

## *Peer Commentary*

### **THE SEDUCTIONS OF MATERIALISM AND THE PLEASURES OF DUALISM**

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We're all materialists now. Among those who retain the Cartesian categories of mind and body, even the Mysterians agree that the mind is what the brain does, even if they despair of knowing how it does it (McGinn, 1991; 1999). And for those biological naturalists who reject the Cartesian categories (Searle, 1992; 1999), consciousness is a feature of brains that have achieved a certain level of organization. The materialist consensus links psychology, William James' (James, 1890/1980) science of mental life, with the other natural sciences, such as biology, chemistry, and physics, and for that reason it has been very seductive. However, as Velmans cogently points out in his target article, it does not offer a complete solution to the problem of consciousness, not least because it promotes premature closure on some problems and leaves others unaddressed. Among these unaddressed questions is whether, to what extent, and how conscious mental states — or *unconscious* ones, for that matter (Kihlstrom, 1987) — can have a causal influence on bodily functions. If we are to take consciousness seriously, as more than epiphenomenal, then we need to show that it has causal powers: that what we think, feel, or want actually has an effect on what we do.

In all of this debate, one relevant body of evidence tends to be ignored: the so-called 'psychosomatic' disorders known to psychiatry, in which a mental state, usually emotional in nature, appears to cause some bodily symptom, such as an ulcer (Graham, 1972; Weiner, 1977). In large part, I suspect that this neglect occurred because the psychosomatic disorders have long been tainted by some of the very worst sort of psychoanalytic thinking. For example, Franz Alexander (1950) argued that a whole host of physical diseases could have their origins in unconscious and unresolved 'nuclear conflicts': anorexia nervosa was caused by envy and jealousy, peptic ulcers were caused by conflicts between infantile dependency versus ego pride and aspiration, bronchial asthma was caused by excessive unresolved dependence on one's mother, essential hypertension was caused by chronically inhibited aggressive impulses, rheumatoid arthritis was caused by rebellion against restrictive parental influences, and so on.

It would be generous to say that the evidence for propositions such as these is weak, based as it is on subjective impressions of personality in individual cases of unknown representativeness without adequate controls. Moreover, to some extent discussion of psychological causes of physical illnesses has been impeded by advances in biomedical knowledge about both 'physical' and 'mental' disease processes. So, for example, it is common to see such psychiatric syndromes as

depression, anxiety, and schizophrenia identified as ‘real diseases’ because we now think we know something about their neurobiological underpinnings in the amygdala, dopamine, the human genome, or whatever — as if these mental illnesses were not real until they had been characterized in neurobiological terms. As another example, the discovery of the role of *Helicobacter pylori* in gastric ulcers (Marshall & Warren, 1984) led Steven E. Hyman, later to become the Director of the National Institute of Mental Health, to gleefully report that ‘Another One Bites the Dust’ (Hyman, 1994), and to question ‘the allure of attributing... illnesses primarily to psychological factors’ (p. 295). Unfortunately for the argument, it turns out that while a large proportion of ulcer patients may be infected with *H. pylori*, a high rate of infection is also found in people *without* ulcers (Nomura *et al.*, 1994). In other words, bacterial infection may be *necessary* for ulcers to occur, but it is not *sufficient* for them to occur, as even the discoverer of *H. pylori* himself seems to agree (Marshall, 1995).

In fact, animal research shows a clear role for stress in the predisposing organisms to ulcers, precipitating ulcers, and sustaining ulcers once they have developed (Overmier & Murison, 1997; 2000; Weiss, 1972). Although ‘stress’ is in some sense a physiological construct, in terms of any event that challenges an organism’s current level of adaptation (Selye, 1956), in this research ‘stress’ refers specifically to a mental state. Beginning in the 1960s, the cognitive revolution in learning theory led to a reinterpretation of classical conditioning in terms of the organism’s efforts to predict environmental events (Kamin, 1969; Rescorla, 1967), and of instrumental conditioning in terms of the organism’s efforts to gain control over environmental events (Maier & Seligman, 1976; Seligman & Maier, 1967). In psychology, organisms (including people) are stressed when they are exposed to unpredictable and unavoidable events, especially if these are aversive (Mineka & Kihlstrom, 1978; Seligman *et al.*, 1971). To the extent that psychological stress is a *psychological*, i.e., *mental*, state, then, the literature on ulcers yields clear evidence of an effect of the mind on the body. We now know that stress, defined psychologically as the exposure to unpredictable and/or unavoidable aversive events, is sufficient to produce ulcers.

Another area of relevant research is on Viagra (sildenafil citrate), the well-known (and increasingly popular) treatment for male erectile dysfunction marketed by Pfizer. Viagra is a pill, and so we might assume that its mechanism of action is purely physiological. And for the most part, it is: according to Pfizer’s package insert, sildenafil selectively inhibits phosphodiesterase type 5 (PDE5), which in turn enhances the effect of nitric oxide (NO) on the release of cyclic guanosine monophosphate (cGMP), causing muscle relaxation and vasodilation in the corpus cavernosum, and the increased bloodflow results in tumescence and full erection. It’s all a matter of biochemistry, except — as Pfizer’s package inserts and advertising clearly state, none of this occurs in the absence of sexual stimulation, which is what releases NO in the first place. This sexual stimulation may be tactile (Maytom *et al.*, 1999), in which case we may be dealing with a simple spinal reflex, or it may be visual (Boolell *et al.*, 1996), in which case we are dealing with something much less reflexive, and something much closer to an

intentional mental state. Unfortunately, there have been no published studies of the effects of Viagra in the absence of any kind of sexual stimulation. But the available literature suggests that, in the absence of tactile stimulation, the biochemical mechanics of Viagra begin with a conscious mental state of sexual arousal.

The experiences of unpredictability and uncontrollability are mental states in the strict sense: they are *beliefs* that the world, or some important aspect of it, is unpredictable, uncontrollable, or both. And sexual arousal is also a mental state, a state of sexual desire. Accordingly, they possess intentionality, or ‘aboutness’ (Searle, 1983; 1992). But they are not particularly specific beliefs like *John believes it is raining* or *John wants a pizza*. Is there evidence for the psychosomatic role of more specific beliefs about more specific things? One relevant body of research concerns the placebo effect in medicine, where a therapeutic change occurs by virtue of the patient’s belief that he or she is receiving an effective treatment — and, perhaps, his or her doctor’s belief that he or she is administering one (Harrington, 1997; Shapiro & Shapiro, 1997). Placebo effects have been called the ‘jewel in the crown’ of ‘mind–body’ medicine, and as such make biologically oriented physicians very nervous — which may be one reason that there are occasional attempts to demonstrate that they don’t exist (Hrobjartsson & Gotzsche, 2001), or to argue that they only affect subjective, mental symptoms such as depression and pain, in which case they don’t really count as examples of psychosomatic interaction (Spiro, 1986). But there is some reason to believe that placebos can have genuine effects on objectively observed bodily functioning, as measured by dopamine release in Parkinson’s disease (de la Fuente *et al.*, 2001), improved knee function in osteoarthritis (Bradley *et al.*, 2002), and changes in brain function in depressed patients (Leuchter *et al.*, 2002). In these cases, at least, we have more than an effect of one belief — that one has received an effective treatment — on another belief — that one is depressed or in pain. We have a genuine effect of a belief on the body.

Placebo effects are usually defined as nonspecific in nature, but some research indicates that they can be very specific indeed. In the domain of pain, for example, two placebos yield more relief than one, and placebo injections more than placebo pills (Evans, 1974). More recently, it has been shown that placebos administered to relieve pain in one part of the body have no effect on pain in another part of the body. Perhaps most dramatically, an analysis by Evans revealed that placebo efficiency was a constant function of the active drug to which placebo was compared (Evans, 1974): placebo aspirin is 54% as effective as aspirin, placebo Darvon is 56% as effective as Darvon, and placebo morphine is 56% as effective as morphine. Evans’ findings have been questioned in some quarters (McQuay *et al.*, 1995), but the later studies varied significantly in design from the ones Evans reviewed. Although it remains to be seen whether Evans’ findings generalize to objective as well as subjective endpoints, it appears that the effectiveness of a placebo depends on what drug the patients *believe* they are taking.

Turning to the effects of belief on objectively measurable physical outcomes, there are a number of studies showing the psychosomatic effects of both hypnotic and nonhypnotic suggestion (Bowers, 1977; Bowers & Kelly, 1979). In one

classic study, 11 of 13 patients who were sensitive to a form of contact dermatitis similar to poison ivy showed a diminished skin reaction when exposed to the plant when they believed the leaf was harmless, and 12 of 13 showed signs of dermatitis when exposed to a harmless plant, which they believed was poisonous (Ikemi and Nakagawa, 1962). Similar results were obtained in more recent symptom-provocation studies of asthma (Luparello *et al.*, 1968) and of food allergies (Jewett *et al.*, 1990). Another series of carefully designed studies showed that subjects who received verbal suggestions showed increased regression of warts, compared to those who received either a placebo or no treatment (Spanos *et al.*, 1988; 1990). In one particularly provocative study, asthmatic patients were administered either a bronchoconstrictor or a bronchodilator. Patients who received the bronchoconstrictor correctly identified as such showed greater airway response than those to whom the drug was identified as a dilator; and similarly, those who received the bronchodilator correctly identified as such showed increased greater response than those for whom it was identified as a constrictor (Luparello *et al.*, 1970).

