Behind the Mereological Fallacy[1]

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Abstract
Language based criticisms of the intelligibility of the programme of neuropsychology have made use of the principle that words the meaning of which is established in the context of descriptions of aspects of whole persons cannot be used in that sense to ascribe properties to parts of human bodies. In particular neither human brains nor their parts think, are conscious, imagine, suffer and so on. Recently, Bennett and Hacker have presented the error as a mereological fallacy, because brains are *parts* of persons. However, while brains are parts of human bodies it is not clear that they are parts of persons. I restyle the argument in terms of fields of family resemblances, in such a way that it makes sense to describe the hippocampus as an organ for remembering, but does not support the claim that neuroscience is core psychology. Such fields are networks of meanings linked by two principles. (1) Taxonomies of relevant body parts are determined by the psychological role they play in everyday human life. (2) Many body parts are also identified by the role they play as tools in human activities including psychological tasks. Arguments are developed to show that objections to the idea that brains and their constituent organs are tools are misplaced. Hybrid psychologies are possible.

At this moment two apparently incompatible research programs are at the growing points of academic, scientific psychology. Each has been proposed as successor to the old naive paradigm of 'experimental' psychology. Must they be forever in irreconcilable conflict or is there a way that a hybrid human science could be constructed by making use of both? Powerful arguments against the very possibility of such a hybrid cognitive neuroscience have been presented by Bennett and Hacker,[2] Rundle,[3] Coulter[4] and others.

The research program of neuroscience as psychology is aimed at giving an account of the phenomena traditionally selected for study by psychologists in terms of processes predominantly occurring in the brain and nervous system of the person who displays or experiences them. Typically the research involves identifying those

[1] This paper is based on the Third Marx Wartofsky Memorial Lecture, given at City University of New York, 11 May 2011.

[2] Bennett, M.R. & Hacker, P.M.S. *Philosophical Foundations of Neurosciences* (Oxford: Blackwell, 2003)

[3] Rundle, B. *Mind in Action* (Oxford: Clarendon Press, 1997)

[4] Coulter, J. *Mind in Action* (Cambridge: Polity, 1989)

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regions of the brain that are active when a person is performing some psychological task such as remembering an event or planning an action, and includes studies of synaptic chemistry in relation to such phenomena as moods.[5]

In a recent publication, Harris and Fiske introduce the concept of 'dehumanized perception' to describe the failure of someone to take account of the thoughts and feelings of another. Generally, one would take this failure to be a moral fault. However, by using fMRI scans the authors claim to have shown that while 'participants normally activate a social-cognition neural network to pictures and thoughts of other people; … parts of this network uniquely fail to engage for [the homeless or drug addicts]'. According to the authors, 'disengaging social cognition affects a number of other brain processes and hints at some of the complex psychological [neural] mechanisms potentially involved in atrocities against humanity'. The concept of 'dehumanized perception' conceals a shift in the meanings of the vocabulary of the report from moral depravity to non-moral neural processing. It can easily seem as if the study shows that atrocities against humanity are not moral outrages at all, but features of the nervous systems of the perpetrators of genocide. Importantly, we cannot say 'faults in the nervous systems' since this would import normative considerations into neuroscience.

The research programs of cultural-discursive psychologists focus on charting the construction and flow of human actions in terms of their meanings and the rules and conventions which express the norms that shape this flow. These norms are ultimately social in origin and originate in diverse historical sources. There are many local linguistic, symbolic frameworks of which the common frame of the many versions of English is only one. In his *Thinking Through Cultures*, R. A. Shweder describes a belief system among the inhabitants of Orissa in India that shapes many of the practices of everyday life. In this system the importance of touch, universal among human beings,[6] and its varieties as locally interpreted, are related to the threat of pollution. Oryans protect themselves against pollution, particularly by making use of the five products of the cow to cleanse themselves from contamination.

Jeff Coulter[7] and Bede Rundle both claim to have found 'grammatical' or conceptual confusions in the foundations of brain oriented

[5] Harris, Lasana T & Fiske, Susan T. *Journal of Psychology* **219**, 175–181. (2011)

[6] Shweder, R.A. *Thinking Through Cultures*. (Cambridge, MA: Harvard University Press, 1991), 265

[7] Coulter, J. op. cit.

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psychological research. The substantial arguments proposed by Bennett and Hacker[8] identify the fatal fault as the commission of a particularly virulent form of the mereological fallacy – the mistake of using an expression that derives its meaning from its use for saying something about a whole entity to predicate something of a part of that entity. 'To ascribe consciousness to the brain – like ascribing thought, belief, understanding, interpreting, perceiving and feeling sensations to the brain – is to commit a *mereological fallacy*. To ascribe attributes to a part of a whole that can properly be ascribed only to the whole of which it is a part is a *mereological fallacy*.'[9] Rundle too, finds fault with aggressive claims made on behalf of neuroscience as psychology based on a similar conceptual error. '… [there are] cruder versions [of the semantic confusions that are visible in the mereological fallacy] which credit the brain with properties which can be meaningfully ascribed only to persons or their mental states, obliging that organ to become a locus of meaning and intentionality, a repository of rules, a home for grammatically characterised internal states, and so forth.'[10] Rundle shows in detail how the conventions for the use of psychological concepts, such as 'intending', are incompatible with the conventions for use of neurological concepts, such as 'synapse'. This divergence is evident when they are 'paired', either in the claim that the existence of one explains the existence of the other, or because one can replace the other in all relevant discourses, *salve veritate*.

