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Does the Man on the Clapham Omnibus have a Labcoat in his Closet?*

Eliminative Materialism is Based on a Valid Argument from the False Premise that Folk Psychology is an Empirical Theory

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Introduction

> Eliminative Materialism is the thesis that our common-sense conception of psychological phenomena constitutes a radically false theory, a theory so fundamentally defective that both the principles and the ontology of that theory will eventually be displaced, rather than smoothly reduced, by completed neuroscience. (Paul Churchland, 1981, p. 67).

There are two main strands running through this paper. Firstly, we shall claim that there is a hidden promissory note in Churchland's argument about the prospects for neuroscientific data being deployed as part of a natural language idiom that will completely supersede the folk psychological idiom. Secondly, we shall argue that Churchland's characterisation of Folk Psychology as theoretical is at the very least problematic for the Eliminative Materialism programme.

We shall use these arguments to show that the displacement of Folk Psychology by completed neuroscience is not sufficiently supported by Churchland's arguments. This critique does not however, rule out the possibility of a consistent form of Eliminative Materialism.

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Our conclusion will be that the price of a consistent eliminativism is a much more thorough explication of the links between a prospectively 'complete' neuroscience and *any* changes in natural language.

The hidden promissory note in Eliminative Materialism

There are, we want to argue, two promissory notes to be found in the above formulation of Eliminative Materialism that Churchland advocates. The first one is well known to most that are even slightly familiar with the eliminativist's program. This is the promise of 'completed' neuroscience. Churchland is entirely open about this promissory note. Although it can be doubted if the qualification 'completed' is not too strong, a charitable reading would only demand a matured neuroscience. Optimism is not (yet) a crime.

The second promissory note consists of two parts that are closely related: a promise of a natural language idiom that effectively deploys neuroscientific data and a promise that we would be able to use the information from neuroscience (whether it be in natural language or not) in the social domain, so as to allow for a better social practice. This second, silent promissory note is implicit in the claim that Churchland makes. This basic claim of Eliminative Materialism, as we see it, can be redescribed in the following way: there will be a popular idiom (or natural language) that will draw sufficiently on the extra content that the completed or matured neuroscience has, over and above the content that Folk Psychology has, so as to allow us to act strategically more effectively than Folk Psychology allows us to do. Not only does completed neuroscience allow us to be more successful, but it is also true (hence, perhaps, the qualification 'completed'). It is the truth of the completed neuroscience in combination with the success that results from its implementation that explains and warrants the elimination of Folk Psychology.

If we are to give a charitable reading of Churchland it seems only fair that we grant him access to his explicit promissory note: he gets completed neuroscience for free. But now we arrive at the point where the trouble starts. The hidden promissory note in this claim is that the form of this true, completed neuroscience is such that some of its radical content (that makes it more effective than Folk Psychology) can be mobilised in terms of the popular idiom.

Here again, we must be charitable in our reading of Churchland. In his account of explanatory understanding he makes use of what he calls 'prototype activation vectors'. Prototypes of different kinds, such as etiological or social and moral ones, are activated when an organism has an explanatory understanding of 'a problematic thing, event, or state of affairs' (Churchland, 1989, p. 198). These prototype activation vectors are directly informed by neuroscience. However, no mention of a popular idiom is made at this time. All that the account of the prototype activation vectors offers so far is a model of what we would have when we have explanatory understanding. In fact, Churchland even says: 'The linguistic expression, exchange, or production of such understanding, should there be any, is an entirely secondary matter.' (Churchland, 1989, p. 198). Thus, we ought to grant that it does not *seem* necessary for Churchland to mobilise the radical content of completed neuroscience in terms of a popular idiom in order to make eliminativism work.

It does not *seem* necessary, but it is, because if completed neuroscience is to displace Folk Psychology, then its radical (and better) content will have to be mobilised in *some* way that will allow us to *use* this better theory. Churchland confirms such a line of thought when he says:

> The positive idea behind the projected displacement of Folk Psychology is the hope of a comparably superior account of human cognition and mental activity. If better chemical theory can sustain better chemical practice, then better psychological theory can sustain better social practice (Churchland, 1993, p. 219).