More research on psychosomatic interactions is clearly in order, once the medical community starts taking them seriously again. Still, the evidence available so far clearly indicates that people's conscious beliefs can play a powerful role in creating and modifying their bodily states. Consciousness is not just an effect of bodily activity, and it is not merely epiphenomenal froth on the wave of neural connections. Consciousness also has causal efficacy, by virtue of its effects on bodily states, and one of the pleasures of dualism is that it reminds us that mind matters. Velmans is right to draw attention to this literature, and to take it seriously. I think he is also right that we will never solve the mind-body problem so long as we focus our attention on the mysterious leap between body and mind, and ignore the equally mysterious link between mind and body.

#### Author Note

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**MENTAL CAUSATION:  
FACING UP TO ONTOLOGICAL SUBJECTIVITY**

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In this commentary I will focus on what I consider to be, from the standpoint of neurology, the most perplexing issue Velmans addresses in his paper: If the physical world appears ‘causally closed’, how are we to describe the causal effects of the mind? As Velmans poses this problem:

. . . if one examines the human brain from an external third-person perspective one can, in principle, trace the effects of input stimuli on the central nervous system all the way from input to output, without finding any ‘gaps’ in the chain of causation . . . if one inspects the operation of the brain from the outside, no subjective experience can be observed at work. Nor does one need to appeal to the existence of subjective experience to account for the neural activity that one *can* observe. (p. 7 above)

This is one of the most perplexing aspects of consciousness and a primary reason for the existence of the ‘hard problem’. From the objective, outside, third-person point of view, the operations of the nervous system appear to be causally sufficient and complete without reference to consciousness. On the other hand, from the subjective, inside, first-person point of view, as individuals we experience an ‘inner I’ that has causal effects upon our bodies and the outside world.<sup>1</sup> How are we to reconcile these points of view? According to Velmans:

One simple way is to accept that for each individual there is *one* ‘mental life’ but *two* ways of knowing it: first-person knowledge and third-person knowledge. From a first-person perspective conscious experiences appear causally effective. From a third-person perspective the same causal sequences can be explained in neural terms. It is not the case that the view from one perspective is right and the other wrong. These perspectives are complementary. The differences between how things appear from a first-versus a third-person perspective has to do with differences in the *observational arrangements* (the means by which a subject and an external observer access the subject’s mental processes). (pp. 10–11 above)

Neuroscience has made enormous progress providing purely objective third-person accounts of the neurological causes of perception and motor action. For example, accounts of the perception of the colour ‘red’ in terms of neural pathways and brain areas devoted to colour perception have achieved enormous specificity and detail. Indications are that we will some day fully understand without perplexity the scientific basis of colour perception. Likewise, we have causal accounts of pain perception that specify which neurotransmitters, pain receptors, neural pathways and brain regions are involved in the creation of subjective pain. It appears, at least in principle, that nothing stands in the way of a complete and non-mysterious third-person *causal* account of the neurology of pain.

When we consider the subjective first-person experiences of colour and pain the situation is less clear. While it is scientifically reasonable, from the objective point of view, to posit that the brain ‘causes’ the consciousness of red and pain, from the first-person point of view it is equally reasonable to claim that the *subjective*

[1] I have addressed these issues from the standpoint of neurology in Feinberg (1997; 2001a,b).

properties of the brain ‘cause’ the objective existence of ‘red’ and ‘pain’. This is particularly clear when we consider the subjective experience of a quality such as ‘pain’. While most scientists would agree that wavelengths of light, sound waves, and tangible objects exist independent of minds, ‘pain’ is wholly created by an experiencing subject and has no objective existence beyond that subject. ‘Pain’ has no third-person objective referent in the world. From the third-person point of view, c-fibres cause the experience ‘pain’, but from the first-person point of view the subjective properties of the brain cause the existence of objective ‘pain’. Therefore, while it is appropriate to say that from the third-person perspective the activation of particular neural pathways causes and creates the perception of specific qualia, it is equally correct to say that from the first person perspective the subjective properties of the brain cause and create objective experience.

Where does subjectivity come from? The basis of subjectivity is the transparency of neural states.<sup>2</sup> It has been known since the time of Aristotle that the brain itself is insensate and has no conscious sensation of itself. For example, if a neurosurgeon electrically stimulates a sensory region of the thalamus or cortex of an awake subject and asks them where they experience a sensation, no subjects report that the experienced sensation is physically located within their brain. If conscious sensation is evoked, it is experienced as physically located outside of or beyond the neural system that actually does the perceiving. A person in subjective ‘pain’ never *objectively* experiences their own activated neurons; neurons are experienced only *subjectively*. Indeed, this can serve as a working definition of subjectivity: *subjective experience occurs whenever an experiencing entity ‘perceives through’ or ‘acts through’ a neural substrate.* Therefore, somewhat paradoxically, consciousness is created as much by what we do not objectively experience as by what we do. Sensory consciousness is created by our *lack* of objective knowledge of our own neural states, and motor consciousness is created by our *lack* of experience of the neural substrate of our actions.

For these reasons, I agree with Velmans that the brain and mind are ontologically complementary and mutually irreducible. From the third-person perspective, *mental events* have no ontological status as observable and directly experienced objects,<sup>3</sup> and from the first-person point of view, *the brain* has no ontological status as a directly experienced and observable object. The ontological and causal relationships between the brain and mind addressed in Velmans’ article can be simply stated: *From the third-person point of view objectively observed neural states cause ontologically subjective experience for the observed subject; from the first-person point of view subjectively experienced neural states cause ontologically objective experience for that subject.*

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[2] For philosophical discussions related to the subjective transparency of the brain, see Michael Polanyi’s (1965a,b) discussion of the ‘tacit dimension’.

[3] For more discussion of the first-person ontology of mental states, see Searle (1992).

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## THE DIFFIDENT PHYSICALIST SPEAKS OUT

*Steve Torrance*

Velmans offers a number of interesting reflections on how to understand 'mental-physical' interaction (particularly interaction between the conscious mind and the body). This is, he thinks, an issue which is too little discussed, perhaps because of the dominance of a reductionist or physicalist orthodoxy which assumes that mental processes (including conscious ones) are 'nothing more than' neural processes of some kind or other.

Velmans raises a number of ticklish problems to do with consciousness and causation. These include: the 'closure' problem (how can conscious thoughts affect processes in a causally closed physical world?), the 'control' problem (how can there be conscious control of processes one is not conscious of, like pre-conscious speech processing?), and the 'delay' problem (if conscious states occur too late to affect the acts they are most relevant to (Libet, 1985), how can there be any conscious volition?). Reductionists *seem* to have an easy letout from these problems: if consciousness is physical then there is no real mystery in any of these cases, they may argue. But according to Velmans, such a buyout is underwritten by an inadequate theory. Even if some form of reductionism or physicalism were to be accepted, the issues raised by Velmans would still need to be discussed.

Nevertheless these puzzles are perhaps more acute for anti-physicalists than for physicalists. Velmans has published many critiques of reductionist and other physicalist views, including an extended discussion in the first part of his recent book (Velmans, 2000). He has usefully summarized some of his key objections in an appendix to the present article. I am not convinced that Velmans has done justice to all the possible positions available to someone sympathetic to a physicalist viewpoint. Much of the present commentary will thus be concerned with the presuppositions of the discussion rather than with its internal details.

The basic package offered by Velmans to show how to deal with these puzzles is described by him as 'Ontological monism combined with epistemological dualism' (section heading on p. 10 above). When we talk about mental→physical or physical→mental causation (and, in a clinical context, the former is the domain *par excellence* of psychosomatic medicine, and the latter of psychiatry) we are, he argues, mixing two different but complementary perspectives — that of the first-person experience of the subject, and that of the third-person observation of the neuroscientist or clinician. These 'mixed perspective' ways of talking — for example invoking the way that certain practices of conscious mental imagery may affect heart rate, muscle tension, etc. — have at least practical utility 'in terms of the things that you can do (maintain that state of mind, deepen it ...)



(p. 15 above). Perhaps they are also theoretically innocent, since they combine equally valid viewpoints on the same process. But the important point for Velmans is that, while complementary, they are ‘mutually irreducible’ (p. 15).

I find a lot of the suggestions made by Velmans quite congenial. However I wonder whether his basic position really is immune from the some of the criticisms he levels at materialist views he rejects. Velmans distinguishes between ‘reductive’ and ‘emergent’ forms of materialist accounts of consciousness.<sup>4</sup> An important part of his critique of reductive theories is that reductionists confuse a number of important concepts that must be distinguished. Once these distinctions are properly recognized, he says, the appeal of reductionism evaporates, or indeed it’s shown to be inconsistent or incoherent.

Thus, Velmans says, reductionists move from asserting that there are neural correlates to consciousness to asserting an identity between a conscious state and its correlate. Yet, as he points out, ‘A correlates with B’ does not entail ‘A is (ontologically) identical with B’, so the two relations should not be confused.<sup>5</sup> But is this fair? First: reductionists don’t need to base their view on *an inference from correlation to identity*. They may simply argue that, given strong evidence in favour of widespread correlation between neural states and conscious states, and given the problems inherent in competing theories, asserting an identity relation seems reasonable, *in the absence of a better alternative*. (Moreover, even if ‘A correlates with B’ doesn’t entail ‘A is identical with B’, the entailment does seem to go the other way, and thus identity could help to explain the correlation.)

Velmans points out that ‘A = B’ obeys Leibniz’s law, whereas ‘A correlates with B’ does not. Leibniz’s law is understood as saying that if A = B then all properties of A are properties of B and vice versa. But, as he further points out, there need be no such systematic property-sharing where A and B are merely correlated. OK — that’s true — but if A and B are correlated *because* they are identical then of course they will have properties in common just to the extent that is required by their being identical. So invoking Leibniz’s law in this way may be beside the point.<sup>6</sup>

Velmans further differentiates causation from both correlation and identity. Causation lacks another formal property which both correlation and identity

[4] See the appendix, and also Velmans (2000), chapter 3. Velmans also mentions eliminativist views which deny the reality of conscious states, but, like him, we will, for brevity, leave these out of the discussion.