Yet, there is something right about identifying the locus, in some sense, of some aspects of human memory with the hippocampus. There is something right about tying the fact of someone feeling depressed to abnormalities in serotonin reuptake in the synapses of that person's nervous system. At the very least we know that damage to the hippocampus affects the ability of a person to remember things. We know that people are grateful for the therapeutic efficacy of serotonin reuptake inhibitors. But it surely counts against taking these uses of words like 'remembering'; and 'feeling depressed' as the semantic basis of psychological research into these phenomena if transferring these words from the vernacular to the vocabulary of cognitive neuroscience grossly distorts the discourse that would

[8] Bennett, M.R. and Hacker, P.M.S. (*Philosophical Foundations of Neuroscience*. Oxford: Blackwell,. 2003)

[9] Hacker, P.M.S. 'Consciousness' in R. Harré and F.M. Moghaddam *Psychology for the Third Millennium* (London and Los Angeles, Sage, 2012) Chapter 4.

[10] Rundle, op. cit., 25

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have to be used to set up a research programme. Can the possibility of a hybrid psychology with a coherent lexicon that incorporates vernacular concepts from which any research program in psychology must take a start, with the conceptual resources of neurology, be defended while doing justice to the criticisms? For that project we need to give some account of what a hybrid vocabulary would be like. However, if we are to create such a vocabulary must the route to this happy outcome be through the resolution of a mereological fallacy? Perhaps the trouble lies in another kind of semantic fracture in the range of uses of the relevant vocabulary. In this paper I suggest that the most fundamental discontinuity in what might be fields of family resemblances presenting the uses of relevant common words across a range of uses from everyday life to neuroscience is none other than the old disjunction between factual and evaluative statements – the radical independence of 'is' and 'ought'.

I will try to show that mereological fallacies in psychology have their source in violations of Hume's famous ukase. However, let us first examine the claim that the incoherence of cognitive neuroscience stems from the commission of a mereological fallacy.

What the fallacy really is! 'I cannot forbear adding to these reasonings an observation, which may, perhaps, be found of some importance. In every system of morality, which I have hitherto met with, I have always remarked, that the author proceeds from some time in the ordinary way of reasoning, and establish the being of a God, or makes observations concerning human affairs; when of all sudden I am surprised to find, that instead of the usual copulations of propositions, is and is not, I meet with no proposition that is not connected with an ought, or an ought not. this change is imperceptible; but is, however, of the last consequence. For as this ought, or ought not, expresses some new relation or affirmation, 'tis necessary that it should be observerd and explained: and at the same time that a reason should be given, for what seems altogether inconceivable, how this new relation can be a deduction from others, which are entirely different from it. But as authors do not commonly use this precaution I shall presume to recommend it to the readers; and am persuaded, that this small attention would subvert all the vulgar systems of morality, and let us see, that the distinction of vice and virtue is not founded merely on the relations of objects, nor as perceived by reason.'

— from *A Treatise of Human Nature, (1739–40)*, Book III, Part 1, Section 1, 469–470, by David Hume.

The flaw in neuropsychology is not that its practitioners consistently and persistently commit mereological fallacies, but that they consequently and persistently fail to attend to the error of deducing

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an is from an ought. Cultural psychology trades in norms so tells us what people think ought to happen while neuroscience trades in empirical facts and hypotheses and so tells us what does or might happen.

Mereological Fallacies

Wittgenstein made a convincing case for interpreting philosophical errors that show themselves in intractable conceptual problems as stemming from mistakes about the 'grammar' of certain key words. This insight can be used to bring to light two major conceptual errors in the elevation of neuroscience to the role of the core psychology. It is also a mistake to attribute psychological features of the lives of people to their brains or any other part of the human body. A person can be said to be reflecting on a problem, but it is a conceptual error to say that that person's left frontal lobe is reflecting on a problem. It is also a mistake to attribute psychological states defined in the context of whole persons to imaginary 'internal' constituent persons which perceive some of the thoughts, feelings and actions of the whole person, the homunculus fallacy. The whole person cannot be part of itself. Both are mereological fallacies.

The general form of a *mereological* fallacy is a sense-destroying attribution of certain properties of parts to the wholes of which they are components, and of certain properties of wholes to their constituent parts. The senselessness of the use of a word both for a part and for the relevant whole arises from the incompatibility of the criteria for the correct use of the word in each context, or, in some cases, the meaninglessness of the focal word in one or the other context. The latter is the stronger complaint since it depends on the claim that the focal expression has meaning *only* as ascribed to the whole of which it is a part. Persons exist as *living embodied beings* that remember, think, act and so on. Their brains, if we are willing to agree for the sake of the argument, that these organs are parts of a *person*, are not properly described as doing any of these things. 'Thinking' does not have a meaning in the context of human anatomy and physiology. Trying to attribute thinking to a brain violates the grammar of 'thinking'. So the question of whether brains do or do not think cannot arise because the question we are trying to pose – can brains think? – eventuates in uttering an incoherent clump of words. There is a mirror image of this fallacy in the attribution of words from the biological lexicon to persons. For example we have such malformed

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propositions as 'Women prefer men who are the biologically fittest'. Here the slippage is in the use of the word 'prefer' between a biological tendency and a personal judgement.

The version of the fallacy discussed by Bennett and Hacker is committed by predicating properties of a whole to one or more of its parts, in such a way as to deprive the word of any meaning at all in the attempt to say something about a body part. Those who try to use a key word for both wholes and their parts must presume a common meaning in both contexts as a necessary condition for the science of the relevant part having anything to contribute to the science of the original whole. Only if the word 'intend' has a closely related meaning in the interpretation of studies of brain states prior to intended actions could the results of such research as that by J.-D. Haynes have anything to say about how people come to act in the ways they do.[11] Bennett and Hacker argue that the practice of seemingly sharing a vocabulary between neuroscience and the relevant vernacular violates the conditions for a predicate meaningful in the context of the whole, to be meaningful in the context of the part. This mereological fallacy, according to Bennett and Hacker, is an obstacle to the claim of neuroscience to be the fundamental ground of a scientific psychology. If the meaning of the word 'suffer' is established and maintained as it is customarily used to predicate some disagreeable psychological state to a person, then it cannot be used to attribute that state to any part of the person. This precludes attributing pains to hands as much as it does consciousness to brains.

