far-reaching challenge to epistemology and philosophy of science. In their descriptions of our epistemic practices, both epistemologists and philosophers of science typically rely upon our ordinary categories for describing the operations of the mind—in particular, the notion of *belief*—commonly described as *folk psychology*. In contrast, Churchland’s *eliminative materialism* holds that folk psychology is a bad theory that will be replaced by the latest theories in cognitive science (Churchland, 1981). As well as requiring a radical shift in our conception of the nature of the mind, Churchland argues that eliminative materialism also undermines the theories of traditional epistemology and philosophy of science. Philosophers of science in particular must abandon their existing “sentential” framework for discussing scientists’ reasoning, knowledge and understanding. In its place, they must learn to adopt a radically new framework, in which the central notions are drawn from the technical vocabulary of neural network modelling (Churchland, 1989).

Churchland’s analysis focuses on the brain. By contrast, much recent work in cognitive

science stresses the importance of interaction of brain, body and world in carrying out cognitive tasks (e.g. Robbins and Aydede, 2008). Familiar examples include the way that we gesture when reasoning or reach for pen and paper when trying to solve a crossword puzzle. In light of this work, some authors have argued that cognition, and even mental states, sometimes *extend* beyond the brain and body into the world (Clark and Chalmers 1998; Clark 2008). In previous work, I have argued that the extended mind thesis has important implications for the way that we understand scientists' cognitive activity (Toon 2014, 2015; for related approaches, see Bechtel, 1996; Nersessian, 2005; Giere, 2006). From this perspective, Churchland's favoured successor to folk psychology looks too narrow in its focus on the brain alone. And yet his eliminativist challenge to philosophy of science must still be faced. Even if our best theory of cognition encompasses not only the brain, but also interaction between brain, body and environment, it might still turn out to stand at odds with the traditional, sentential framework of folk psychology.

How should we respond to this challenge? Eliminativism is a hard road to follow. Folk psychology is intricately woven into the fabric of our language, and into the way that we talk about reasoning, knowledge and understanding in particular. Embracing eliminativism would therefore require a radical transformation in the way that we try to make sense of people and their epistemic activities. Moreover, given the difficulties faced by Churchland's own approach, it remains far from clear what framework we ought to adopt in its place. This paper explores an alternative response to the threat of eliminativism. *Mental fictionalism* is the view, even though folk psychological states might not exist, it is useful to talk as if they do. According to the fictionalist, mental states, like beliefs and desires, are useful fictions (for discussion, see Wallace, 2007; Demeter, 2013a). In previous work, I have argued that a fictionalist approach captures the spirit of much of our ordinary talk about the mind (Toon, 2016). In this paper, I will argue that fictionalism also provides philosophers of science with a promising way to respond to Churchland.

The discussion will proceed as follows. In Section 2, I will introduce eliminativism, focusing on Churchland's account of the nature of understanding. In Section 3, I will

argue that Churchland's account is too restrictive and that understanding is often an extended mental state. In Section 4 I will introduce mental fictionalism. Finally, in Section 5, I will show how fictionalism allows philosophers of science to respond to the threat of eliminativism.

2 Eliminativism and epistemology

A key feature of folk psychology is the attribution of propositional attitudes. We say that Barbara believes that planes can fly, that George wants to go to the cinema, that Adam hopes that Derby County will win promotion this year, and so on. Such talk is also central to epistemology. To know that p is to have the belief that p , where that belief is true and suitably justified (or obtained in the right sort of way, etc.). Reasoning is taken to involve moving from one set of claims (e.g. that the body was found in the library, that the only person with a key was the butler) to another (e.g. that the butler did it). Classical approaches in cognitive science hope to find beliefs, desires and other propositional attitudes as language-like structures inside the head (e.g. Fodor, 1975). By contrast, Churchland argues that “the sentential kinematics of folk psychology is but a commonsense *theory*, and almost certainly a *false* theory” (1989, p. xvi). In fact, our best theories in cognitive science reveal that “the basic kinematics of cognitive creatures is a kinematic not of sentences but of high-dimensional activation vectors being transformed into other such vectors by passing through large arrays of synaptic connections” (1989, p. xvi). As a result, we ought to stop talking about beliefs, desires and other propositional attitudes and instead adopt the language of our best theories of mind and cognition.