[5] See appendix, p. 21–7, and also Velmans (2000), pp. 35ff.

[6] There is in any case a problem with Leibniz’s law in connection with proposed mental-neural identities. Many philosophers recognize that there are important exceptions to Leibniz’s law. Someone may believe Mrs David Beckham to be married to a footballer while having no such belief about Posh Spice, even though they are the same individual. Properties like ‘...is believed by X to have property P’ — so-called ‘referentially opaque contexts’ — are often thought to be excluded from the scope of Leibniz’s law. This may be important in getting mind–brain identity theorists out of tangles to do with failure of substitution in the case of mental ascriptions and neural or bodily ascriptions. Suppose a twinge in my knee were identical to a certain neural-bodily state S. The twinge is observed by me to be painful but S is not observed by me to be anything (since unknown to me). All such anomalies might *perhaps* be explained away by identity theorists as permissible exemptions to Leibniz’s law. (But that’s a big ‘perhaps’.)

share, namely symmetry: if A causes B it does not follow, he says, that B causes A (indeed it's perhaps unusual for causation to be symmetrical). Velmans is right that these different relations must not be confused. But this is not enough to show why a reductionist *must* be stating a falsehood in asserting the following, for example: that for every mental state  $S_m$  there is a certain neural state  $S_n$ , such that all of the following hold:  $S_n = S_m$ ;  $S_n$  and  $S_m$  are correlated; and  $S_n$  both causes and (in some sense) is caused by  $S_m$ .

Velmans also discusses an alternative to reductionist materialism, namely emergentism, according to which conscious states are higher-order, non-reducible properties of brains. Many of those who support an emergence view use analogies such as the relation between high-level macroproperties, (liquidity; genetic inheritance), and low-level micro-properties (the right sort of molecular structure; the relevant features of DNA). In fact, as Velmans points out, reductionists invoke similar cases in support of their view, so the debate between emergent and reductive forms of physicalism may come down at least in part to issues in the philosophy of science over differing interpretations of the same phenomena.

Velmans expresses strong reservations about any attempt to assimilate the consciousness–brain relation to cases like liquidity or to biological properties such as genetic inheritance. In this respect he follows the tradition of writers like Levine, Chalmers, etc., who see the special features such as subjectivity, phenomenality, first-person privacy, etc., as rendering any physicalist account highly problematic, if not ruling it out. Velmans believes, with them, that such special features make it impossible to assimilate the consciousness–brain relation to less problematic cases of emergence of high-level properties from low-level ones, as in the examples previously mentioned. Velmans has no objection to calling the relation one of emergence.<sup>7</sup> His quarrel is with the application of the word ‘physical’ to the case of consciousness-emergence.

Is he perhaps being a trifle unfair, however? First, he seems intent on tarring emergence-theorists with the same brush as reductionists, namely ‘nothingmore-ism’. Thus he writes (on p. 26 above) that for emergentist physicalists ‘consciousness is ... nothing more than the higher order, emergent effect of [neuronal activity]’ (and other similar characterizations occur elsewhere). Of course this is accurate, but misleading, since emergence theorists will also stress that higher-order properties, while in one sense nothing more than the effects of their constituent low-level processes, may nevertheless in another sense be *toto mundo* distinct from those constituent processes.

Also he suggests that it is just arbitrary, an act of ‘relabelling’ (p. 26) or of *fiat* (p. 27), to describe high-level subjective states as ‘physical’ emergent properties. But again I wonder if this is not perhaps unfair. For there are clearly strong arguments — to do with ontological economy, conceptual conservatism, causal closure, and so on, against introducing non-physical properties into the universe. In

[7] ‘I should stress that I do not deny that conscious experiences can be said to “emerge” from the human brain in the sense that given brain states can be said to *cause* given conscious experiences’ (footnote 20 of target article, on p. 27 above).

any case one does not have to hold to physicalism as a dogma, to be rejected only *in extremis*.

One way of describing physicalism (not a formulation that Velmans uses) is as the view that the only kind of facts that exist in the world are (in a wide sense) physical ones. In other words, if you took away the physical facts, then you would take away all the facts in the world (and *a fortiori* you would remove all the consciousness in the world). It is possible to hold such a view in one of at least two ways — either (weakly) as a view which is considered *no less unreasonable* than any competing view, or (more strongly) as a view which is thought *more reasonable* than any competing view. I think many people attracted to physicalism hold it in the former, rather diffident way, rather than in the latter way. As a weaker position, the former is correspondingly harder to dismiss than its more strident variant.

Merely saying that the presupposition that conscious subjective states are physical is arbitrary or not rationally forced upon us is not sufficient to dislodge the more diffident form of physicalism, surely, for no such claim is there being made. This kind of adherent of physicalism will concede that they do not have any conclusive argument for their view: rather, they will say, it is to be preferred for the pragmatic reasons mentioned earlier, so long as it is not shown to be inconsistent or otherwise rationally objectionable. I don't see that Velmans has pointed out any inconsistency or incoherence in the view that subjective properties are physical: as far as I can see he has merely claimed that there is no necessitation to believe it.

So I'm arguing that perhaps a somewhat self-effacing, emergentist form of physicalism may require a stronger argument than Velmans seems to want to give in order to dismiss it from the stage. (Plenty of people have advanced such arguments, of course — Chalmers (1996) is one of the most notable.) Perhaps Velmans' complaint is that such a view — he refers specifically to that of Searle (1987) — is incapable of explaining *why* the relevant macrofeatures of the brain that are to be identified with consciousness should have the subjective feel that they do have. But a diffident supporter of emergent physicalism does not, perhaps, have to see their view as committing them to supplying an explanation of why such emergent states must have the subjective feel about them (although no doubt if an explanation were to come along they would welcome it as much as anyone).

In any case, it's not clear that Velmans' own view is really that distinct from this kind of physicalism. First, in describing his position as one of ontological monism, he seems to be opening himself up to the following line of questioning: 'Doesn't monism imply unity? So are you not saying that the neuroscientist's third-person facts and the subjective first-person facts are two equally real parts of a single unity? But then, if one side of this unity is physical, mustn't the other side also be physical (or it's not a unity)?' Perhaps Velmans' answer to this is that neither the third-person physical facts nor the first-person subjective facts are ultimately real, and that the underlying bedrock of reality is neither the one nor the other. (I guess this is implied by his calling it a 'dual-aspect' theory.) Some of the remarks he makes towards the end of his book suggest this interpretation,

particularly his suggestion (Velmans, 2000, p. 249) that it is perhaps information-processing that lies at the heart of both conscious experiences and their physical correlates.

But then there is a second problem: Velmans does not really express anything more than the most tentative speculation about how this duality-in-unity is to be understood or explained — merely to characterize it in terms of ‘information-processing’ in the way that he does seems to be merely to ‘re-label’ it, which is to open himself to just the kind of complaint he lays at the feet of physicalists. Velmans refers to wave–particle complementarity to help make things clearer,<sup>8</sup> but this is offered only as a helpful analogy, and the obscurity of the idea of quantum complementarity is fully acknowledged in the field, so the help it gives is very limited.

So Velmans’ own position may be less clearly demarcated from emergentist physicalism (e.g. as found in Searle) than might be thought. In so far as it is distinguishable from the latter, it may rest on some very strongly revisionary conceptions of the nature of physical ‘reality’. And his complaints against some of the views he opposes may be deemed unfair if they are requiring of them a standard of clarity and conclusiveness in explaining the link between third-person and first-person manifestations of consciousness that does not seem to be available for his own view.<sup>9</sup>

Notwithstanding these concerns, Velmans has some important issues to raise about mental–physical interaction. The puzzles he addresses require an account on any view, and some of his positive suggestions are extremely plausible and make important contributions to the growing area of psychophysics.

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## NONREDUCTION, CONSCIOUSNESS AND PHYSICAL CAUSATION

*Robert Van Gulick*

Max Velmans presents and then attempts to defang several apparent threats to the causal efficacy of consciousness and personal agency. The sort of non-reductive pluralism that he proposes strikes me as plausible and very much in the mainstream of current philosophic thought on mind–body matters. It is less clear how successfully his specific replies to the alleged three threats disarm their targets.

[8] See footnote 13 (p. 14 above); also Velmans (2000), ch. 11.

[9] See Velmans (2000), p. 250: ‘At present there is little more about ‘what dwells within the explanatory gap’ that can be said with confidence.’ I don’t deny that Velmans seeks as much clarity as possible, in a domain where the latter is desperately at a premium.

Nonreductive physicalism has been perhaps the most widely accepted view of the mind/body relation among Anglo-American philosophers for the past quarter century. The approach, as articulated by Jerry Fodor (1974) and Hilary Putnam (1972; 1978) in the mid 1970s, aims to combine a pluralist nonreductive view of theories with an ontological commitment to the physical as the underlying basis and substrate of mind (and of all else that is real). The former claim, referred to by Fodor as the ‘autonomy of the special sciences’, expresses the belief that describing and understanding reality requires us to use a wide diversity of theoretical, conceptual and representational schemes, many of which cannot be reduced to the language and concepts of physical science. The natural world exhibits order and regularity at a variety of levels, and we need to use a wide range of intellectual and cognitive tools to model and interact it with in its diverse aspects.