> But isn't it absurd to say of a *body* that it has pain? And why does one feel an absurdity in that? In what sense is it true that my hand does not feel pain, but I in my hand?
>
> What sort of issue is this: Is it the *body* that feels pain? – How is it to be decided? What makes it possible to say that it is *not* the body? – Well, something like this: If someone has a pain in his hand, then the hand does not say so (unless it writes it) and one does not comfort the hand, but the sufferer: one looks into his face.[12]

Abandoning the substantival dichotomy as the foundation for human psychology by deleting 'mind' from the scheme does not leave us with 'body' as the residue with which we must work from now on. In the above passage we are advised to delete both sides of the original

[11] Haynes, J.-D. 'Deciding and predicting intentions', *Annals of the New York Academy of Sciences* **1224**, (2011): 9–21.

[12] Wittgenstein, op. cit., §286.

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distinction, and work with other concept pairs, such as 'human/non-human'. 'A smiling mouth *smiles* only in a human face'.[13]

What Lies Beneath

To see how these fallacies come to be revived and repeated we need to turn to another of Wittgenstein's insights. He pointed out that the source of an intractable problem that continues to trouble the philosophical community for centuries, such as the 'mind-body' problem, may lie in the persistence of unexamined dichotomies that subtly shape the way a discussion develops. His point is more than noting that the problem of how the body and mind interact disappears if we cease to think that the seeming coherence between the very different mental and material activities of a human being can be put down to the mysterious union and interaction of correlated states of two disparate substances. Abandon the interpretation of thinking and acting in terms of a substantival dichotomy and the interaction problem vanishes with it. In the section the *Philosophical Investigations* that runs from §282 to §302 he points out that even though many philosophers and psychologists have abandoned the Cartesian dichotomy between 'mind' and 'body', and choose to base their metaphysics of humanity on the concept of 'body', the meaningfulness of the default choice depends on the semantic content of the apparently abandoned Cartesian dichotomy. To go forward we need to abandon even the rump of the Cartesian distinction.

> Look at a stone [pure material body] and imagine it having sensations … And now look at a wriggling fly and at once these difficulties vanish and pain seems to get a footing here, and where before everything was, so to speak, too smooth for it.
>
> And so, too, a corpse seems to us quite inaccessible to pain. – Our attitude to what is alive and to what is dead is not the same. All our reactions are different.[14]

So we turn to such distinctions as 'living'/'dead', 'thinking'/'reacting' and importantly 'person' and 'non-person',[15] and so on. Many examples of such dichotomies appear in the *Philosophical Investigations*. There is no place for the default concept of 'body'

[13] Wittgenstein, op. cit., §583.
[14] Wittgenstein, op. cit., §284.
[15] Coulter, J. & Sharrock, W. *Brains, Minds and Human Behaviour in Contemporary Cognitive Science* (Lewiston: Mellen Press, 2007)

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(aka 'matter') if there is no place for a concept of a substantive 'mind' (aka 'spirit').[16]

The 'Part of a Person' Problem

The force of the Bennett and Hacker criticism of cognitive neuroscience as committing a mereological fallacy depends on the content of the part–whole relation they build their argument around – the brain as a part of the person. But is the brain a part of the person? The accusation that ascribing a psychological attribute to my brain by the use of a word that gets its meaning from its use to ascribe a psychological state or process to a person is much stronger than Wittgenstein's puzzled observation about one's reluctance to sympathise with an injured hand rather than with the person whose hand it is.

Bennett and Hacker formulate the relevant mereological fallacy as follows: 'The principle that psychological predicates apply only to human beings (or other animals) as wholes cannot intelligibly applied to their parts, such as the brain, we shall call "the mereological principle in neuroscience."'[17]

There are two presuppositions embedded in this passage. The authors clearly take the human brain to be part of a person, since the predicates they are concerned with are psychological, such as intending, being conscious and so on, the application of which to animals is debateable. The second presupposition is that the normative implications of human psychological predicates can be taken through to the descriptions of the lives of animals.

On reflection one feels some uneasiness in arguing on the basis of the principle that the brain is a part of the person in the same sense as a liver or a hand is a part of a human body. For a start there are conceptual problems with the status of isolated brains and hands disjoined from their original bodies, for example the anthropomorphism of the 'hand' in the Addams Family saga. In the same way the pieces of wood that are going to be or have been parts of a chair are not just seats, arms and backs in detachment from their role in a chair as a usable totality. Coming across a warehouse of empty sacks and bins of beans may not strike us at first as a furniture factory. We should not take it for granted that it is obvious that this lump of stuff is the

[16] For a contrary view see Cook, J. 'Locating Wittgenstein' *Philosophy* **85** (2010), 273–289.

[17] Bennett and Hacker, op. cit., 73

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control system for a human body. When we find out its role in the body there is still a gap between that insight and the assertion that the human brain is part of a person.

By the Lesniewskian Mereological Rule of Transitivity, if an X is a part of certain whole Y, and that whole is a part of a larger whole Z, then X is a part of Z. Seeking the middle term so to say, if we declare that a brain is part of a person, and a brain is plainly part of a human body, that body must be a part of the person to complete the transitive relationship. Brain and body are both substances, so does not the application of the mereological principle require that the person too is a substance? What, we may ask, is the other part of the person if the brain is one the person's parts? It cannot be the totality of organic bits and pieces that are the remnants of the mereological decomposition of the body. Ironically, the core of the accusation that neuroscience is the commission of a mereological fallacy presented in the simple way above looks very like a version of Cartesian dualism.