Like epistemologists in general, philosophers of science also tend to use the “sentential” framework of folk psychology when describing scientists’ reasoning, knowledge and understanding.¹ As a result, they too face the challenge posed by eliminativism. Let us

¹ A noteworthy attempt to depart from the sentential framework is the semantic view of

focus on understanding in particular, since it is here that Churchland develops his approach in most detail. Churchland motives his account by pointing to the shortcomings of the deductive-nomological model of explanation (DN model) (Hempel, 1965). According to the DN model, we explain a phenomenon by showing how it may be deduced from some general law, together with relevant initial conditions. While the conceptual difficulties of the DN model are well known, Churchland argues that it is also psychologically unrealistic. People often possess explanatory understanding without being able to articulate the required laws or initial conditions. Moreover, they are often unable to perform the necessary deductions, at least not with the swiftness with which understanding often dawns. According to Churchland, such difficulties are not specific to the DN model. Instead, they stem from “the fundamental assumption that languagelike structures of some kind constitute the basic or most important form of representation in cognitive creatures, and the correlative assumption that cognition consists in the manipulation of those representations by means of structure-sensitive rules” (1989, p. 154).

As William Lycan (1996) has pointed out, Churchland’s criticism of the DN model is somewhat unfair, since most of its proponents did not aim to describe scientists’ cognitive processes (see also Bechtel, 1996). Such authors tended to focus on *explanation*, rather than *understanding*: while accounts like the DN model sought to spell out what makes a good scientific explanation, understanding was taken to be a subjective, psychological phenomenon of little interest to philosophers of science. Times have changed, however. Amongst both epistemologists and philosophers of science, there is now widespread agreement that understanding is an important cognitive state that we ought to try to analyse (Kvanvig, 2003; de Regt, et al., 2009). It is also commonly agreed that understanding goes beyond merely knowing the various facts and theoretical principles

theories (e.g. Suppe, 1974; Van Fraassen, 1980; Giere, 1988). For a critical discussion of the semantic view in relation to eliminativism, see Churchland (1989, pp. 157-158).

needed to explain some phenomenon. To possess understanding, it is said, someone must also “see” or “grasp” how the various principles and facts fit together. In this vein, Wayne Riggs (2003, p. 218) writes that:

“[a]n important difference between merely believing a bunch of true statements within subject matter M, and having understanding of M, is that one somehow sees the way things fit together. There is a pattern discerned within all the individual bits of information or knowledge”

Consider the question “why do planes fly?” On this view of understanding, someone who understands why planes fly can do more than simply recall Bernoulli’s principle, recite facts about air pressure, and so on; she also “grasps” or “sees” the connections between these things. For example, she must “grasp” how Bernoulli’s principle applies to the air flow around the wing, “see” how the difference in air speed will result in a difference in pressure, and so on. This conception of understanding differs from the DN model in a number of respects. In particular, it does not require that the relationship between the different propositions involved be deductive. And yet it remains resolutely “sentential” in its approach and so, if Churchland is correct, must ultimately be discarded.

In place of the DN model, and other sentential accounts of understanding, Churchland proposes his own *prototype-activation model* (PA model). The key theoretical notions underpinning the PA model are drawn from *artificial neural networks* or *connectionist* models of the brain. Put simply, connectionist networks are collections of input-output devices called *units*. Each unit can be activated to various degrees and is connected to other units by “synaptic” connections with different *weights*. When the input units are activated, a *pattern of activation* spreads throughout the network, resulting in a particular output. The way that the network responds to a particular input is determined by the weights of the connections between its units. Once the network’s connection weights are adjusted correctly, it will learn to categorise input patterns into different groups. One of Churchland’s main examples is a network that learnt to categorise sonar echoes into two groups: those resulting from underwater mines from those resulting from rocks on the seabed. For each category that the network can distinguish, there will be a *prototypical*

response. In the rock-mine network, this is the pattern of response corresponding to a prototypical mine or prototypical rock. Responses to actual mines or rocks will tend to cluster around these prototypes (Churchland, 1989, pp. 200-206).

According to Churchland, connectionism provides a “possible conception of knowledge or understanding that owes nothing to the sentential categories of current common sense” (1989, p. 177). For example, an individual’s *theory* of the world, Churchland argues, “is not a large collection or a long list of stored symbolic items. Rather, it is a specific point in that individual’s synaptic weight space. It is a configuration of connection weights, a configuration that partitions the system’s activation-vector space(s) into useful divisions and subdivisions relative to the inputs typically fed the system” (1989, p. 177). The connectionist framework is also central to Churchland’s PA model of understanding. According to the PA model, “understanding consists in the activation of a specific prototype vector in a well-trained network. It consists in the apprehension of the problematic case as an instance of a general type, *a type for which the creature has a detailed and well-informed representation* (1989, p. 210). For example, in the case of the rock-mine network, understanding might consist in the fact that, when presented with a sonar echo from a mine that it has not yet encountered, the network follows a pattern of activation close to that of the prototypical mine.