Economic cases are often used to illustrate the basic point. All economic transactions may be at base physical events, yet no one would propose that we should construct our economic models using only the language and properties of physical science. In part this is because economic facts and concepts divide up the world along lines that crosscut those associated with physical theory. There are many ways to make a thousand dollar payment, and though they are all realized by underlying physical processes, the specific properties involved vary radically from case to case. I might pay by writing a bank cheque, using a credit card, making an electronic transfer or by handing over ten one hundred US dollar bills or any other mix of currency and coins that sums to one thousand dollars. Each and every such transaction is a physical event, but they share little in common physically. What makes it appropriate to group them all together as events of a given sort is the economic regularity they instantiate within the rich social financial context in which they occur. It would be hopeless to try reduce the concepts, kinds and models of economics to those of physics or to do economics using only the linguistic conceptual tools that suffice for doing physics. Yet no one is seriously worried by a money/matter problem, nor are there any serious advocates of money/matter dualism. The theoretical, conceptual and representational autonomy of economics need not threaten the ontologically physical status of economic events.

Velmans’ own view seems to be in much the same spirit, though it is unclear just how much it agrees in its actual specifics. He describes his view as ‘ontological monism combined with epistemological dualism’ (p. 8), and in that respect his view accords with mainstream nonreductive physicalism. Both hold that there is a single underlying reality that is legitimately viewed and conceptualized from more than one irreducible perspective. However, Velmans’ position seems to diverge in at least three important respects from typical nonreductive physicalism.

1. First it is presented a matter of *dualism* rather than *pluralism*. This may well be more a matter of exposition rather than substantive disagreement. Velmans may indeed be willing to generalize his point about the legitimacy of mutually irreducible perspectives far more widely than his use of the term ‘dualism’ would suggest. However, that is not obvious. He may instead regard the mental/



physical distinction as special, and thus he may not want to generalize and assimilate it to all the other cases to which the pluralist appeals in distinguishing irreducible perspectives among the biological, the chemical, the evolutionary, the economic, the geological, the historical, and perhaps even the Freudian, the Marxist and the feminist. Perhaps Velmans would take such assimilation to diminish the force of his claim about the mental and the physical, or perhaps he would take it as confirming reinforcement. I cannot infer his view on this matter with any confidence based on what he says in his article. Clarification would be welcome.

2. His view seems to equate the mental perspective with the first-person perspective, whereas nonreductive materialism generally distinguishes between the two and treats the first-person perspective(s) as a subset of a larger set of mental perspectives, some of which are quite third-person in nature and application. For example, many would take the perspective of ordinary intentional folk psychology, i.e. the rational agent perspective of belief, desire, motive and intention, to be a largely third-person perspective applied primarily in making sense of the rational purposive behaviour of those around us. Daniel Dennett's intentional stance (1987) is explicitly constructed as a third-person perspective but one that Dennett and many others regard as genuinely mental and intentional. Velmans equation of the mental perspective with the first-person perspective might seem to exclude such alternative third-person mental perspectives, or at least to deny their status as genuinely mental.

Again the disagreement may be more apparent than real; perhaps Velmans would accept the existence of genuinely mental third-person perspectives that are legitimate and essential despite being as irreducible to the physical perspective as is the first-person perspective on which he fixes his sole attention. The apparent difference may again be just a matter of exposition rather than substance. However, it is not clear from what Velmans actually says in his article, and he might indeed intend to link the mental perspective quite tightly to the first-person point of view. John Searle (1992) for example has done just that. He argues that nothing is genuinely and nonderivatively mental except what is apprehended from the first-person point of view. That view is a distinctly minority one in the current philosophic world, but it nonetheless represents a live option, and thus one that Velmans as well might endorse. The extent to which he intends such a limitation on the mental perspective remains unclear from what he says in his paper, though his willingness to include nonconscious mental factors in his account of volition and choice makes it seem that his view of the mental is less closely linked to the conscious first-person perspective that is Searle's. Once again clarification would be welcome.

3. Velmans appears not to regard his view as a variety of physicalism, which would be a significant respect in which it differs from current mainstream nonreductive views. Both Velmans and the nonreductive physicalist are committed to the an ontological monism, but while most nonreductivists take the underlying reality to be physical, Velmans seems to tend more toward some form of neutral monism or dual aspect theory. Although his position on this issue is not explicit in his article, it seems that he takes the underlying reality to be neither physical

nor mental. If that is so, then he surely parts company with nonreductive physicalists. However, the reasons for doing so remain unclear. Thus it would be helpful if Velmans would clarify his position on this central issue, and give a fuller explanation of his reasons for rejecting physicalism, if he in fact does so.

At this point a dilemma presents itself. Either Velmans rejects physicalism or he does not. Whichever he opts for, he must confront the challenges raised by the critics of nonreductivism, such as Jaegwon Kim (1989; 1990; 1999), who argue that unless the mental reduces to the physical it can have no impact on the physical world and thus could not have most of the causal effects we are inclined to attribute to it. These critics appeal to the supposed causal closure of the physical world, which is the basis of the third of the three apparent challenges that Velmans himself raises against the causal status of consciousness. So it will be best to turn our attention to those specific threats and Velmans' attempts to blunt them.

He raises three apparent threats to the causal status of consciousness:

- We lack (conscious) knowledge of (the details of) the relevant processes.
- Consciousness occurs too late to effect the (relevant) processes, those to which they most closely relate.
- The causal closure of the physical precludes (any nonreductive form of) the mental from having any causal effect on the physical.

(Parentheses are inserted to emphasize key aspects of the claims which may be presumed rather than stated.) The first two of these strike me as far less threatening and capable of being answered on fairly narrow grounds without appeal to any grand or general metaphysical cum epistemological principles, of the sort which may however be needed to deal with the third.

Regarding the first, what sort of knowledge need we have of a process and of its detailed working in order to affect, control or initiate it? The answer is often very little. When I work at my computer I make use of all sorts of high level commands that are made available to me through the virtual machine interfaces that allow me to interact with the programs that I have running on it. I need not know anything about the underlying structure of the operations that execute those commands, yet I surely can and do exercise a great deal of control and influence on what happens. Similarly the causal and control affordances through which conscious experiences and thoughts are able to elicit and affect underlying mental operations are likely to involve similar high level virtual interfaces. That is, consciousness is likely to exercise its influence on mental processes through a high level, perhaps even conscious, mode of conceptualizing the nature of those processes rather through any knowledge or understanding of their underlying details. If this is so, then I think it blunts the force of the first objection. We may indeed lack conscious knowledge of the details of many of the processes that consciousness is supposed to control, but lack of that knowledge need not undermine such control as long as there are suitable high level interfaces and modes of access through which our conscious states can have appropriate effects on those processes. When I consciously reason, imagine, 'move' around an imagined space, or call up remembered experiences, my ability to do so does not depend upon any conscious knowledge of how those processes are implemented or

realized at the nonconscious level. All that is needed is that I can elicit or produce them through the relevant interface, just as I can call high level operations on my computer through its virtual machine commands. Thus it would seem that the first challenge to the causality of consciousness is easily met.

Answering the second, or ‘too late’, challenge is a matter of taking care in determining what should count as a relevant process, when it is claimed that consciousness occurs too late to affect the relevant processes, those to ‘which they most obviously relate’. Velmans claims that conscious ‘experiences relate most closely to those processes that *produce* them’ (p. 13). More specifically he claims, ‘Visual perception becomes “conscious” once visual processing results in a conscious visual experience, cognitive processing become “conscious” once it produces the inner speech that forms a conscious thought and so on. Once such experiences arise the processes that have produced them have already taken place.’ I find Velmans’ argument puzzling. I agree of course that conscious experiences follow the processes that produce them. How could it be otherwise? But why should that in anyway impugn the commonly accepted causal status of conscious experiences? Neither folk psychology nor any scientific model of consciousness of which I know supposes that experiences produce the very processing from which they themselves result. However that fact seems irrelevant to assessing the causal status of experience. Even if these processes are those to which experiences are ‘most closely related’ — which is itself unclear since I have no idea how to measure such a unarticulated claim of closeness — they nonetheless do not seem to be the processes that are relevant to assessing the validity of our ordinary beliefs about the causal efficacy of conscious experience. When I walk down the street and see a thirty percent off sale sign in a bookstore window, no one supposes the visual processing that produces my conscious experience is itself a result of that very conscious state (though it may be influenced through top down processing by my prior conscious state.) However, my conscious experience of the sale sign may cause me to recall a book I have been wanting to purchase but had deferred because of its high price. It may thus also cause me to change my immediate plans and walk into the bookstore to see if it has that volume in stock. Thus Velmans’ second challenge strikes me as a seeming non sequitur. Regardless of whether the processes that produce conscious experiences are those ‘to which they are most closely related’, they do not seem to be those relevant to determining whether or not conscious experiences have the causal effects they are commonly supposed to have.

Perhaps I have misunderstood Velmans’ line of argument here, but it does not as far as I can see pose any real threat to the commonly accepted causal role of experience in the explanation of human action.

We come at last to the third and most daunting of Velmans’ three apparent challenges, namely that the causal closure of the physical seems to leave no room for conscious experiences to have any impact on the physical world, including on the physical motions of my body or the physical activity of my brain. The claim relies upon an implied nonreductive view of consciousness; that is, the claim can be read as a conditional: ‘If consciousness is not reducible to the physical then it

can have no impact on the physical given the closed causal nature of the physical.' If everything physical that happens has a complete explanation in terms of solely physical causes, then there would seem to be no causal work left for conscious experiences to do. The nonreductive assumption is essential to giving the challenge its bite; if conscious experiences were reducible to the physical their having effects on the physical would involve no violation of its supposed causal closure. It is thus that critics of nonreductivism, such as Kim (1990; 1999), argue that reductivism is the price one must pay if one wishes to preserve the causal status of mind and consciousness. According to such critics, it is only if conscious experiences turn out to be wholly physical events that they can have the sorts of causal impacts on our bodies, our behaviours and the rest of the physical world that they are almost universally taken to have. By contrast, they argue that any nonreductive view of mind and consciousness condemns them to epiphenomenal status and causal impotence at least with respect to everything physical. Reducibility they claim is the price one must pay to earn causal potency. This line of attack on nonreductivism, which is often referred to as the 'causal exclusion argument' (Kim, 1990), seems similar in its essentials to Velmans' third challenge.