Locke made the distinction between being a person and being a body that is worth returning to. He would surely have resisted the idea that the brain is a part of the person, on the grounds that while a man is an animated body a person is a centre of consciousness, and, in one sense, has no parts. Expressing Locke's distinction between 'the man' and 'the person' in the terminology of discursive psychology, we would say that the person is a singularity that displays its mode of being as the spatio-temporal locus of a personal life in the indexical role of devices such as pronouns, while the body is a material object with parts that obey the laws of the mereology of material substances and as such is the referent of certain common nouns and established proper names. In a well known passage Locke[18] gives us 'person' as thinking intelligent being that is aware of itself and of its past life, and so has 'personal identity'. This does not require that a person always be embodied in the same material substance. In the previous section he notes that it is not the idea of a thinking being 'that makes the idea of a man in most people's sense, but of a body, so shaped and joined to it'.

An analysis of the pattern of concepts involved here might go as follows:

> The function of the brain in the life of a human body is defined biologically. In this context the brain is part of the body as a

[18] Locke, J. *An Essay Concerning Human Understanding* (London, 1690), Book 2, Chapter XXVII, §9.

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living being. Concepts such as 'structure' are comfortably in use for both brain and body.

The function of the brain in the life of a person is defined by vernacular usage as an instrument or tool a person uses for carrying out certain tasks. Concepts such as 'tool' stand in various diverse relations to the concepts for the material parts of a human body, and in quite a different kind of relation to the person as active agent, for example 'executioner' or 'electrician' or 'gardener'.

As a general rule the tools we use as persons are not parts of those persons, though they are often parts of the relevant human body. When I return the spade to garden shed I do not put away a part of myself as a person. Asleep I am not using my brain for any of its day time tasks, but it remains as a body part. Conceptual problems with the programme of neuroscience as psychology are more complex than simple violations of the basic mereological principle.

One way of defusing this problem would be take the human body to be a *site* for a person, a site that may or may not be occupied. The material site for a person is not that person, any more than a site for a demonstration is a demonstration.

Semantic Sources of the Incoherence of Cognitive Neuroscience

Suppose we set up a field of family resemblances for one of the words that seems to be used both in the vernacular and in neuroscience. What sort of rupture in the semantic network would endanger the programme of cognitive neuroscience as a fallacy?

One source of the conceptual confusion underlying cognitive neuroscience involves slides across the relevant semantic field which obscure the difference between intentional and automatic behaviour, between doing something deliberately for an envisaged end and reacting to a situation, even if the reaction does serve a purpose. Only the former requires the target of attribution to be a person and only intentional actions are relevant to this chain of uses. However, the whole story of a human being's reaction on a certain occasion might be told neurophysiologically. 'She rapidly retreated' could be said of instances of both kinds of doings – deliberate performances and stimulus-response reactions. But the former is attributed to a person having made a decision and the latter might go no further than an attribution of a startle response to a human organism considered only as a body.

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Another source of conceptual infelicities involves chains of similarities and differences in use across the semantic field of a certain expression which obscures the difference between morally or normatively constrained and assessable actions and non- or a-moral activities, described by the same word. Bennett and Hacker examine a case in which a word the meaning of which is determined by its use to say something about persons in everyday contexts is used in contexts where there are effectively only organisms and their anatomical and molecular constituents. Is this a mereological fallacy or a violation of the logical independence of normative and factual propositions?

The relocation of the error they point out would call for an argument to show that vernacular uses of the words 'memory' and 'remembering' is generally morally loaded while the neuropsychological use is morally neutral. For example 'You ought not to rely on my memory' – with the moral implication that my recollections should not be trusted, contrasted with the observation that the 'entorhinal cortex, the site of long term memory, has been damaged by a recent stroke', an event in the speaker's brain – with no moral implications at all. Thus, a chain of family-resembling usages for a word like 'anger' has a vernacular anchor in which it is used to express a judgement with an indispensable moral component, for example that the way someone has treated me is demeaning. The activity in the chain of brain organs in the limbic system is amoral, just neuronal firings. Only persons and their actions are subject to moral assessments, not their organs. Indigestion is not a moral failing of one's *stomach*, though the gluttony that induced it is a moral failing of the person whose stomach it is. One kind of fatal semantic break in a field of family resemblances occurs when the moral content of the vernacular origin of the field is lost as the relevant word is used in neuroscientific contexts. It follows that the application of a word having its root in the vernacular to the relevant brain organs must involve the deletion of the moral element from its meaning. Hence the *appearance* of the commission of a mereological fallacy when the discourse is looked at 'close up'. It is a fallacy to attribute something to a part of a person, say that person's brain, when the words involved get their meaning for their use of that person, because to do so would violate the radical disjunction of moral and factual judgements.

The flaw in the discourse of cognitive neuroscience is not a mereological fallacy but a break in the chain of meanings which starts in a vernacular which incorporates local norms and reaches a use of the 'word' under examination which is held to be correct or incorrect on empirical grounds. Being angry is a reaction to what a person

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discerns as a moral fault in the behaviour of another – describing a state of the limbic system as 'anger' is to use the word for a material state of that system, an empirical matter. The disparity in the meanings of 'anger' in the two contexts are radical however tidy their correlation.

Circumventing the Mereological and the Humean Fallacies

Currently, in most of the world, people adhere to two groups of standards of correct practice in the discursive means by which they manage their everyday lives – one is cultural such as family life, shopping, and so on. The other is biochemical, such as checking the trans-fatty acid content of a packaged food item, or making use of Diazepam to manage a moral crisis, and so on. By looking for what sort of beings are presumed in everyday conversation and soliloquy we can mark out four groups of 'rules' expressing two distinct groups of practices, each with its characteristic lexicon.

A. Vernacular

P-grammars, in which the uncontested entities of their domain of application are persons, morally protected linguistically competent embodied beings. These grammars, be they Swahili or Albanian, express the norms for the symbolic devices that the members of a society use in most of their usual ways of living, in a variety of cultures and historical epochs.

B. Technical

S-grammars in which the uncontested entities of their domains of application are souls, or something of the sort. These grammars express the conventions for the correct performance of such practices as the rituals of the Mexican Day of the Dead, the 'sale of indulgences', Jehadist suicides, and many, many others.