Churchland argues that abandoning the sentential framework will transform our approach to a whole raft of issues in philosophy of science, including “the nature of theories, the theory-ladenness of perception, the nature of conceptual unification, the virtues of theoretical simplicity, the nature of paradigms, the kinematics of conceptual change, the character of abductive inference, and the nature of explanatory understanding” (1989, p. xv). And yet, as Churchland himself acknowledges, pursuing this new approach is far from straightforward. As we noted earlier, abandoning the categories of folk psychology would require a fundamental shift in the way that we talk about people and their behaviour, and their reasoning, knowledge and understanding in particular. For example, Churchland notes that, when it comes to saying what it is that makes one explanation better than another, “we must answer carefully, since we are denied the usual semantic

vocabulary of reference, truth, consistency, entailment, and so forth” (1989, p. 220). Instead, we must learn to answer such questions within a radically different framework of networks, connection weights and activation vectors.

3 Extended cognition

Churchland’s account focuses on the brain. In response, Bill Bechtel (1996) has argued that this approach is too narrow. In fact,

“Churchland is mistaken in localizing the focus of philosophy of science exclusively in activities occurring in the heads of scientists. While representations are central to scientific activity, the representations that matter are not exclusively mental representations. They are also external representations such as are found in sentences of natural language as well as in tables, figures, and diagrams.” (1996, p. 122; for similar criticism of Churchland, see Giere 2002)

External representations are not merely vehicles for communication, Bechtel argues. Instead, they play a key role in scientists’ reasoning processes. For example, “constructing an explanation is an interactive activity involving both the cognitive agent and various external representational systems” (Bechtel 1996, p. 126). To illustrate this idea, Bechtel cites an influential discussion of multiplication by the San Diego connectionist group (Rumelhart, et al., 1986). Most of us aren’t able to multiply three digit numbers in our heads. If we’re given pen and paper, however, the task becomes much easier: we can write the numbers down one underneath the other and work step-by-step through the procedure for long multiplication. In this way, we transform a complex task (e.g. multiplying 546 by 837) into a series of much simpler tasks (e.g. multiplying 3 x 4, remembering to carry the 1, and so on). While connectionist models might explain what is happening in our brain when we do this, the overall task is accomplished by a larger system that includes external, material representations.

In recent years, a growing body of work in cognitive science has revealed that much of our cognitive activity has a similar character, involving productive cooperation between internal and external resources (e.g. Robbins and Aydede, 2008). In light of this work, some philosophers have endorsed the *hypothesis of extended cognition* (HEC) (e.g. Clark and Chalmers, 1998; Clark, 2008; for related ideas, see Menary, 2007; Rowlands, 1999; Wheeler, 2005; and Wilson, 2004). According to HEC, external devices can sometimes become part of our cognitive processes. On this view, the pen and paper we use in long multiplication is not simply a useful tool; it is part of the mechanism that realises our cognitive processes, just like the neurons in our brain. Proponents of the *extended mind thesis* go further and argue that it is not only cognitive processes that can be realised by external devices; even mental states, such as beliefs, can extend outside the head. Thus, Clark and Chalmers (1998) offer the well-known example of Otto, an Alzheimer’s patient who carries a notebook wherever he goes to record useful information. According to Clark and Chalmers, Otto’s notebook plays a similar role to normal biological memory. As a result, they argue, we ought to count the entries in the notebook as Otto’s (dispositional) beliefs. Only an unmotivated bias for skin and skull would lead us to deny this (for debate over the extended mind thesis, see Menary, 2010).