The literature on this issue is enormous (see for example the papers in Heil and Mele, 1993), and I will not try to review it here. What matters for present purposes is that the exclusion argument is aimed at all nonreductive views of mind, applying equally to Velmans' dual aspect version as to more common forms of nonreductive physicalism. The thrust of the argument is the same against both. The causal closure of the physical leaves no room for anything nonphysical to have a causal impact on the course of physical events. Thus unless the mental reduces to the physical, i.e. unless it is in some sense really physical, then the mental can not causally affect what happens in the physical world. Unless my conscious experience of the sale sign in bookstore windows reduces in some relevant sense to some physical state or process in my brain, then it can not be even part of the cause of my turning and walking into the store to check the philosophy shelves. We need not worry about arcane and controversial cases of supposed mind/body interaction in alternative medicine. Even the most mundane and seemingly obvious cases in which our conscious lives appear to affect our behaviour would be called into question by the exclusion argument in so far as one holds a nonreductive view of mind. Or so at least the proponents of the exclusion argument allege.

What is Velmans' reply and how does it compare with those given by nonreductive physicalists? His response to the causal closure of the physical turns mainly on his epistemological dualism and his claim that the first- and third-person perspective are complementary and equally essential for understanding the nature of mind and consciousness. As indicated above, I am sympathetic to the need for a plurality of perspectives, but I do not see how that in itself provides a reply to the challenge of the exclusion argument.

If the physical factors revealed from the third-person perspective give a complete causal explanation of physical events and nothing nonphysical can have a causal impact on the physical, then there does not seem to be any room for other

factors viewed from an alternative perspective to act as causes of physical events, such as the movement of my body when it turns and walks into the bookstore. That alternative perspective might have some value and interest, but it can not do so by making us aware of nonphysical causes of the physical. The possibility of such factors is ruled out by the causal closure of the physical.

Perhaps an analogy will help. In a modern sports stadium, I might watch various game plays on the giant display screen, some of which depicted live action, some of which are show replays and some of which may be just simulations. The scenes and changes on the screen have a regularity and order that can allow for reliable prediction, but the depicted events do not in fact cause each other. The depicted ball may well sail across the screen with a speed and direction that reliably follows from the speed and angle of the depicted foot that made contact with it, but the depicted foot does NOT cause the depicted flight of the ball. Both are instead the causal effects of processing in the graphics software that generates the changing display.

The challenge posed by the exclusion argument is to give good reasons for believing that in the mental case we are not observing a similar illusion of causation. Yes, we see events in a regular and reliable order of succession that looks like mental properties causing physical effects, but the proponent of the exclusion argument claims we are mistaken. Since nothing outside the physical causally effects the physical, any perspective that seems to indicate otherwise is merely an illusion. The causal closure of the physical is inconsistent with there being any non-physical cause of my body's turning and walking into the bookstore. An appeal to epistemological dualism and complementarity by itself does not suffice to resolve the apparent contradiction. Velmans' response is a version of what is called a 'no competition' solution, i.e. one according to which the causal explanation at the mental and physical levels can both be true because they do not compete. But in order to make such a claim plausible, one needs to explain specifically how and why they do not compete and how they might thus both be true. In that respect, I do not see how the crucial details of the story are supposed to go on Velmans' complementarity view.

The problem is a serious one for nonreductive physicalists as well, but their commitment to the ultimately physical nature of the underlying or basic reality gives them an option that may not be available to Velmans and other dual aspect theorists. What makes the nonreductive physicalist a physicalist is a commitment to the physicality of all the underlying entities, properties and forces that realize or instantiate the higher level patterns and regularities that we apprehend from a plurality of perspectives quite distinct from those provided by physics and the physical sciences. Biology, immunology and evolutionary theory provide concepts and organizing structures that allow us to grasp and understand high level organizing features of the biological realm, but deep down at some fundamental level all those features are fully realized and implemented by physical structures that behave as they do solely because of their physical natures plus their mode of combination; vitalism is just false in the actual world. Thus when we view any specific instance of a higher level regularity, we are in fact seeing the world of physical reality and



physical causes but through a set of concepts and cognitive structures that allows us to abstract from the blizzard of physical details to grasp robust and resilient patterns that are instantiated by that underlying physical reality.

The nonreductive physicalist is thus in a position to explain why the mental and physical causal explanations do not compete. It is simply an application of the general principle of noncompetition between mechanisms and their implementations. I can dim the lights by turning the rheostat built into the dimmer switch, and that explanation is not made false by the fact there is a more micro account that might be given of just how the construction of that particular switch increases its resistance to current as I turn it. Similarly if mental states and conscious processes are all physically realized at the underlying level, then there need be no competition between the mental and physical causal explanations one might give of my behavior when I turn to walk through the bookstore door.

Critics of the nonreductive view have unsurprisingly not been persuaded by such attempts to rebut the causal exclusion challenge by replies based on the noncompetition between realizer and realization. That sort of move, they protest, is not available to the nonreductive physicalist, since the absence of reductive links between the mental and the physical precludes the very sorts of cross level implementation relations it requires.

I believe the nonreductive physicalist can answer such charges and I have tried to do so elsewhere (Van Gulick, 1992; 1993) The story is too long to lay out here, but the goal is to give an account of the sense in which higher level regularities might apply ‘in virtue of’ lower level ones, despite our human inability to put the schemes we use to describe and represent the various levels into the sort of tight correspondence that traditional reductivism demands. It is thus a specific instance of the general tension in the nonreductive view between on the one hand its ontological commitment to the physical as the basis in virtue of which all else applies, and its denial of our ability to make the sorts of links between our cognitive and theoretical structures that would allow us to deduce our mental concepts and theories from our physical ones or to substitute the latter for the former in every practical application.

Resolving that tension is a challenge, but one I believe can and has been met elsewhere (Van Gulick 1992; 1993). By contrast, it remains unclear whether or how Velmans might use his notion of complementarity to spell out the details of his own version of the noncompetition approach. He may indeed have the means to do so, but further explanation is clearly called for.

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## IT'S TIME TO MOVE ON FROM PHILOSOPHY TO SCIENCE

*Jeffrey Gray*

### *The complementarity model*

Max Velmans has done so much to clarify the nature of the Hard Problem of consciousness, both in his important review of the literature demonstrating the lateness of conscious experience (Velmans, 1991; see also section 3 on p. 9 above) and in his lucid overview of the whole area (Velmans, 2000; required reading!), that I am reluctant to launch an outright attack on the position he adopts. But that is what commentaries are for; so here goes.

In essence, the Hard Problem can be stripped down to just two questions: how does the brain create qualia; and how does the brain inspect them? (It *may* be possible to eliminate the second of these questions; Gray, in preparation.) I shall call these the 'central questions'. In the target article Velmans unnecessarily distracts us from the central questions by asking us to consider four possible putative routes of causation: mental to mental, physical to physical, mental to physical, and physical to mental. This division would be of serious value only if it demonstrated a new way of tackling the central questions. But Velmans does not attempt any such demonstration. That is because he believes he *already* has a solution to the Hard Problem. The four different routes of causal action that he puts under the microscope serve only to let him demonstrate this solution. That would be a useful exercise, if it were a genuine solution. But it isn't; so the exercise becomes vacuous.

Velmans' proposed solution, as is probably well known to most *JCS* readers, is a version of dual aspect theory. First-person and third-person accounts of what goes on in John's consciousness/John's brain are both correct. They deal with exactly the same information, but observed from different perspectives. Hey, presto, Houdini is out of the box! (My summary is admittedly crude; for a full account, see Velmans, 2000.)

Philosophical arguments, including those deployed by Velmans, have played a vital role in clarifying the Hard Problem. But it is time for the problem finally to come out of the philosophical closet. Conscious experience is part of the natural world. Therefore, the only satisfying explanation will be one that shows how consciousness is linked to the scientific account that applies to the rest of that world. The standard criterion for whether or not a proposed theory forms part of science is potential falsifiability by empirical observation. I cannot think of any such test of Velmans' model, nor has he proposed any himself. The same is true, so far as I know, of all other versions of dual-aspect theory, including for

example Chalmers' (1996) attempt to seek a common basis for the physical and conscious realms in an underlying stuff of 'information' (a move Velmans also makes, in his section on 'the neural correlates of conscious experience'). Thus, Velmans' proposed solution to the Hard Problem is purely philosophical, which is to say, purely verbal. It purports to tell us what we 'really' mean when we say things, respectively, from first- and third-person points of view. We need to move beyond this.

Velmans uses the term 'complementarity' to describe his theory. First- and third-person accounts are said to 'complement' one another: both describe the same underlying information structures, and both are equally valid; but it is impossible simultaneously to take up first- and third-person perspectives towards the same information structure. The analogy with the complementarity principles of physics is clear. But the *disanalogy* is much more important. The complementarity principles of physics are embedded in a detailed theory that makes a huge array of empirical predictions, and these have passed the test of experiment over and over again. It is not impossible that a complementarity theory of consciousness may one day be formulated in a similarly testable manner. But that day has not yet come.