O-grammar in which the uncontested entities of its domain of application are organisms, and some of their significant parts. This grammar expresses the norms for discourses defining and describing work in genetic psychology and human ethology, in which human practices are explained in terms of their reproductive advantages in the Palaeolithic period of human evolution.

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M-grammar in which the uncontested entities of its domain of application are molecules. This grammar expresses the norms for discourses of chemistry in such fields of psychological relevance as the study of neurotransmitters (serotonin reuptake inhibition) and recommendations for healthful dietary practices (avoid trans-fatty acids!).

While discourse fragments that exemplify S-grammars are much less common than they used to be in Western culture, the response to Richard Dawkin's publicly expressed scepticism of the existence of the entities that discourses using this grammar are concerned with, and much else such as the rhetoric of Jihadists, shows that philosophical psychology should take the S-grammar into account. However, a glance at the labels on the products on supermarket shelves and a skip through the science reports in the Sunday papers shows how much the vocabulary of the O- and M-grammars has leaked into everyday discourse. People manage their life choices, or at least are exhorted so to do, by means of a common coherent discourse in which the O- and the M-grammars have pride of place. Chemistry begins to have a moral aura. We evidently have adopted a hybrid vocabulary, with roughly the same shape as the hybrid vocabulary we are seeking to recover as a coherent psychology. Could this grouping of discursive practices be a model for a hybrid psychology?

A useful tactic might be to examine a concrete case to see if the use of a phrase in all four domains could be displayed as a field of family resemblances à la Wittgenstein? To succeed we would have to display patterns of similarity and difference that linked uses of the exemplary phrase in such a way that there was no semantic fracture in the field.

The phrase 'red wine' reappears in each of the discourse domains for the P-, S-, O- and M-grammars. The word has identical orthography and phonology in each domain of use.

In accordance with the P-grammar it refers, among other things, to one of the finer things of life for many discerning people;

In accordance with the S-grammar it refers to the blood of Christ, literally for Catholics and symbolically for Protestants (a mini field of family resemblances);

In accordance with the O-grammar it refers to a substance good for warding off heart attacks, preventing strokes and postponing the ravages of Alzheimer's disease;

In accordance with the M-grammar it refers to a rich source of antioxidants.

There are substantive links between the O- and M-uses, since antioxidants are the effective agents in the medical benefits of a modest consumption of red wine. Presuming that people are inclined to

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adopt practices to ward of medical conditions they dread, the O-uses can find a place as an adjunct to the P-grammar. The semantic link to the S-grammar does not obviously extend to the O- and M-grammars. The similarity is in the key substance, its provenance and its place in the life of Jesus. However, though we have no evidence that Jesus turned the water into wine at the marriage in Cana for medical reasons, St Paul advised the consumption of a little wine for the stomach's sake, thus tying in a similarity with the O-uses.

Here we seem to have a field of family resemblances, which could be spelled out in detail in terms of similarities and differences in the rules for the appropriate use of the phrase 'red wine' in each of these topic contexts. Could this sketch serve as an exemplar for the construction of a hybrid vocabulary for a core psychology?

A key feature of the S- and P-grammars is narrative schemata, story-lines and plots, backed by tradition and cultural histories. The Eucharist is part of the moral life of Christians.

A key feature of O- and M-grammars is the use of causal concepts referring to processes, backed by hypotheses about the relevant generative mechanisms. Avoiding unhealthy foods is prudential and perhaps even part of economic exhortations.

Is this difference so fundamental that a hybrid semantic field is impossible? Compare an example from the discourse of cognitive neuroscience.[19] By the use of fMRI J.-P. Haynes has explored the correlation between certain activities in some centres in the brain of a person and the incidents of thinking and planning that the person is carrying out. In summary, this research explores the hypothesis that there are 'brain signals that precede the outcome of decisions, even before the subjects believe they are consciously making up their minds. … New results show that the specific outcome of free choices between different plans can be interpreted from brain activity, not only after a decision has been made, but even several seconds before it is made.' A correlation between setting about a reaching and grasping task (which of course could be done well or badly) has been established by Gallivan et al. The authors claim that by using fMRI scanning they can 'decode movement intentions from human brain signals. Specifically object directed and reach movements, moments before their initiation'.[20] The line of research

[19] Haynes, J.-P. op. cit., 9–21.

[20] Gallivan, J.P., McLean, A., Valyear, K.F., Pettypiece, C.E. & Culham, J., 'Decoding action intentions from preparatory brain activity in human parieto-frontal networks', *Journal of Neuroscience* **31** (2011) 9599–9610.

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initiated by J. P. Gallivan is presented as 'how the brain uses tools'. Of course, the brain does not use tools, I do. Does this tell us anything about the human practice of trying to grasp something? According to the line of criticism here in the answer is 'no', however interesting the findings of this group may be. Testing the parallel with the dietary case above we note that the intentions we have are prime targets for moral reflection and comment. The same could be said about what we reach for. However, if there are identifiably relevant neural signals before conscious reflection takes place these have no moral significance whatever. Only if a person chooses a course of action could he or she be held morally responsible for it.

Similarly there is a great deal of research on the relation between someone being 'depressed' and over active 'serotonin reuptake' in the neural synapses of the depressed person. Treatment with 'serotonin reuptake inhibitors' such as Prozac has proved to be an effective therapy. Can these phases of medical neuroscience be fused into a hybrid clinical psychology? Could we accept the discoveries by J.-P. Haynes as contributions to the understanding of what it is for a person to intend to do something? Bennett and Hacker would say no. To do so would be to commit a mereological fallacy. Coulter and Rundle would say no. To do so would be to misuse words the grammar of which is well established in the vernacular. Both point to 'grammatical errors' in the genesis of cognitive neuroscience as a core psychology, but Bennett and Hacker find a deeper source for this. There seems to be a serious flaw in their argument – brains are not parts of persons. However, can their conclusion be reached from another direction?