Bechtel’s criticism focuses mainly on what we might call *explanatory inquiry*—that is, the reasoning process that scientists follow in order to construct a new explanation for some phenomenon (1996, pp. 131-135). At first glance, we might think that, even if explanatory inquiry involves external representations, still the *outcome* of that process—that is, the state of understanding itself—remains inside the head. Elsewhere, I have argued that this would be a mistake. In fact, understanding is often an extended mental state (Toon, 2015). To see this, suppose that, rather than “why do planes fly?”, we consider a more difficult question, like “why do planes experience Dutch roll?” Dutch roll is an oscillatory motion that can affect planes when they fly through turbulence. It is a fairly complicated phenomenon: merely writing down the equations of motion required to explain it requires a page or two, and textbooks normally include a series of diagrams and graphs to show the sequence of steps in a typical Dutch roll cycle. Now suppose that

Barbara is an aeronautical engineer. When she is asked why planes experience Dutch Roll, Barbara is able to write down the relevant theoretical principles and facts about air pressure, plane's wings, and so on. She can also show how these principles and facts combine to lead to Dutch roll. Without pen and paper, however, Barbara is unable to work through these steps. I suggest that this is a case of extended understanding. Barbara understands Dutch roll: she not only knows the relevant facts and theoretical principles; she also "sees" or "grasps" the connections between them. It is simply that these acts of "seeing" or "grasping" don't happen entirely inside her head (for further discussion, see Toon, 2015).

Of course, Churchland is well aware that scientists make use of pen and paper. And yet, he insists, the use of external representational devices should be kept distinct from understanding proper:

The prototype activation model is focused first and foremost on what it is to have explanatory understanding of a problematic thing, event, or state of affairs. The linguistic expression, exchange, or production of understanding, should there be any, is an entirely secondary matter" (1989, p. 198).

According to Churchland, an explanation—in the sense of a set of sentences written down on paper—may *represent* a scientists' understanding of some phenomenon and it may be enough to *cause* that understanding in others (1996a, p. 258). The understanding itself, however, remains entirely internal. The notion of extended understanding suggests that this view of the role of external representations is mistaken. In Barbara's case, external representations do not serve merely to represent her understanding or pass that understanding on to other people. Instead, the pen and paper is itself part of the material basis that realises Barbara's understanding of the phenomenon. In criticising the DN model, Churchland objects that working through a DN explanation takes some time, whereas understanding often dawns upon us almost immediately. We see that the kitchen is filled with smoke and realise straightaway that the toast is burning (1989, p. 199). Barbara's case serves to remind us that not all understanding is like this, however. In the case of more complex phenomena, such as that of Dutch roll, exercising our grasp of the

relevant facts may take more time and involve prolonged and highly skilled interaction with external, material devices.

If scientists' cognitive processes and mental states can extend into the environment, then Churchland's own approach looks too narrow. What about traditional, sentential epistemology? In some respects, it might now seem to be on safer ground. For even if Churchland is right to say that the brain does not operate on language-like entities, such entities *will* often be found in scientists' extended cognitive systems. After all, Barbara *writes down* the various facts and theoretical principles required to explain Dutch roll. In this sense, it might seem that the sentential story is vindicated (Bechtel, 1996; see also Clark, 1989).

And yet not all cases of understanding will involve external, linguistic representations. In this vein, Churchland (1996b) argues that non-human animals and pre-linguistic children can possess understanding. For Churchland, this supports his non-linguistic, PA model. Rather than insisting upon a single, universal account of the nature of understanding, however, we might instead allow for a range of different cases. In some instances, understanding might depend upon external, linguistic representations, while in others it might not. And, of course, even where external representations are involved, they might not be linguistic (Bechtel 1996). Rather than writing down various facts and principles, for example, Barbara might instead resort to working with graphs and diagrams, sketching the plane from various angles and positions. Alternatively, she might need to pick up a plastic model of a plane, imagining it being buffeted by a crosswind and tilting its wings from side to side. Or she might gesture with her hands instead. Each of these cases might require a different account of the underlying dynamics of cognition and each might find itself at odds with a traditional, sentential story.

So it appear that, although the notion of extended cognition might point to shortcomings in Churchland's own approach, his eliminativist challenge must still be met. Can we continue to use the sentential framework of folk psychology and talk about scientists believing particular propositions, inferring from one claim to another and "seeing" connections between them? Or must we search for a radical new framework—or perhaps

frameworks—which can capture the complex interplay that takes place between scientists’ internal, pattern-matching abilities, bodily skills and external, material devices? In response to this challenge, I suggest that we turn to fictionalism.

4 Mental fictionalism

According to the fictionalist, folk psychological states like beliefs and desires are useful fictions (Wallace, 2007; Demeter, 2013a). In earlier work, I have developed a version of this approach by drawing on Kendall Walton’s theory of fiction (Toon, 2016). The guiding idea behind this approach is that our ordinary talk about mental states can be understood along the same lines as acts of pretence within a game of make-believe.