I am reminded in this respect of Searle's (1987) suggestion that consciousness is an emergent, high-level property of a system made up of micro-elements, none of which has that property itself in isolation. His analogy lies in the way that, e.g., liquidity is not a property of any individual molecule of H<sub>2</sub>O, but only of water in bulk. Like Velmans' complementarity analogy, it is perfectly plausible. But proposals of this kind tell us only that there may one day be a comprehensible theory of consciousness along these general lines. They are, so to speak, 'prolegomena' to theories. They do not, in the absence of specific and testable predictions, count as theories themselves. I do not deny, however, that they are nonetheless useful steps forward — just the right kind of steps, indeed, that one looks to philosophy to provide. They set the stage for an eventual scientific theory that may fit with one or other of the prolegomena.

### *Voluntary behaviour*

There is a second aspect to Velmans' target article which is only tangentially, if at all, dependent upon acceptance of his overall complementarity model. This consists in his account, in the final section ('Who's in control?'), of voluntary action (often referred to, more grandiosely, as the problem of free will). As Velmans indicates, in approaching these issues one must first dispense with the notion that voluntary action results from conscious decisions. This notion has been demonstrated empirically to be false in numerous experiments, of which those by Benjamin Libet, described in the target article, are justly the most famous.

To be sure, there are occasions when voluntary action does take place after, and apparently in consequence of, mature, conscious reflection. But these occasions are the exception, not the rule. They are picked out as special, for example, in the quasi-legal description of an action as 'premeditated'. Premeditation is seen as aggravating criminal action. But the *absence* of premeditation does not excuse the perpetrator from responsibility. This distinction maps pretty well on

to one between: (1) decisions to act of which one becomes consciously aware only after the decision has been taken and when the action is already in course (capable still, at best, of being inhibited from proceeding to fruition; Libet, 1985); and (2) decisions to act taken consciously prior to (sometimes, a long time prior to) the initiation of any action at all. To absolve people of personal responsibility for the former kind of action would entail wholesale reconstruction of the law, not to speak of the down-stream effects upon society as a whole. We should avoid, therefore, that absolution if we can. But wanting there to be a certain state of affairs does not justify us in postulating it.

Velmans' solution to this dilemma is one with which I agree. Those actions that are not premeditated (a major part, perhaps the vast majority, of actions) are outputs of *unconscious* brain processing. But, as Velmans points out, this statement in no way implies that such actions lack the possibility of choice. The arguments he makes in elaboration of this point are cogent, correct and stand in no need of reiteration. I add here just one consideration.

Essentially, the brain is a highly complex cybernetic system, with multiple sub-systems in massive hierarchical and parallel interaction, each of which is based for the most part upon familiar engineering principles of feedback, controlled variables, etc. (see, for a recent and important statement of this point of view, Hurley, 1998). Overall, the system is built so as to control as well as it possibly can those variables that reflect the environment in which it has to survive. An important subset of these 'controlled variables' consist in those that are familiarly described as 'rewards' and 'punishments'. There is a large technical literature on animal and human learning and conditioning in which the detailed operations of rewards and punishments have been subjected to experimental and theoretical analysis. Within this framework voluntary behaviour is construed as behaviour which is readily sensitive to change by reward and punishment; involuntary behaviour, by contrast, is highly resistant to change by these means. Application of this distinction does not rest upon prior knowledge of the degree to which consciousness is involved in the relevant behavioural change. Indeed, the degree to which this is the case is still a matter of intense experimental investigation, and probably differs between different experimental circumstances.

In both everyday parlance and the legal determination of responsibility, the class of voluntary behaviour maps pretty well upon that same sensitivity to change by reward and punishment that figures in the technical literature of learning theory. In the legal case, the rationale for such a mapping is clear. The criminal law hands down punishment in order to discourage the performance of certain actions. There would be little point in so doing if these actions were not responsive to change by punishment. The law works because it deals with organisms — ourselves — constructed as cybernetic systems that respond to feedback from punishment (and of course reward) in just this way. Our choices are constrained by the way the cybernetic system that is our brain is constructed, and by the environment in which we develop and function. But they are choices nonetheless. Premeditation apart, conscious awareness of the choices is irrelevant.

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## SCIENTIFIC RULES OF THE GAME AND THE MIND/BODY: A CRITIQUE BASED ON THE THEORY OF MEASUREMENT

*Sam S. Rakover*

*Velmans' approach (psychophysical theory and neurophenomenological laws) does not fulfill the requirements of the theory of measurement accepted by science. Therefore, this approach lacks the capability of empirically explaining his proposed three mind/body problems.*

### *Introduction: Velmans' theory of mind/body*

The relationship between our conscious private sensations, feelings, images, thoughts etc., called conscious experiences (CE), and our public behaviour transforms into various mind/body problems when we attempt to understand it in terms of the scientific rules of the game. Velmans focuses on three mind/body problems: (1) The 'closed system' problem proposes that there is no room for CE in the causally closed physical world; (2) The 'nonconscious physiological processes' problem proposes that CE cannot control physiological processes of which one is not conscious; and (3) The 'mental causation' problem proposes that CE cannot affect physiological events that precede them.

Velmans proposes a psychophysical theory that explains mental causation and resolves these three mind/body problems. This theory, which combines ontological monism with epistemological dualism, is based on the assumption that both CE and their neural correlates in the brain represent the same information. 'As each experience and its physical correlate represents the same thing it follows that each experience and its physical correlate encodes the same information about that thing. That is, they are representations with the same *information structure*' (p.12 above). These two kinds of information, the 'phenomenally encoded information and its correlated neural encoded information may be two manifestations (or "dual-aspects") of a more fundamental, psychophysical mind, and their relationship may, in time, be describable by neurophenomenological laws ...' (footnote 14, on p. 14 above).



*Scientific rules of the game*

I shall criticize Velmans' psychophysical theory and the fundamental neurophenomenological laws by employing certain scientific rules of the game that are accepted by the natural sciences and cognitive psychology. The critique is based on the following steps:

- (1) Velmans' theory and neurophenomenological laws do not fulfill the requirement for 'unit equivalency' (see below);
- (2) The reason for (1) is that consciousness does not have units of measurement as with natural laws;
- (3) Information cannot be the unit of measurement of consciousness;
- (4) Neurophenomenological laws are not natural laws but are 'correlational laws' (see below);
- (5) Velmans' three mind/body problems cannot be explained by appeal to correlational laws, since the problems demand explanations by appeal to natural laws.

Hence, Velmans' approach does not seem able empirically to explain the three mind/body problems.

*'Unit equivalency' requirement.* One important requirement of any scientific law or theory (such as Newton's theory of mechanics, statistical mechanics, electromagnetism) is that the units of measurements or their combination on both sides of the law will be equal (see Rakover, 1997). I call this the 'unit equivalency' requirement. To substantiate this, let us examine the law of free fall of bodies:

$$S = 1/2GT^2, \text{ where } S \text{ represents distance of fall,}$$

T time of fall, and

G the acceleration of the fall as a result of gravitational force.

The important point for us is this: in this law the combinations of the measurement units on both sides of the equation must be identical. As S is measured by distance, the expression  $GT^2$  must also be measured by distance. And indeed, a simple algebraic calculation shows that this is the case:

$$\text{distance} = [\text{distance}/(\text{time})^2](\text{time})^2.$$

In view of this, I propose that a neurophenomenological law or theory does not fulfill the unit equivalency requirement. Let us examine a hypothetical law of pain behaviour (after Velmans' 'hot iron' example, pp. 17–18 above):

$$\text{Pain behaviour} = f(\text{Aversive stimulus, Neurophysiological process, Cognitive process}).$$

I touch a hot iron, my brain and cognitive processes start operating, my hand is withdrawn, and I feel pain and fear. Can it be shown that the combination of the units of measurement on the right-hand side of the pain equation is identical to the combination of the units on the left-hand side? To the best of my knowledge the answer is no.

It is not possible to take one group of measurements: heat, neurophysiological processes, and cognitive information, and another group of measurements:

subjective, phenomenological, expressions of pain and fear, and of a meaningful behavior (which is not a mere motor movement), and to show that the combinations of the units of measurements of these two groups are identical. But why not? My answer is rooted in the theory of measurement.

*Theory of measurement.* My major point is that psychological concepts do not have fundamental measurement units. By contrast, physics is based on the very fact that its concepts are built on such measurement units (see Michell, 1990; 1999; Campbell, 1953; Coombs *et al.*, 1970; Rakover, 1990). By such fundamental measurements physics builds various theoretical structures such as velocity, acceleration, force, work and energy. For instance, the theoretical structure entitled kinetic energy is based on the basic measurements of length, mass (weight) and time. This conceptual system represents the physical world and empirically explains it by employing explanation models such as the D-N model developed by Hempel (1965).

To exemplify this, consider the variable of length. We cannot only know if object *a* is longer than object *b* but also by how many units of length *a* is longer than *b*. If for instance *a* is <----->, *b* is <---->, and the measurement unit is <->, then *a* is longer by five length units than *b*, and *a* is twice the length of *b*. <-> is therefore a measurement unit by whose means the length of any object may be measured. The measurement of length is an example of the procedure called 'fundamental measurement': an empirical procedure by which one determines the ratio between a quantitative property of an object and the unit of measurement of that property. This procedure sustains several important mathematical properties such as transitivity and additivity.