In the 'red wine' case the field of family resemblances is held together by the material identity across all contexts of the very same being, type or token. In the case of 'intending' the field of family resemblances is fractured in two places – at the point where the predicate as utterance or inscription shifts from the person domain to the neuroscience domain, and where this predicate shifts from the normative domain of uses to the descriptive domain. In the 'red wine' example there is ontological continuity but normative discontinuity across the field of contexts of use. In the 'intention' example there is neither ontological nor normative continuity across of the field of contexts of use.

The Basis of the Circumvention Move

Here is a proposal for hybridization that does not depend on the diagnosis of a mereological fallacy. We can maintain the continuity of the semantic chain from the uses of words and phrases subject to

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the norms of the P grammar to the description of the organ in the technical vocabulary of O and M grammars, provided that the description of the organ includes its role as an instrument in a human practice and that the region of the nervous system where this organ is located is identified by the use of classification categories that derive from those by which normatively constrained situations and activities of ordinary life are identified. If this field survives intact then neuroscience must include a consideration of normative principles – such as the *right* way of working of the brain and the *right* concentration of serotonin in the synapses. 'Right' with respect to what? The norms of everyday life at this or that time and place. The very idea of neurosurgery, removing a tumour or excising an epileptic centre, displays normative considerations. In some cultures the epileptic aura was valued as an experience of the presence of God. R. D. Laing declared that though the discourse of sufferers from schizophrenia was different from the way people usually talked, and the chemistry of their brains was different from that of most people, this discourse contained deep insights into the human condition.[21] Should the condition be cured? That question presupposes a moral valuation of the existence of the condition. This presupposition has been fiercely contested since Laing's heyday but it has to be contested on normative grounds, not on the basis of biochemistry.

The criteria by which a region of the brain, the sense organs and CNS are identified functionally depend on the meanings of the description of the task being performed – for example we might identify a certain performance as giving instructions for some job. This invokes the P-grammar, in that it is persons that follow instructions and whose actions are assessable according to the local standards for the fulfilment of the task. The instructions could be impersonal – say the score of an orchestral part – but the player is expected to perform according to the local standards of good playing.

Alexander Luria[22] brought the 'top-down' method to a fine art, by mapping brain regions functionally. He noted how defects in socially-instrumentally defined performances (cultural) correlated with brain lesions (neurological). Luria strove to develop treatments aimed at the ultimate restoration of the deficient function by training programmes that were focussed on the building up of alternative neurological pathways, the relevance of which was determined by the nature of the deficit.

[21] Laing, R.D. *The Divided Self: An Existential Study in Sanity and Madness* (London: Penguin, 2010), New Edition.

[22] Luria, A.R. *Restoration of Function after Brain Injury* (Oxford: Pergamon, 1963).

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The philosophical basis of contemporary brain research when a person performs a cognitive, perceptual or other higher order task while his or her brain is being scanned on fMRI equipment is the same as that on which Luria's method was based. Certain brain regions display greater activity than in the resting state. That these are the brain regions relevant to the task can only be determined by culturally maintained performance criteria.

Two Hybridisation Devices

The brief sketches above can be elaborated.

The taxonomic priority principle – TPP

This is an uncontroversial feature of the planning and execution of research into the regions of the brain that are active while a person is carrying out some task, cognitive or perceptual, and it is an uncontroversial feature of brain surgery. A separate semantic linkage would be required for each of a very large number of expressions - 'remorse', 'intend', 'try', 'aim', and 'worry, and so on and so on. There is no guarantee that a successful hybridization by preservation of some elements of meaning extracted from cultural-discursive studies with neuroscience usages would be achieved.

Turning to psychology, consider the words that make up the semantic field of 'memory' in contemporary English. The 'memory' vocabulary is a central part of P-grammar discourses of all kinds, the courts, family life, business, farming and so on, that is in the vernaculars of various forms of contemporary life. A basic rule of this grammar is that *people* remember recollect, recall, reminisce, forget, and so on. The 'person-centred' grammar of the use of memory vocabularies is not independent of culture – certain features are different in some language cultures – including the implication of personal responsibility for memorial claims. There are several dimensions of normative demands on the act of remembering and of publicly declaring one's recollections. It is a moral fault to mislead someone by making an over confident memory claim. It can be a moral fault to have forgotten something – one's mother's birthday for example. Remembering is embedded in normative frameworks.

It seems that words from the vocabulary in question also have a regular use in neuroscience – in the anatomical and physiological discourses about brain regions such as the hippocampus, and in

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computational models of these organs created by psychologists.[23] The very idea that the hippocampus and the entorhinal cortex are constituent organs of the neural devices for recognition, recollection and reminiscence by the people who possess them, depends on our being able to recognise such everyday phenomena as remembering a telephone number and forgetting the way to the station, without recourse to a brain scan. In these contexts we have a clear idea of how the words 'remember;' and 'forget' are used.

To rebut accusations that they are committing the mereological fallacy neuroscientists would need to show that their uses and the vernacular uses can be linked into a field of family resemblances, which is free of a certain kind of semantic fracture, using a word the meaning of which is established by its use to describe some aspect of a whole, in describing one of its parts. However, as I have argued, the fracture may be due to another kind of philosophical sin, failing to keep a clear line between descriptive and normative discourse.

The neuroscience use appears to delete the moral implications of the cultural-discursive use. Hans Ebbinghaus's researches into the elementary features of rote learning took for granted that recollecting correctly was a desirable phenomenon.[24] His method involved comparisons between the lists of syllables he had scanned and the lists of syllables he recalled after ever longer delays. It was just a matter of fact how well the lists matched. However, in everyday person-oriented practices, 'I remember …' is a claim to authority and, if you trust me, entitles you to repeat what I have told you as a true account of some past event. The essential role of moral concepts such as 'authority' and 'trust' displays clearly that this step in the family resemblance field is a candidate for the kind of fissure in the semantic chain that would support a strong reading of neuroscience as an example of breaching Hume's ukase.