Suppose that some children are playing with a doll. In Walton’s terminology, the doll is a *prop* and the rules that govern the children’s game are called *principles of generation* (Walton, 1990). The props in a game, together with its principles of generation, require the children to imagine certain things. For example, if the doll is in its pushchair, then the children are to imagine that the baby is in its pushchair. In Walton’s terminology, this is *fictional* in the game. Children also *participate* in games in various ways. For example, they might push the doll along in the pushchair, thereby making it fictional that they are taking the baby for a walk. They also participate verbally. Significantly for our purposes, these acts of verbal participation can be used to make genuine assertions. Suppose George says “The baby’s in her pushchair”. When he says this, George isn’t *really* claiming that there is a baby in the pushchair; he is “only” pretending. And yet, by doing so, George indicates that pretending in this way is appropriate. As a result, George *does* make a genuine assertion: he claims that the state of the props is such that to pretend in the way that he does is, fictionally, to speak the truth. In other words, he claims that the doll is in the pushchair.

Games with dolls are what Walton (1993) calls *content oriented*: the children’s interest is not with the doll *per se*, but with the content of the make-believe world it helps to create. In some cases, however, our interest lies in the props themselves; the role of make-believe

is to help us to understand the props. Walton (1993) argues that this *prop oriented* make-believe may be found in cases of metaphor:

“Where in Italy is the town of Crotone?, I ask. You explain that it is on the arch of the Italian boot. ‘See the thundercloud over there – the big angry face near the horizon,’ you say; ‘it is headed this way’. Plumbers and electricians distinguish between ‘male’ and ‘female’ plumbing and electrical connections. [...]

All of these cases are linked to make-believe. We think of Italy and the thundercloud as something like pictures. Italy (or a map of Italy) depicts a boot. The cloud is a prop which makes it fictional that there is an angry face. Male and female plumbing or electrical connections are understood to be, fictionally, male and female sexual organs. [...] But our interest, in these instances, is not in the make-believe itself, and it is not for the sake of games of make-believe that we regard these things as props. [...]

Make-believe [...] is useful in these cases [...] for articulating, remembering, and communicating facts about the props – about the geography of Italy, or the identity of the storm cloud, or functional properties of plumbing or electrical fixtures [...]. It is by thinking of Italy or the thundercloud or plumbing connections as potential if not actual props that I understand where Crotone is, which cloud is the one being talked about, or whether one pipe can be connected to another.” (Walton, 1993, pp. 40-41)

Suppose that Elaine says “Crotone is on the arch of the Italian boot”. When she says this, Elaine is not claiming there really *is* a giant boot in the Mediterranean; she is involved in pretence. And yet, like George when he talks about the baby, Elaine also makes a genuine assertion: she claims that the state of the props is such that to pretend in the way that she does is, fictionally, to speak the truth. In other words, Elaine asserts that Crotone is in a particular spot on the southern coast of Italy. In this case, make-believe is not interesting

for its own sake; instead, it provides a vivid and memorable way of communicating a fact about the props in the game—that is, about the geography of Italy.

I suggest that we understand ordinary talk about mental states along similar lines. The Italian boot provides a useful game for understanding the geography of Italy. In a similar manner, folk psychology provides a useful game for understanding people and their behaviour. In this game, we imagine that people have certain states inside their heads, such as beliefs and desires. We also imagine that these states are caused by certain experiences, interact in certain ways, and cause certain sorts of behaviour. We are no more committed to the existence of this inner machinery than we are to the existence of the Italian boot. And yet pretending that this machinery exists serves an important purpose, providing us with an enormously valuable means of explaining and predicting people's behaviour.

Although folk psychological talk involves pretence, it also allows us to make genuine assertions. Suppose that Elaine says “George wants to go to the cinema tonight”. According to the fictionalist, when she says this, Elaine is not claiming that there is a particular sort of causal state inside George's head. Instead, she is invoking a familiar pretence within the game of folk psychology. By doing so, however, Elaine does make a genuine assertion about George: she claims that he is in some state *S* such that, fictionally, she speaks the truth. There are many different situations that would make Elaine's pretence appropriate: George might be standing patiently in a queue outside the box office, eagerly buying his tickets online, loudly complaining that he has to work tonight instead, and so on. Invoking the game of folk psychology provides Elaine with a concise and extremely valuable—in fact, indispensable—means for picking out this disparate set of scenarios and thereby describing George and his behaviour.