Can this measurement procedure be applied to psychology? In my view, it cannot. Consider the following example (after Campbell, 1953). We have a heap of 60 corn kernels. I add (or remove) 30 kernels. Without doubt, I have significantly altered the heap's weight and volume. But have I altered the taste of the corn by addition or removal of kernels? Obviously not. The addition or removal of the kernels does not alter the 'corny' taste. There is no measurement unit for taste whereby we may increase or decrease the taste of the corn, as we did in the physical case. Similarly, it makes no sense to propose that Jacob loved Rachel three and a half times in 'love units' more than Leah; and if we assume that Einstein's IQ was 150, it makes no sense to propose that his IQ equals the IQs of three imbeciles ( $150 = 50+50+50$ ). (However, it should be noted that although in special cases mathematical models can be developed to generate interval and ratio measurement scales, they do not constitute a proof that natural measurement units in psychology do exist. See, e.g., Michell, 1990; 1999; Coombs *et al.*, 1970.)

*Information as unit of measurement.* Velmans proposes that a mental state (MS) and its correlated neurophysiological state in the brain (NS) represent the same information. Can information be a unit of measurement? My answer is no, for the following two reasons.

First, the concept of information in cognitive psychology relates to infinite psychological phenomena such as sensations, feelings, images, thoughts, contents of visual stimuli, voluntary acts and unconscious processes. Palmer & Kimchi (1986), who analysed the Information Processing approach to cognition, write: ‘Mental events can be functionally described as “informational events”, each of which consists of three parts: the *input information* (what it starts with), the *operation* (what gets done to the input), and the *output information* (what it ends with). By “mental events” we mean to include not only conscious experiences but all internal happenings that influence behavior, many of which will not produce any conscious experiences at all’ (p. 40). Their analysis showed that the concept of information is hard to describe and to understand, and it seems to defy any attempts to define it, including the attempt to understand it in terms of Shannon’s mathematical theory of information (see their discussion on pp. 40–3). In my view, even if one could apply Shannon’s theory of information to different NSs, because of the above arguments, I do not see how one could apply it to meaningful contents of different MSs.

Second, there is a difference in the way observations on MS and on NS are carried out, and it seems that observations on MS (introspection) do not fulfill the scientific requirements for observation (for a discussion see Rakover, 1990). There are three requirements that a scientific observation has to fulfill. *Objectivity* requires that neither the process of observation nor the observer will affect the observed behaviour and vice versa. *Publicity* requires that all scientists be able to make the same observations. *Repeatability* requires that observations be repeatable or replicable. Clearly, while observation of NS fulfills these requirements, introspection of MS does not. Introspection of MS is private, and it is doubtful if it can be objective and repeatable. Given this, how can we test empirically the hypothesis that a correlated NS of a given MS in X’s mind represents the same information that is represented by that MS? Since NS information is not a natural observable property (such as length and weight), but rather it is a trait that we attribute to NS, we have no choice but to rely on X’s introspection. Hence, observation of the NS information is depended on the introspection of MS information, but introspection does not fulfill the requirements of scientific observation. (If, in this regard, Velmans’ approach is viewed as an interesting version of the mind/body identity theory, the ‘information-based’ identity theory, then Meehl’s [1966] discussion of the ‘autocerebroscope thought-experiment’ is most relevant. Observing his brain through the autocerebroscope, he discovered that while his visual cortex is in a state red, he sees green in 10% of the cases.)

#### *Correlation and Velmans’ three problems*

In view of the above analysis, it is safe to propose that Velmans’ theory and laws as well as psychology’s theories and laws are not like those in the natural sciences. Instead we find in psychology ‘correlational laws or theories’, i.e., laws or theories that are based on an empirical correlation:

Behaviour = f(Stimulus, Neurophysiological processes, Cognitive processes),

where Neurophysiological and Cognitive processes are conceived of as hypothetical constructs. These constructs are indirectly associated with certain response-indices, such as pain that is indexed by verbal responses, heart rate, GSR, EEG, and fMRI. As such, it is not known if the indices represent the whole range of the hypothetical constructs, if they are not affected by other irrelevant factors, and if they are not task-specific. In contrast, due to the procedure of fundamental measurement, concepts in a natural law represent observations directly and entirely.

Can a correlational law empirically account for the three mind/body problems? My answer is no. First, a correlational law (an empirical generalization) itself is a target for an explanation and it is doubtful if it can play an explanatory role as do natural laws. And second, a correlational law is not an adequate tool to deal with the explanatory job demanded by the three mind/body problems that stem from the basic question of whether consciousness plays an explanatory role in a given behavioral system. (Similarly, we cannot turn a 3cm screw with a 0.5cm wrench.) To test this basic question empirically, we have to employ the following experimental procedures that are based on the requirements of fundamental measurement and of unit equivalency. We have to measure consciousness and see whether the obtained value is greater than zero, or we have to measure the other components in the system and see if their addition equals the total activation of the system. If the value is zero or if the addition equals the total activation, then the conclusion is that consciousness has no explanatory role. Otherwise, scientific work has to be continued, for example, to discover the kinds of connection among MS, NS and behaviour. (This is a very difficult task, since we are in a continuous flow of consciousness of different contents and intensities as long as we live.) Since these two experimental procedures are based on the requirements of fundamental measurement and of unit equivalency, and since a correlational law cannot fulfill these two requirements, it follows that one cannot appeal to a correlational law in order to account for the three mind/body problems. (Another problem that cannot be solved by appeal to a correlational law is whether cognitive processes are serial or parallel.)

In light of this, consider the closed system problem. To discover whether CE has an explanatory role in a particular closed system, we have to measure CE (or the other components) and see whether the obtained value is greater than zero. If the value equals zero, then CE does not play any explanatory role in that particular closed system. However, as argued above, these measurements cannot be carried out.

Similar things can be said about the problem of nonconscious physiological processes. The problem does not relate to the very fact that there are a huge number of nonconscious physiological processes. One cannot be conscious of millions of neurophysiological processes and function adaptively, and one does not become conscious of a stimulus (e.g., hot iron) at once, but only after the appropriate neurophysiological processes are activated (see also Rakover, 1996). Rather the empirical question is as follows: given an act that involves both CE and their correlated physiological events, can this act be performed without consciousness? As an example, consider automatic driving. It seems as if one does

not need to be conscious in order to execute this action. But is this a valid description of the situation? I think not (actually, I hope not), since a minimum, low level of consciousness, which does not reside in the centre of the inner attention process, is probably involved in monitoring and controlling driving. However, this hypothesis is very difficult to test for the same reasons discussed above.

Finally, consider the mental causation problem with regard to Velmans' hot iron example: accordingly, the withdrawal of the hand precedes the experience of pain. The causal problem is that the consciousness of pain followed the swift hand withdrawal. But this may be only a seeming problem, since it is possible that a fast and low degree of conscious event, which is different from the acute feeling of pain, is responsible for the withdrawal (and even for blocking pain for a short time for reasons of adaptive adjustments). After all, withdrawal and pain are just two responses to the aversive situation. After all, as mentioned above, we are immersed in a continuous flow of multiple states of consciousness of different contents, durations and intensities. Once again, it is difficult empirically to deal with this possibility by using a correlational law.

Thus, I propose that Velmans' approach does not seem qualified empirically to explain the three mind/body problems.

#### *A general conclusion*

The above critique could also be directed at psychology at large. In comparison with research in the natural sciences, psychological research is limited and does not progress like physics (see Rakover, 1992). In nutshell, while correlational laws and theories deal with ordinal relation (scale) at most, the solutions to many psychological problems require explanations based on interval relation (scale) at least. Analogously, the fact that we do not see the earth as a ball does not mean that it is flat. This is not a pessimistic point of view, but rather an opened-eyed attempt to see where the methodological problems reside.

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### HOW VELMANS' CONSCIOUS EXPERIENCES AFFECTED OUR BRAINS

*Ron Chrisley and Aaron Sloman*

Velmans' paper raises three problems concerning mental causation:

- (1) How can consciousness affect the physical, given that the physical world appears causally closed?<sup>10</sup>
- (2) How can one be in conscious control of processes of which one is not consciously aware?
- (3) Conscious experiences appear to come too late to causally affect the processes to which they most obviously relate.

In an appendix Velmans gives his reasons for refusing to resolve these problems through adopting the position (which he labels 'physicalism') that 'consciousness is nothing more than a state of the brain'. The rest of the paper, then, is an attempt to solve these problems without embracing a reductionist physicalism.

Velmans' solution to the first problem is 'ontological monism combined with epistemological dualism': First-person and third-person accounts are two different ways of knowing the same facts. This kind of reply is not new; it is, for example, a twist on the position expressed in Davidson (1970). True, there are substantial differences: For one, Davidson reconciles the tension between descriptions of events in mentalistic and physicalist language, not between first- and third-person descriptions of states; for another, Davidson actually provides an argument for his position, although to do so he assumes that there are no psycho-physical (or indeed, psycho-psycho) laws, something which we suspect Velmans would be reluctant to do. Nevertheless, they have in common the idea that the causal efficacy of the mental is not at odds with the causal closure of physics, since a mind-involving causal story is just another way of talking about the same facts that a purely physical causal story talks about.

This 'dual-aspect' approach is a popular tactic for resolving the mind–body problem, but it has some well-known problems, and it is unfortunate Velmans doesn't reply to these standard objections. For example, a frequently discussed issue in connection with theories of mental causation is the problem of overdetermination (see, e.g., Unger, 1977; Peacocke, 1979). (Although usually stated in terms of a contrast between the mental and the physical, we'll translate the problem into 'consciousness speak'.) It would seem that any account that admits

[10] Actually, that's a big 'given': Although at least one of the present authors favours a Bohmian interpretation of quantum mechanics (Bohm, 1952), which is compatible with determinism, we both acknowledge that physical reality could very well be as orthodoxy says it is: non-deterministic. If so, there are indeed "gaps" in the chain of causation that consciousness might fill'. One might doubt that such gaps could be present or significant in warm, massive brains, but there are several authors who argue otherwise (e.g., Beck, 1996; Beck and Eccles, 1992; Hameroff and Penrose, 1996; Hagan *et al.*, 2002).



the causal closure of the physical, yet introduces the causal efficacy of conscious states, ends up in the unfortunate situation of having too many causes lying around. If physical event P causes action A, and also the event of having a conscious experience C causes action A, then even if the physical world had been otherwise (P' rather than P had occurred, say), it seems that A would still have occurred, since C would still have been there to do the causing. And conversely, if C had not occurred, it looks as if A would have still occurred, since P is still in place to do the causing. The problem is that this situation, on most accounts of causation, renders both P and C causally impotent. The very concept of A causing B has it that if A had not occurred, B would not have occurred.