The Task-Tool Principle semantics – TTP

As we will see the 'cultural Task- neural Tool' principle relieves this problem since how the tool is made and what material processes take place within it can be described independently of the tasks it is used to perform. Under that mode of description there is no place for such

[23] McLeod, P., Plunkett, K., & Rolls, E.T. *Introduction to Connectionist Modelling of Cognitive Processes* (Oxford: Oxford University Press, 1998).

[24] Ebbinghaus, H. *Memory: A Contribution to Experimental Psychology*. Trans. H. A. Roger & C. E. Bussenius, New Edition (New York: Dover Books, [1885] 1987).

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concepts as working well or ill, because they require attention to the tasks the tool is to be called on to perform. A blunt chisel has a metallic profile just as robust as the profile of the edge of a sharp tool. The discourse of Hybrid Carpentry is brought into being by incorporating normative concepts from the work the tools are used to perform, so that 'sharp' becomes a normative concept in the context of discussions of chisels and saws.

However, not every psychological concept fits the Task-Tool semantics smoothly

- For many everyday material tasks people use material tools – screwdrivers to insert screws. We do not say 'the screwdriver inserts the screws', unless we are demonstrating a striking new automated device.
- For many everyday and more esoteric tasks people use symbolic tools, such as diagrams, numbers, languages and so on. We do not say 'The plan brought about the lay out of the Olympic Village', unless we are demonstrating a program controlled device for laying bricks, for example

This idea introduces a much more complex pattern of linkages between vernaculars and the technical vocabularies of neuroscience than the Taxonomic Priority Principle. Remembering is an activity defined in the vernaculars of most human cultures, shaped by local P-grammars. Remembering includes recalling, recognising and reminiscing – each links to a different neuro-process and the third requires other people. There is remembering how and remembering that.

Is it conceptually proper to say 'I use my hippocampus and entorhinal corpus to remember my past and so recall the happy times of yesteryear' just as 'I use my hand to turn the screwdriver and so drive the screw'? Having learned to drive screws I must remember how to do it. Do I have to remember how to remember?

- Both are body parts in the absence of which the activity cannot be carried out. The parallel is more subtle than a simple comparison. Part of the equipment necessary to perform the task (defined in the vernacular) is a trained and activated neural net, which is identified via the screw-driving ability, defined in the vernacular of carpentry, identified via the ability to recollect past events, defined in the vernacular of everyday life.
- As a person starts to insert screws, solve equations and speak Swahili, the relevant brain region must be active. In the absence of the relevant brain structure due to some accident

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or to defect in its functioning, inserting screws, solving equations or speaking Swahili is impossible.

- The ability to insert screws, to solve equations, to speak Swahili, is acquired by training.

So much for similarities. Are the differences great enough to weaken the Task-Tool metaphor as the link to maintain a bridge across the chasm of an incipient Humean fallacy? While it is sometimes proper to say that I control the movements of my hand, for example when the screw should be inserted counter-clockwise, I don't generally say that I control the processes in my hippocampus when I try to remember something and succeed. I may control the direction of my reflections, the images I conjure up and so on as part of my memorial technique. Doesn't this show that the 'tool' metaphor is misleading?

Response: If my brain is in decline (I am an ancient person, for example) I can substitute a prosthetic device to do my remembering for me. For example I can carry my diary of appointments or my smart phone with me and consult it regularly, as a means of recollecting whom I am supposed to meet for lunch, where and when, perhaps in the worst case who I am myself.

Here we have a significant similarity between the part a brain region plays in my life and the part played by a prosthetic device, *which I use as a tool to supplement my failing powers of remembering*. So the device and the brain region are relevantly similar, with respect to an uncontroversial use of the word 'remember'. This linkage, I claim, justifies us in adopting the metaphor of 'using' when referring to a relevant neural network in a brain region to express the relation between the neuroscience of remembering and discursive analyses of remembering practices.

However, at least in learning a trade or skill the apprentice is aware of the tool he or she is using. Is it generally true that I must be aware of the tool when I am carrying out a task? If this expresses a conceptual matter then neither my brain nor any part of it could be a tool in the relevant sense. I am not aware of my entorhinal cortex or of what is happening there when I am remembering a childhood incident.

Response: A competent and trained user is generally not aware of the tool being used. Focal awareness may leave the distal aspects of the practice unattended. During training the domain of conscious awareness changes, eventually leaving the tool out of consideration. In the case of the hippocampus the process of the natural endowment of a person with that organ is equivalent to the process of

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acquiring the skill. The utility of the Task-Tool Principle seems undamaged.

To complete the defence of the Task-Tool Principle we need to look at the reverse of the above situation. Just as my 'Blackberry' is a prosthesis for a failing brain mechanism so a brain mechanism can be seen as a prosthesis for a failing electronic device. My calculator crashes and I have to do some mental arithmetic. The task is presumably the same – to work out the tip – when I am unable to use my iPhone my brain will have to do. Development of research programs in the psychology of the many kinds of memorial activities we engage in may lead to reverse semantics – new vernacular concepts, e.g. 'implicit memory' and 'false memory syndrome', both which are now part of the English vernacular for many people.

These uses at least seem to belong to a coherent field of family resemblances but occupy regions distant from one another. However, the above cluster of examples displays the similarities and differences that hold the field of uses together while opening up some semantic spaces between them. The moral aspect of a vernacular psychological concept is preserved by the use-by-a-person of the brain-body system organ for some personal project. For example, the Task-Tool Principle would support a psychologist saying both that people express 'anger' by displays that are to be read as protests at infringements of their rights or dignity, and also use 'anger' as a descriptive term in human ethology, embedding the phenomenon in a selectionist explanation of the evolution of emotions. The task is to display one's sense of affront. The tool is the reaction pattern we have inherited from our Palaeolithic forebears. Culture can reshape that reaction pattern. By basing our psychological discourse on the Task-Tool Principle we skirt both the mereological fallacy and Hume's ukase. In effect this serves a radical purpose. By pursuing it we can incorporate neuroscience into psychology as a moral discipline.