In earlier work, I have tried to demonstrate the attractions of this way of understanding folk psychology and its advantages over related approaches, such as behaviourism and instrumentalism (Toon, 2016). In what follows, I want to focus on how fictionalism can help us to respond to the eliminativist's challenge to epistemology and philosophy of science.

5 Epistemology as fiction

The eliminativist claims that folk psychology is bad theory of mind and cognition. As a result, talk of beliefs, desires and other mental states should go the same way as talk about witches and phlogiston. While it might be difficult to accept, says the eliminativist, this harsh lesson applies to philosophers of science no less than it does to the folk. They too must stop talking about scientists believing certain claims, inferring from one proposition to the next, and so on. This “sentential” view of cognition must be jettisoned as a faulty picture of the reality of scientists’ cognitive lives. In its place, we must learn to adopt the radical new theories formulated by our best cognitive science. For Churchland, this means embracing the technical vocabulary of connectionism and learning to describe and assess scientists’ reasoning, knowledge and understanding in terms of networks, activation vectors and prototypes. As we have seen, more recent movements in cognitive science point in a different direction, seeking to capture complex interactions between our brains, bodies and external devices—some linguistic, others not. Taking this route, the final framework(s) that might replace folk psychology remain as yet unclear.

Fictionalism suggests an alternative path. While the eliminativist claims that folk psychology is a bad theory, the fictionalist denies that the folk were trying to give a theory of mind and cognition in the first place. According to fictionalism, when the folk say that someone has a particular belief, they are not making a claim about their inner machinery. Instead, talk about mental states is a useful fiction. As a result, the legitimacy of folk psychology does not depend upon cognitive science discovering beliefs and desires inside the head. Even if such states do not exist, says the fictionalist, it is useful to talk as if they do. This suggests a way for philosophers of science to respond to Churchland’s challenge. Rather than treating the traditional, sentential framework as a theory of the nature of cognition, we ought instead to regard it as a useful metaphor for describing scientists’ reasoning, knowledge and understanding. Crucially, I suggest, this metaphor serves to encompass not only what happens inside the scientists’ head, but also their interactions with external, material devices (for a similar position, see Dennett,

1996).

To see how this might work, let us return to the case of understanding. As we have seen, both epistemologists and philosophers of science typically characterise understanding in sentential terms. To understand a phenomenon, it is said, someone must believe a set of propositions about it and “see” or “grasp” the connections between them. Churchland urges us to reject this view as a mistaken attempt to capture the underlying dynamics of cognition. The fictionalist suggests that we resist this interpretation of folk discourse. When we attribute understanding to someone, we are not claiming that they have a set of language-like structures inside their head. Instead, we are invoking the game of folk psychology; we are availing ourselves of a familiar and invaluable form of pretence. As a result, the epistemologists’ characterisation of understanding in sentential terms need not be given up if it turns out that the brain does not operate on language-like structures.

When we invoke our pretence, we do make a genuine assertion: we claim that the person to whom we are attributing understanding is in some state *S* such that, fictionally, we speak the truth. Importantly, this state can encompass factors that extend beyond the person’s brain and body. As we saw in Section 3, understanding can take any number of different forms and will often involve interaction with external devices: Barbara’s understanding of Dutch roll might depend upon her writing down equations with pen and paper, drawing diagrams, working with models, or even gesturing. When we say that Barbara understands Dutch roll, we are saying that she is in any one of *these* states—the states such that it is appropriate to pretend as we do. In some of these cases, there will be language-like structures involved, so that our sentential characterisation of understanding might come close to the truth. In other cases, the underlying dynamics of cognition might stand at odds with the sentential framework. Despite this, each of these different scenarios counts as a case in which our pretence is appropriate.

Why the detour via make-believe? Why talk about things that don’t exist? One reason is that metaphor allows us to express things that we cannot express in a straightforward, literal description. Recall the Italian boot. In this case, we can offer a literal paraphrase for our assertion about Crotone: we are claiming that it lies on the southern coast of Italy

between Capo Colonna and Taranto. In other cases, however, a literal paraphrase might not be available. Thus, Stephen Yablo argues that some metaphors are *representationally essential* (1998, p. 250). In such cases,

“the language might have no more to offer in the way of a unifying principle for the worlds in a given content than that they are the ones making the relevant sentence fictional. It seems at least an open question, for example, whether clouds we call *angry* are the ones that are literally F, for any F other than ‘such that it would be natural and proper to regard them as angry if one were going to attribute emotions to clouds’”. (Yablo, 1998, p. 250)

Like the metaphor of angry clouds, our folk psychological metaphors might also be representationally essential (Toon, 2016). In some cases, understanding might involve manipulating external, linguistic structures. In others, it might involve diagrams, graphs or models. In still other cases, it might be entirely internal. Despite the hopes of Churchland and others to offer a single, overarching theory of understanding, it might turn out that there is little in common between these various different cases—apart from that each counts as a case in which it is appropriate to attribute understanding within the game of folk psychology.