Regardless of the persuasiveness of this analogy, we must understand Churchland to be firmly committed to an increased practical value to whatever it is that must replace Folk Psychology. This increased practical value requires that the content of completed neuroscience be mobilised in some way such that we can use it. It is entirely unclear what the vehicle for this mobilisation is to be if it is not natural language (some popular idiom).

Perhaps it is not the case that it must be a natural language that will be the vehicle for the better theory, but whatever it is, it will have to allow us to use the radical content that completed neuroscience has over and above Folk Psychology in the appropriate strategic domain. And we are not presented with a clear argument that shows that this promise can be fulfilled.

The most obvious way in which we might expect such a mobilisation of the strategically relevant parts of completed neuroscience is by means of a natural language. We believe that this is the approach that Churchland wishes to take. He says:

> it is not inconceivable that some segment of the population, or all of it, should become intimately familiar with the vocabulary required to characterise our kinematical states, learn the laws governing their interactions and behavioral projections, acquire a facility in their first-person ascription, and displace the use of Folk Psychology altogether, even in the marketplace (Churchland, 1989, p. 18).

It almost goes without saying that the displacement of Folk Psychology would drastically change the way natural language looks. This drastic change could range from changes in *our* natural language to the development of an entirely new and much more effective natural language. At the very least the use of all the propositional attitudes would disappear. For such a transformation of natural language to take place successfully, there must be versions of the prototype activation vectors at the level of natural language. That is, we must be able to use the better psychological theory (i.e. completed neuroscience) in terms of our popular idiom, or natural language. It could be argued that those 'natural language versions' of the prototypes are appropriately simplified versions of the underlying theory, so as to make the theory useable. But even if this is so, we must not forget that such simplified versions must not be too simple. For, these prototypes must allow us to perform with a higher success rate than Folk Psychology allowed us to do. Thus, they must guarantee more strategic or social success, while replacing the strategic shortcuts of Folk Psychology with true, albeit simplified, prototypes that are immediately informed by completed neuroscience. Neuroscience, after all, is where the information that will make us more successful social beings is to be found. Churchland himself illustrates the informational density of neuroscience:

> With roughly 10^{11} nonsensory neurons, the human brain commands a global state space of fully 10^{11} dimensions. Each brain subsystem will typically be operating with something like one thousandth of that number, which gives a typical specialised state space approximately 10^{8} proprietary dimensions to play with. This will allow for some stunningly complex and fine-grained representations,

> since a single vector with 10^8 elements can code the contents of an entire book. A space state of 10^8 dimensions will also allow for similarly stunning variety of coding vectors. If we assume that each neuron admits of only 10 distinct levels of activation (a serious underestimation), then that typical specialised state space must have at least […] $10^{100,000,000}$ functionally distinct positions within it. This is the number of distinct possible *activation vectors.* To appreciate the magnitude of this number recall that the total number of elementary particles in the physical universe, photons included, is only about 10^{87}. And recall that, on the above assumptions, your brain commands something like a thousand of these specialised state spaces. (Churchland, 1989, p. 209).

This reveals the first part of the hidden promissory note: if natural language will be the vehicle for the extra information that completed neuroscience is going to provide, then we are assuming that natural language can provide effective theoretical access to the data of such an informationally dense subject matter, and that it can and will do so in the relevant way. This means that a natural language would have to be able to express the added information that completed neuroscience provides in the right (social) domain, so as to allow humans to function better than Folk Psychology allowed us to do. It is by no means self-evident that this is possible. The fact that we have acquired a better theory does not guarantee that this new theory will displace the idiom that stems from the old theory. The idiom of Newtonian physics, for example, has not been displaced by the idiom of Einsteinian relativity theory. The question must be if natural language can provide effective theoretical access to such an informationally dense subject matter while retaining the radical, extra content that makes completed neuroscience the better theory. And it must be the better theory in a strategically relevant domain. The differences between the popular idiom of Folk Psychology and the new popular idiom of completed neuroscience must be the kinds of differences that matter to our social practices. This, surely, must be a condition on the possible displacement of the old theory.