The Multiplicity of Hybrids

Since there are many subtly different vernaculars, even in the same cultural milieu, with distinctive ways of partitioning human activities, with different story-line repertoires that shape the phenomena, there will be many different hybrids. There will inevitably be many different neuropsychologies because of different vernacular driven task demands, depending on the cultural matrix of the language and on differing features of vernaculars themselves. However, in whatever hybrid psychology emerges, the problems of bridging

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possible semantic fracture can be resolved by attending to a field of family resemblances with TPP and TTP links in use. Considering the ought/is fracture in the psycho-neuro hybrid field there is, in effect, a bridge already in existence in the discourse of neurosurgeons and clinicians – namely the covert importation of normative meanings into the neuro-discourse. This parallels the importation of normative meanings into carpentry, engineering and even cooking. Medicine depends on classifying some ways of working of the human machine as good and others as bad. The brains of the people exemplifying either are doing what they are doing. But in the world of psychiatry TPP is routinely used to classify some ways of working of a human brain as pathological. Then we call in the neurosurgeons to make some changes in the machine, or the pharmacologist to prescribe a suitable chemical to restore functioning that we take to be normal and healthy. Of course these are only taken to be improvements by reference to the restoration of *locally acceptable* ways of thinking, acting, feeling and perceiving. In the renaissance some forms of melancholy were thought be valuable.[25]

Is the display of a field of 'family resemblances' the only or the best philosophical tactic to take from Wittgenstein?

In favour: identifying a field of family resembling uses relieves one from the temptation to propose a common and hidden 'something' that explains why the same vocable (word as concept bearer) is used in the diverse situations that comprise the context of field of uses. In Wittgenstein's example of 'guiding',[26] several of the uses of the word or cognates imply active control by a conscious guide, such as ballroom dancing, when the guidance might be right or wrong. However, importantly, there are also uses of the word which have no such implication, such as following a path through a field while attending to a conversation with a friend. There is no room for normative concepts in discussing the role of the path in one's walk. So when we talk about 'being guided' in the case of reading from a text we need not think that we are obliged to hypothesize (and perhaps look for) the hidden source of some active control exercised by the text. It may be more like following the well worn path to home. Provided we are alert to the change from descriptive to normative criteria in

[25] Burton, R. *The Anatomy of Melancholy*, (Oxford: Clarendon Press [1621]. New edition 1989–1994)

[26] Wittgenstein, op. cit. §172 .

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the uses of a word we can use the idea of a field of family resemblances as a research tool, where at some points the differences in usage involve the presence or absence of moral concepts.

Against: Iakovos Vasiliou[27] has suggested that one could avoid both the mereological and the Humean fallacy by attending to the *various* ways that concepts such as 'seeing', 'remembering', 'thinking', 'hoping' and 'suffering' are used, each having a variety of defensible and independent context-dependent meanings. Take 'seeing': one of these ways would be in the context of describing the function of the eye as the organ of sight. Another would be to express the experience of suddenly 'seeing a bullfinch' in the sense of spotting it among the branches of the apple tree, and yet another 'seeing a joke'.

Why assemble a field of family resemblances rather than a catalogue of diverse uses? Looking for a pattern or structure among the uses of a word as concept bearer, the technique of 'logical geography', enables us to do more than we could do with just a catalogue. A field of family resemblances is a *catalogue raisonné*. We can use it for the following tasks:

1. To track shifts of meaning context by context noting metaphor creation and quasi synonymy.
2. To identity gaps in the layout, e.g. where we move from descriptive to evaluative or normative meanings for seemingly the same word. This can help to resolve the problem of over ambitious hegemonic claims for cognitive neuroscience as the core psychology.
3. To pick up examples of the fallacy of inventing hidden common referents – Wittgenstein's original intention for the use of the technique of examining fields of family resemblances in detail. This application has no place in this discussion, though it would in criticisms of attempts to invent a realm of abstract mental operations to account for what we say and do.

The philosophical work will be done by attending to the detail of differences and similarities between adjoining locations in the field of context-sensitive meanings.

Concluding Remarks

The grammatical error pointed out by Coulter, Rundle and Hacker is not a simple mereological fallacy because the brain is not a part of a

[27] Personal communication.

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person in the way that a grain of sand is part of a beach. It is part of a person's body and a person's body is not a part of that person in the relevant sense. To presume so is to commit the Cartesian error, a category mistake. However we can draw on two other Wittgensteinian insights to find detours around the obstacle to a condemnation of the bid by neuroscience to be the core psychology.

The most important insight for the analysis of the shortcomings of cognitive neuroscience is idea that the meanings of many key words can be seen as constituting fields of family resemblances with widely different meanings which may be related by a long chain of gradually weakening similarities and differences in use. In the 'red wine' example the field of family resemblances was held together by the substantival identity of the target of attributions across all the assembled contexts, however diverse. In the case of 'intending' the field of family resemblances is held together by the two linking devices of Taxonomic Priority and Task and Tool. However, the field fractures at two points. From the discursive to the neuroscience domain there is an ontological fracture, and from the domain of normative uses to the domain of descriptive uses there is a fracture of semantic overtones, moral or non-moral.

The mistake pointed out by Bennett and Hacker looks like a mereological fallacy because the whole to which a psychological predicate is applied is a person and that to which neuroscientists should refrain from applying the predicate in that sense is, in a kind of dog-legged 'knight's move', a material entity that is part of the body of the person.

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