Metaphors also bring further benefits. They introduce “framing effects” in which we are asked to “see” our primary subject (e.g. Italy, clouds) in terms of another, secondary subject (e.g. a boat, emotions) (Moran, 1989; Beardsley, 1962). This can be extremely fruitful, leading us to a host of further insights and prompting a range of further questions about the primary subject matter. By asking us to see people as if they had certain inner states interacting in various ways, folk psychology offers an enormously powerful framing effect for explaining and predicting their behaviour (Toon, 2016; see also Demeter, 2013b). For example, if Barbara understands Dutch roll, we can infer that she has various beliefs about it. If we also assume that Barbara possesses various other mental states (e.g. the desire to avoid feeling sick), then we will also predict that she will act in certain ways (e.g. designing her new aircraft in ways that minimise Dutch roll). We can also ask whether, in order to possess understanding, the propositions that Barbara believes

must be true (Elgin, 2009) or ask how exactly how “seeing” or “grasping” a set of propositions differs from merely knowing them (Grimm, 2006).

The key advantage of fictionalism over eliminativism, then, is that it allows us to retain our ordinary categories for making sense of scientists’ epistemic activities. Such talk serves its own distinctive purposes and need not await vindication from our final science of the mind. Of course, the fictionalist can still share the eliminativists’ keen interest in the latest developments in cognitive science. If we want to understand exactly how it is that scientists recognise certain patterns, for example, or explore the way in which they interact with graphs or diagrams, the sentential framework may have little to tell us. Here we will need to consult our latest theories in these domains. And yet, the fictionalist insists, the sentential framework will continue to play its role, allowing us to draw together otherwise disparate forms of behaviour and explore their interconnections. Indeed, folk psychology might retain this role, even once our final cognitive science is in hand.

Conclusion

Eliminativism presents an important challenge to epistemologists and philosophers of science. Might the language that we use to describe reason, knowledge and understanding turn out to be fundamentally misguided? If so, must we find a radically new framework for describing our epistemic activities? Fictionalism offers a promising alternative.

According to the fictionalist, our traditional, sentential framework plays a vital role in making sense of our epistemic practices, even if it fails to describe our inner machinery—even if, in fact, it was never intended to do that. For Churchland, the sentential framework is a bad theory. For the fictionalist, it is not a theory, but a metaphor—and an invaluable one.

References

Beardsley, M., 1962. The Metaphorical Twist. *Philosophy and Phenomenological*

Research, 22(3), 293–307.

Bechtel, W., 1996. What Should a Connectionist Philosophy of Science Look Like? In: R. McCauley, ed. 1996. *The Churchlands and Their Critics*. Cambridge, Mass.: Blackwell. pp. 121-144.

Churchland, P. M., 1981. Eliminative Materialism and the Propositional Attitudes. *The Journal of Philosophy*, 78(2), 67–90.

Churchland, P. M., 1989. *A Neurocomputational Perspective: The Nature of Mind and the Structure of Science*. Cambridge, MA: MIT Press.

Churchland, P. M., 1996a. On the Nature of Explanation: William Lycan. In: R. McCauley, ed. 1996. *The Churchlands and Their Critics*. Cambridge, Mass.: Blackwell. pp. 257-264

Churchland, P. M., 1996b. Bechtel on the Proper Form of a Connectionist Philosophy of Science. In: R. McCauley, ed. 1996. *The Churchlands and Their Critics*. Cambridge, Mass.: Blackwell. pp. 265-270.

Clark, A., 1989. *Microcognition: Philosophy, Cognitive Science, and Parallel Distributed Processing*. Cambridge, MA: MIT Press.

Clark, A., 2008. *Supersizing the mind: Embodiment, Action, and Cognitive Extension* Oxford: Oxford University Press.

Clark, A and Chalmers, D., 1998. The Extended Mind. *Analysis*, 58(1), 7–19.

Demeter, T. ed., 2013a. Mental Fictionalism [Special Issue]. *The Monist*, 96(4).