We do not want to misunderstand Churchland's view by thinking that our new and improved natural language is just going to perform the same tasks that Folk Psychology performed, but disguised by the use of 'neuro-speak' (perhaps as the neurocomputational counterpart of 'psycho-babble'). Clearly, Churchland promises improvement and this

improvement must come from the implementation of the content of the better theory in our natural language in ways that make our natural language more effective as a tool of social practice.

But we may have been asking the wrong question here. It is not so much the question whether or not natural language can provide theoretical access to such an informationally dense subject, but rather whether or not the language users can work with any language that *can* do so. Perhaps they cannot. But then, we must not forget that Churchland said that 'the linguistic exchange, expression, or production of (explanatory) understanding, should there be any, is an entirely secondary matter'. It may be that the implementation of completed neuroscience is not to be sought after in terms of a natural language, but rather in terms of immediate brain to brain communication (whatever that may be like). This brings us to the second part of the hidden promissory note.

This part of the hidden promissory note makes the following claim: humans will be able to deal with, or use the information of neuroscience and they will be able to do so in a way that improves on the performance of Folk Psychology. This might well require us to attain a firm grasp of some particularly difficult mathematics that would allow us to organise and manipulate the informationally dense subject matter of neuroscience. Even if mathematics is the right theory, and it can be expressed in a form of natural language, it is not at all clear that this promise can be kept. Perhaps it is necessary to change humans to such a degree that we are able to make use of the advantages that completed neuroscience has to offer. (Remember that we are not merely trying to describe accurately what our psychology is like; we are aiming to mobilise this theory in the relevant domain; that of our social practice. Being right is simply not good enough). Naturally there are all kinds of interesting science fiction scenarios to be had that suggest to us what this might be like. Immediate brain to brain communication without any identifiable natural language intervening, is an example.[1] Such innovation can take place in two different ways: we can evolve naturally to become languageless users of completed neuroscience, or we can use technology to adapt our physiology. But notice, that even in such extreme scenarios, it is not clear that we *would* be able to use the

[1] One could ask what such methods of exchange of information should be called. Perhaps we would want to call them natural language after all. The point here, however, is that regardless of what we would call such systems of communication, they would not look very much like our present natural language and they would require adaptations to us (physiologically). Thus, that we might want to call these systems language does not affect the argument here.

organising theory (including its mathematics) that would allow us to manipulate the informationally dense subject matter of completed neuroscience effectively in the social domain.

Perhaps these scenarios are not all that far fetched. But the promise that this is what will happen and thus we should abandon Folk Psychology is quite a different one from the original claim that we ought to replace Folk Psychology because it is a false theory. Implicit in our suggestion that our physiology might change, so as to accommodate completed neuroscience without the use of a natural language, whether it be through evolution or through technology, is the notion that there is a systematicity to be had from the actual processes that go on in our brains that will replace the systematicity we gain from our natural language. Whatever the regularities are that we would find would, again, have to be deployable in the domain of our social practice. Otherwise, there would be no argument for the elimination of Folk Psychology.

Further, it is not clear what an 'explanatory understanding' without any natural language would be like.[2] It is for these two reasons, and because Churchland's attack on Folk Psychology focuses mostly on the propositional attitudes that we think that he wants to hold on to natural language, while replacing the folk psychological theory that has been normalised into it with completed neuroscience. But even when we want to hold on to natural language, there is no guarantee that there could be any such language that would allow the highly complex and informationally dense neuroscientific theory to be put into terms that simplify it sufficiently, while retaining the additional and radical content of the theory that makes it superior to Folk Psychology, *and* would allow us to use it in everyday life. If this is not possible, then replacing our Folk Psychology-infused natural language with a neuroscience-infused natural language might well require some major changes in our physiology just as any of the science fiction scenarios do.

Churchland recognises the science fiction scenarios of brain to brain communication and the like as interesting, future possibilities, or even consequences of the completion and implementation of neuroscience and of the elimination of Folk Psychology (see Churchland, 1989, chapter I, §5). But if we are right that even the replacement of Folk Psychology by

[2] It is not entirely clear that mathematics would be an example of a theory that could provide us with an explanatory understanding without the use of a natural language. Would mathematics not need natural language as a vehicle for us to understand what it is that it 'explains' to us?

completed neuroscience *within* our natural language would require the physiology of the language users to change quite drastically, in order for them to be able to use such a more accurate natural language effectively in the right strategic domain, then Churchland seems to have mistaken for a consequence of his argument what should have been a premise. That is to say, if it is the case that in order for us to be able to *use* the vast amount of data from neuroscience in our everyday, social interactions, to a greater degree of success than Folk Psychology could offer, we need to change physiologically, then this physiological change (or at least its possibility) should be a condition on the actual elimination of Folk Psychology, not merely an interesting and tentative consequence.

Notice that these arguments against the elimination of Folk Psychology on the grounds that Churchland offers do not rule out the possibility of the elimination of Folk Psychology altogether. What has changed with these arguments, if we are right, are the conditions under which such elimination could take place.

Hidden behind the arguments against Folk Psychology are the silent assumptions that our natural language will be able to sustain an informationally dense theory such as neuroscience (while retaining the relevant extra information that this theory has to offer), and that if natural language can sustain this theory, we will be able to use this language with greater success than Folk Psychology had to offer in the strategically relevant domain of our social practices.

In short, we think that it is far from obvious (and should thus not be a silent premise), that even if neuroscience is complete, its radical, innovative content will be mobilisable at the same level of mediation as Folk Psychology is, namely at the level of natural language.

Further, we think that, even if it were mobilisable in terms of natural language, it is still far from obvious that the content of the theory would be computationally accessible to ordinary social practice, or, for that matter, to ordinary social practitioners. It looks, then, as if the man on the Clapham Omnibus does not have a labcoat in his closet, and even if he did, he would not know how to put it on.

The evolution of Folk Psychology

Some philosophers are prepared to accept and even to insist on the theoretical character of our commonsense folk psychology (Folk

> Psychology), while maintaining that, on the whole, the empirical evidence still indicates that Folk Psychology, *qua* theory, is at least roughly *true*. This approach at least locates the issue where it should be located - in the empirical trenches. (Paul M. Churchland, 1993)

Our second set of objections to Paul Churchland's version of Eliminative Materialism examines the context of elimination. Churchland's view is that, if scientifically informed theory *would* yield improved practical results in the social domain, then it *should* eliminate the substandard folk theory used to date. Two related presuppositions are apparent in this claim: 1. Folk Psychology is theoretical in a manner relevantly analogous to scientific theory, and 2. The normative constraints on scientific theory are appropriate to non-institutional social practice. We concur with Churchland that the survival of Folk Psychology is a contingent matter, and one best studied naturalistically. But we argue against the view that the constraints shaping the evolution of the behaviour we call 'Folk Psychology' are to be found in its failure as a proto-scientific theory.

Paul Churchland claims that any attempt to hold the modern epistemological position that 'all human knowledge is speculative and provisional' simultaneously with a view that Folk Psychology is not accommodating to the methodologies we use to eliminate false scientific theories displays 'bad faith', or 'inauthenticity'. According to this view, ours is an 'inauthentic' position, one that does simultaneously hold to these apparently contradictory views. We advocate the hypothesis that Folk Psychology is eliminable, but not by the means appropriate to scientific development. We hold that Paul Churchland's characterisation of Folk Psychology as theoretical is premised on a description of the behaviour he wishes to eliminate that is unusually attenuated for a philosopher committed to naturalism. Folk Psychology may be articulated theoretically, but in its everyday use it is *not always* articulated theoretically. These non-theoretical, pragmatic uses of the folk psychological idiom are not straightforwardly amenable to reduction in the manner advocated by Paul Churchland, but their elimination is certainly not ruled out by other means.

Folk Psychology should be considered more analogous to *a collection of technologies* rather than a *unified theory*. Paul Churchland's position should then be regarded as glossing over the differences between science and technology, such that he ignores the possibility that Folk Psychology may be eliminated in a manner more akin to technological change than scientific change. In a sense, Paul Churchland is too wedded to the implicit

normative aspects of Folk Psychology to notice their persistence within his apparently radical position. Eliminative Materialism fails because it is too conservative in this regard.