Demeter, T., 2013b. Mental Fictionalism: The Very Idea. *The Monist*, 96(4), 483–504.

Dennett, D., 1996. *Kinds of Minds*. New York: Basic Books.

de Regt, H., Leonelli, S. and Eigner, K. eds., 2009. *Scientific Understanding: Philosophical Perspectives*. Pittsburgh University Press.

Elgin, C., 2009. Is Understanding Factive? In: D. Pritchard, A. Millar, and A. Haddock

- eds. 2009. *Epistemic Value*. Oxford: Oxford University Press. pp. 322–329.
- Fodor, J., 1975. *The Language of Thought*. Cambridge, MA.: Harvard University Press.
- Giere, R. (1988). *Explaining Science*. Chicago: University of Chicago Press.
- Giere, R., 2002. Scientific cognition as distributed cognition. In: P. Carruthers, S. Stich and M. Siegal, eds. 2002. *The cognitive basis of science*. Cambridge: CUP. pp. 285-299.
- Giere, R., 2006. *Scientific Perspectivism*. University of Chicago Press.
- Grimm, S., 2006. Is Understanding A Species Of Knowledge? *British Journal for the Philosophy of Science* 57(3): 515–535.
- Hempel, C., 1965. *Aspects of Scientific Explanation and Other Essays*. New York: Free Press.
- Kvanvig, J., 2003. *The Value of Knowledge and the Pursuit of Understanding*. Cambridge: Cambridge University Press.
- Lycan, W., 1996. Paul Churchland's PDP Approach to Explanation. In R. McCauley, ed. 1996. *The Churchlands and Their Critics*. Cambridge, Mass.: Blackwell. pp. 104-120.
- Menary, R., 2007. *Cognitive integration: mind and cognition unbounded*. Basingstoke: Palgrave Macmillan.
- Menary, R., ed., 2010. *The Extended Mind*. Cambridge, MA: MIT Press.
- Moran, R., 1989. Seeing and Believing: Metaphor, Image, and Force, *Critical Inquiry*, 16(1), 87–112.
- Nersessian, N. J., 2005. Interpreting scientific and engineering practices: Integrating the cognitive, social, and cultural dimensions. In: M. Gorman, R. Tweney, D. Gooding, and A. Kincannon, eds., 2005. *Scientific and technological thinking*. New Jersey: Erlbaum. pp. 17-56.
- Riggs, W., 2003. Understanding 'Virtue' and the Virtue of Understanding. In: M. DePaul and L. Zagzebski, eds. 2003. *Intellectual Virtue: Perspectives from Ethics and*

Epistemology. Oxford University Press. pp. 203–226.

Robbins, P., and Aydede, M., 2009. *The Cambridge handbook of situated cognition*. Cambridge University Press.

Rowlands, M., 1999. *The Body in Mind: Understanding Cognitive Processes*. Cambridge: Cambridge University Press.

Rumelhart, D., Smolensky, P., McClelland, J., and Hinton, G., 1986. Schemata and sequential thought processes in PDP models. In: Rumelhart et al., eds., 1986. *Parallel Distributed Processing*. Cambridge, MA: MIT Press.

Suppe, F., 1974. *The Structure of Scientific Theories*. Chicago: University of Chicago Press.

Toon, A. 2014. Empiricism for cyborgs. *Philosophical Issues* 24 (1): 409-425.

Toon, A., 2015. Where is the understanding? *Synthese* 192 (12): 3859-3875.

Toon, A., 2016. Fictionalism and the Folk. *The Monist* 99: 280-295.

Van Fraassen, B. C. (1980). *The Scientific Image*. Oxford University Press.

Wallace, M., 2007. Mental Fictionalism. Unpublished manuscript.

Walton, K., 1990. *Mimesis as Make-Believe: On the Foundations of the Representational Arts*. Harvard: Harvard University Press.

Walton, K., 1993. Metaphor and Prop Oriented Make-Believe. *European Journal of Philosophy*, 1(1), 39–56.

Wheeler, M., 2005. *Reconstructing the Cognitive World*. Cambridge, MA: MIT Press.

Wilson, R. A., 2004. *Boundaries of the Mind: The Individual in the Fragile Sciences: Cognition*. Cambridge: Cambridge University Press.

Yablo, S., 1998. Does Ontology Rest on a Mistake? *Proceedings of the Aristotelian Society, Supplementary Volume*, 72, 229–261.