Another 'it serves quite different purposes' objection

> Let us begin with the explanation of human (and animal) behaviour. The fact is that the average person is able to explain, and even predict, the behaviour of persons with a facility and success that is remarkable. (P.M. Churchland, 1989, p.2)

Paul Churchland, in '*Evaluating Our Self Conception*', defends Eliminative Materialism against objections proposed by Barbara Hannan (1993), who argued against Eliminative Materialism on the basis that it ignored many of the functions of Folk Psychology which do not readily correspond to the 'game or the goals of a typical scientific theory' (P.M. Churchland, 1993, p.217). Churchland argues that Hannan provides a 'narrow and cartoonish conception of what theories are and what they do' (1993, p.217). We claim that Paul Churchland is too liberal in his account of theory, and that a modified version of Hannan's objections is more robust than Paul Churchland allows for.

As the quotation above suggests, Churchland, like many practising psychologists, regards explanation and prediction to be fundamental categories of cognitive activity. But why begin with explanation and prediction? Certainly a philosopher of science would be interested in *these* roles, they are after all the roles we usually assign to theories. But any questions concerning the persistence of a particular form of Folk Psychology over time must address *all* the roles Folk Psychology plays. The failure of Folk Psychology in one of its domains will not be critical if it has no competitors in its other significant domains. Paul Churchland bases his arguments on the explanatory and predictive roles of Folk Psychology, which *are* undoubtedly important. If these are not even claimed to be exhaustive characterisations of the uses of Folk Psychology, why would we regard them to be the points at which failure would be sufficient to warrant elimination?

The danger inherent in these attenuated descriptions of behaviour is that we misjudge their functional stability. If we are hasty in our judgement of what is significant in a complex phenomenon, we risk oversimplifying

our description of it to the extent that we build our conclusions into our very framing of the problem:

> 308. How does the philosophical problem about mental processes and states and about behaviourism arise? -- The first step is the one that altogether escapes notice. We talk of processes and states and leave their nature undecided. Sometime perhaps we shall know more about them -- we think. But that is just what commits us to a particular way of looking at the matter. For we have a definite concept of what it means to learn to know a process better. (The decisive movement in the conjuring trick has been made, and it is the very one that we thought quite innocent.) -- And now the analogy which was to make us understand our thoughts falls to pieces. So we have to deny the yet uncomprehended process in the yet unexplored medium. And now it looks as if we had denied mental processes. And naturally we don't want to deny them. **(**Ludwig Wittgenstein, 1953)

We are not convinced that Paul Churchland's description of the functions of Folk Psychology is sufficient for him to avoid the trap Wittgenstein has delineated. The exclusive characterisation of the roles of Folk Psychology as explanatory and predictive is too restrictive. Folk Psychology may well be under threat when articulated as a scientific theory, but eliminative materialism claims a more substantial set of consequences than the modification of our scientific practice. Eliminative Materialism is intended to herald a revolution in the natural language idiom most commonly used in the negotiation of our social interactions. So in order that Eliminative Materialism proceed, Paul Churchland must argue for the crucial significance of the failure of scientific Folk Psychology for the *social* uses of Folk Psychology. It is not sufficient merely to assume that the functions of Folk Psychology are isomorphic with the functions of scientific theories of psychology.

Katherine Wilkes and Barbara Hannan presented a series of objections to Eliminative Materialism on the basis of its alleged misreading of the roles Folk Psychology plays (Wilkes, 1984, Hannan, 1993). Paul Churchland musters a series of arguments against these *'It Serves Quite Different Purposes'* objections. These arguments are best introduced by Paul Churchland's own liberal account of theory. He remarks that 'these premises about the manifold practical functions of Folk Psychology are all

true. Yet the conclusions drawn therefrom betray a narrow and cartoonish conception of what theories are and what they do' (1993). This criticism is a little too hasty. If there are instances of social practice in which Folk Psychology is typically used which are not rigidly teleological then these surely have to be considered as *potentially* central features. It is often stated that the best reason to believe that someone will meet us at a prearranged time is *that they promised*. In practice, success is judged at an extremely gross level of description relative to those studied by the psychological sciences. Even then we accept a relatively large error rate, being quite prepared to acknowledge normal social contingencies as explanations for the failure of our predictions. Many of our social interactions may have this character. An excessively liberal definition of proto-scientific theory hardly enables the apparatus of scientific criticism if it extends to include 'theories', the regular failure of which is considered perfectly acceptable. On at least this point, we believe the Eliminative Materialism arguments fall foul of the 'It Serves Quite Different Purposes' objection.

The refrain we hear often repeated by Paul Churchland is that better theory leads to better practice. As though this were both necessary and sufficient. But any brief examination of the histories of technology and science finds technological innovation preceding theoretical sophistication on a sufficient number of occasions (Laudan, 1981) for us to be profoundly skeptical about this assumption. The question we must answer about this temporal order is whether we would be justified in interpreting the cognitive resources deployed by technologists or artisans as theoretical. On this issue perhaps it is Paul Churchland who displays a narrow and cartoonish view of the shared characteristics of technological and scientific evolution.

We have already seen the potential pitfalls facing the propagation of concepts from completed neuroscience into natural language. The constraints operating on the development of technology, or practice, are very different to those operating on scientific development. Paul Churchland seems to have conflated these two very different scenarios. This conflation forms the basis of his primary objections to our multiple function thesis. Remarking that, 'theory is regularly an intimate part and constituting element in people's second-by-second practical lives' he urges us to:

> Consider the role of circuit theory in the practical day of an electronics engineer designing radios, TVs, and stereos. Consider the role of geometry in the working day of a carpenter. Musical theory in the working day of a composer or jazz musician. Consider … (Paul Churchland, 1993, p.218)

Providing more detail, he remarks that:

> Our best (Kuhn, 1962) and most recent (Churchland 1989, Chapter 9) accounts of what learning a theory amounts to portray the process as much less the memorizing of doctrine and much more the slow acquisition and development of a host of diverse *skills* – skills of perception, categorization, analogical extension, physical manipulation, evaluation, construction, analysis, argument, computation, anticipation, and so forth. (Paul Churchland, 1993, p.218)

Now, some of these skills may well be necessary components of what we should consider learning a theory to involve. The question remains though, whether there are combinations of these skills that don't amount to having learned a theory. When success is the sole criterion used to select performance, have we still learned a theory? If our motivations owe more to habit and practical success than to consideration of the semantics of our linguistic idiom then we can no longer assume that the concepts mobilised in this domain have sufficient semantic stability to be effectively damaged by their scientific failings.

Consider Churchland's example of the composer and the jazz musician. Composers do often learn extremely complex music theory. Is this also the case for the improvisational musician? Many social behaviours involve ongoing reconstruction of their goals, improvisational music performance is one such example. They are not concerned with truth, in the sense in which a scientific theory is judged by the consequences of its semantics, and what may count as success is open to ongoing revision. In these cases there must be criteria Churchland could use to decide between theoretical and non-theoretical practice. After all, if Churchland's argument is valid, then better music theory would 'sustain' better music.

If we fail do develop such criteria, then an *immune system* satisfies Paul Churchland's liberal conditions. Has the immune system of an organism recently recovered from illness learned a theory about

pathogens? It has modified its performance on the basis of experience, and displays a high degree of technical sophistication. Our reluctance to describe such technical prowess as theoretical largely follows from the absence of identifiable semantics in the operations of the system. Even an immune system has, however, an easily identifiable function compared to the folk psychological idiom. When we are concerned with social practice we must address, rather than assume, the generation and appropriation of new domains of activity and their attendant criteria of effectiveness if we are even to reconstruct the intentional idiom as theoretically motivated. Even then, supplementary evidence would be needed to demonstrate that the robustness of the intentional idiom throughout substantial social upheaval was related to its semantic content. Historical robustness might just as well be considered as evidence that the semantics of the theory are not important to its survival.

Churchland completes his list of potential components for theory with his crucial remark, 'Sustaining enhanced practice is what theories typically do, at least for those who have internalized the relevant theories' (1993). The significance of these remarks is, for Paul Churchland, encapsulated by the claim that:

> In sum, the claim that Folk Psychology is an empirical theory is entirely consistent with -- indeed it is explanatory of -- the intricate practical life enjoyed by its adepts. It is typical of theoretical adepts that their practical activities, and their practical worlds, are transformed by the relevant acquisition of knowledge. (P.M. Churchland, 1993, p.218)

But the fact that theory *may* inform and sustain sophisticated practice tells us nothing about whether or not it *actually* does in specific cases. These arguments are perilously close to the fallacy of affirming the consequent. No amount of sophisticated practice is sufficient to reliably indicate the pre-existence of proto-scientific theory.

Paul Churchland states that 'the positive idea behind the projected displacement of Folk Psychology is the hope of a comparably superior social practice rooted in a comparably superior account of human cognition and mental activity' (1993). We have already argued that there are no guarantees that a completed neuroscience would be in a position to inform the folk psychological idiom. Even were it to be in this position,

Laudan (1981) has demonstrated that there are no guarantees of improved effectiveness in practice solely on the basis of better theory.

When Churchland asserts that 'Perversity of practice is a chronic feature of our social history' (1993, p.220) we must remind ourselves that evolutionary theory, even in its most conservative and attenuated form, still regards the 'perversion' of previously adaptive traits to be one of the major sources of innovation. Similarly, as far as social life is concerned, there are no straightforward constraints on our ordinary language that it be functionally justifiable in a manner comparable to scientific practice.

It is one thing to claim that some aspect of cognition cannot be articulated theoretically. We do not claim this, unlike many of the phenomenologically inspired critics of cognitive science. But articulated theory behaves very differently to unarticulated intuition unconstrained by the stricter parameters of scientific practice. When we are interested in the historical selection constraints that may be generated by behaviours of any kind, we must pay attention to the forms they take during *actual* behaviour. Only actual, rather than possible, behaviour is exposed to selection.

The philosophy of science and the attendant perspective from which it evaluates the worth of theories is just not in a position to affect the type of change in social behaviour proposed by Eliminative Materialism. Social evolution does not operate under the same constraints. The Churchlands have fallen foul of one of the classical pitfalls facing evolutionists: they have underplayed the richness of the descriptions we *could* provide for any phenomena facing natural selection. In so doing they have provided a non-naturalistically conceived functional account of folk psychology that downplays the inevitable functional redundancy in any system produced by natural selection. Adaptationism may be the dominant explanatory strategy of Neo-Darwinism, but no evolutionists regard the adaptive function of a trait as a constraint on the new behaviours and structures it may engender.

There are many naturalistic analyses of the development of cognitive capacities. No consensus exists on the manner in which evolutionary constraints interact with the constraints we design and impose on such development. The Churchlands rightly draw our attention to the potential instability of such descriptions, even if their account of the selection mechanisms operating on such descriptions is wide of the mark. However, we cannot agree that the descriptions of theory offered by Paul Churchland are sufficient to license the claims that Folk Psychology can be described as theoretical in a manner analogous to *scientific* theorising, and that it can

and will be eliminated by those selection mechanisms appropriate to scientific theories.

Conclusion

The manner in which scientific ideas spread throughout natural language idioms is complex and unpredictable. Eliminative Materialism makes strong claims about the outcome of this process for the intentional idiom. We have articulated two promissory notes accompanying the Eliminative Materialism programme concerning the ability of a scientific theory to substantially constrain the evolution of a social practice as widespread as the use of the intentional idiom. The radical new content of the theory would have to be accessible in its natural language analogue, and that new content would have to substantially improve the effectiveness of its users in social practice. We are also skeptical concerning claims that the evolution of natural language idioms does, or could, proceed under comparable constraints to those under which scientific theories evolve. A natural language idiom moves in circles less amenable to discipline than Churchland requires.

None of these arguments militate against the possibility of the elimination of Folk Psychology. However, it does not fall within the power of neuroscientists to manage such a change. We contend that there are no principled arguments to be had against the possibility of social upheaval on a scale damaging to Folk Psychology's prospects. Consequently, the future of Folk Psychology should be a matter for gamblers rather than analysts.

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