A dual-aspect theory, it is said, allows one to resolve this problem. Since the physical and experiential perspectives are different ways of describing the same underlying reality, one cannot assume that if P does not occur, C still occurs. And, assuming supervenience of the experiential on the physical, one *knows* that if C had not occurred, P definitely would not have occurred. Thus, on an 'ontologically monist but epistemologically dualist' account, there is no problem of causal over-determination of effect.

But many have questioned whether this answer is satisfying (e.g., Sosa, 1984; Block, 1989; LePore and Loewer, 1989; Leiter and Miller, 1994): We'd like to think that our conscious states have causal power by virtue of their being the mental states that they are, not by virtue of being identical with some physical state, which itself has, by virtue of falling under physical laws, the true causal power. Simplistic appeals to a 'neutral' reality, which underwrites both physical and experiential causation talk, will not work here. There is a fundamental asymmetry between the physical and the conscious: Physical laws apply everywhere, both in situations where there is and where there is not consciousness, while the converse does not hold.<sup>11</sup> So there seems to be a primacy of the physical, and one must reply to the idea that it is this physical, causal reality which is always doing all the work.

This is only to mention one issue which must be addressed by any proposal such as Velmans'; there are others. For example, Honderich (1993) would seem to argue that Velmans' position cannot give a proper account of mental causation, while Kim (1993) explicitly argues that non-reductive approaches that try to do justice to mental causation end up violating the causal closure of the physical. By mentioning these examples, we are not saying that dual-aspect theories cannot be defended against them, nor indeed that such theories are not good contenders for a proper account of the relation between consciousness and the physical; but Velmans has not given such a defence, and his proposal would benefit from his locating it within the discussion that has already occurred in this area.<sup>12</sup>

[11] This asymmetry implies that there is more work to be done than Velmans, even in footnote 14, acknowledges. Not only will there have to be laws relating the first- and third-person characterisations of a psychophysical state, but there will also have to be laws which tell us the conditions under which a state that has a physical/third-person characterisation also has an experiential/first-person characterisation in the first place.

[12] Some overviews of the positions in the mental causation debate can be found in Crane (1995) and Jackson (1996).

One particular benefit of such contextualisation would be the clarification of Velmans' position itself. Although the above discussion takes the 'ontological monism combined with epistemological dualism' slogan at its word, there are several passages in Velmans' text which are in tension with that phrase. For example, the 'epistemological dualism' part of the slogan is supposed to rule out the reductionist physicalism rejected in the appendix. But Velmans seems to be assuming a reductionist position himself when he discusses the neural correlates of consciousness in the light of his theory. When Velmans moves, without argument, from the representational nature of experiences to the existence of neural correlates of these experiences which have the same representational content as these experiences, he is either making a rather strong reductionist assumption, or (worse) postulating a dubious causal connection (between the structure of experience and the structure of neural states) that needs to be explained.

A general point can be made here. When people consider the proposal that computation or artificial intelligence (AI) can help us understand the mind, they often assume that this would only be true if the mind were in some sense computational. But this is to ignore a different way in which work in AI can be of assistance: by being a test-bed for our metaphysical theories. If one interacts with virtual machines implemented in computational hardware, one can come to realize that the mirroring of structure that Velmans is assuming need not hold. That is, computational examples make it clear that although level of description (aspect) Y is implemented or realized in (is an aspect of the same thing as) level of description (aspect) X, it does not follow that for every entity, structure or property referred to in Y there is something referred to in X to which it corresponds. For example, a computer can be understood as computing with sparse arrays, even though for any particular cell of the array there will likely be nothing localizable in computer hardware to which that cell corresponds (Sloman, 2001). It is through designing, implementing and/or interacting with computational systems realizing multiple levels of virtual machines that one's comprehension of the metaphysical possibilities is expanded. So, no, it does not follow that there must be neural correlates of consciousness (in Velmans' strong sense of the term), just as there are not, in general, silicon correlates of computation. (See, e.g., Hurley, 1998, for a quite different reason for believing that the structure of consciousness need not be mirrored in the structure of the vehicles of consciousness.) In assuming that there must be such correlates, it is hard to see how Velmans is less reductionist than (some of) the positions that he argues against in the appendix.

Perhaps sensing that he is falling into reductionism, Velmans uses three analogies to attempt to convince us that all is well, but they in fact make matters worse. Sameness of information structure does not mean that experiences are nothing more than physical states, Velmans points out. A video recording of a TV broadcast of Hamlet, Velmans says, has the same 'sequential informational structure' as the screen of the TV receiving that programme, and yet the videotape and screen states are 'not ontologically identical'.<sup>13</sup> Even if we assume that Velmans

[13] Surely Velmans does not need to claim that the experience and its correlate have the *same* informational structure; doubtlessly (and in the light of his footnote 9) the physical aspect of the system will

is correct in this claim, his attempt to make a point with it misfires, for two reasons. First, the problem was not that we had as data sameness of information structure, and this seemed to force us into monism. Rather, it seemed that Velmans could only move from the existence of informationally structured experiences to identically informationally structured physical states by assuming some kind of systematic, law-like relations between experience and physical reality. Perhaps this is not an ontological reduction, but it is an epistemological one; yet epistemological dualism is the only thing separating Velmans from the physicalist positions he rejects. It is this need to distance himself from physicalism which raises the second problem with the analogy: he admits that the videotape and the screen are ontologically distinct, yet he was supposedly defending an ‘ontologically monist’ position! It seems Velmans ends up with the converse of the position for which he was aiming: ontological dualism, but epistemological monism (in the sense that strong assumptions are made about ‘informational mirroring’).

This is not a problem which can be disposed of by simply deleting the Hamlet TV programme/video analogy, but is rather a deep tension in Velmans’ position which surfaces at several points. Consider another analogy which Velmans offers to illustrate his view of the ontological relation between experience and the physical: that of electricity and magnetism. Velmans observes, in footnote 14: ‘it does not make sense to suggest that the current in the wire is nothing more than the surrounding magnetic field, or vice versa (reductionism)’. But then Velmans wants to also have it that the duality implied by this observation is one of aspects, not of ontological character. This is meant to be analogous to the relation between the experiential and the physical. However, the analogy doesn’t work: electricity and magnetism are not simply two ways of thinking about the same phenomenon, but two different physical phenomena that can be related to each other mathematically. In contrast, and crucially, Velmans claims that the difference between first- and third-person ways of thinking of psychophysical stuff is merely that of differently formatted ways of representing the same information. This is not what is happening in the case of electromagnetism: the electrical phenomenon is not just an aspect, a way of formatting the same information as that represented by the magnetic way of looking at the situation. There are situations where only the electrical description applies, and other situations where only the magnetic description applies. *Prima facie*, this suggests that there are two distinct phenomena involved; to argue that there is actually only one, root phenomenon will require further work from Velmans. The analogy is also spoiled by the symmetry of the electrical/magnetic relation, and the asymmetry (discussed above) of the consciousness/physical relation. It may be disputed which of the following is the case:

- Electrical phenomena can exist in the absence of magnetic phenomena, and vice versa; or

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typically encode much more information than is experientially represented. Thus Velmans may say (and *should* say, in order to reflect the asymmetry between the experiential and the physical) that the physical aspect must contain at least as much as informational structure as the experiential aspect. However, this proviso will not on its own answer the other objections we are making.

- Whenever an electrical phenomenon exists, there also exists a corresponding magnetic phenomenon, and vice versa.

However, in both cases, the ‘vice versa’ implies an ontological symmetry which is not shared by the experiential/physical relation. The only way to impose symmetry would be to assume (as others have been forced to do, e.g. Chalmers, 1996) that whenever there is a physical phenomenon, there is some experiential phenomenon, however slight or imperceptible or implausible, accompanying it. Panpsychism threatens.

The third analogy, that of wave/particle complementarity, is even worse. More and more physicists and philosophers take the appeal to complementarity as a *reductio ad absurdum* of particular ontological positions in quantum mechanics. They do not deny the veracity of the data that have led some to conclude that quanta have both wave and particle aspects; but they do deny that the paradox of complementarity is a satisfying way of accounting for that data. There are other, less paradoxical and thus more satisfying metaphysical pictures on offer (e.g. Bohm, 1952; Hiley and Pylykänen, 2001). To say that your metaphysics of mind is akin to the wave/particle complementarity metaphysics of quanta is just another way of saying that you don’t have a satisfying metaphysics, and choose instead to ‘live with’ the paradoxes.

So much for Velmans’ first problem. His proposed solutions to the other two are relatively independent of his proposed solution to the first; we now consider them in reverse order. Concerning the third problem, Velmans concedes that in many cases (e.g., those documented in Libet, 1985), conscious experiences do come too late to causally affect the processes to which they most obviously relate (although they may have longer-term causal effects). Some might think that this would have the unpalatable consequence that many of our actions are involuntary, but Velmans’ solution to the second problem shows why this is not so: non-conscious processes can nevertheless produce voluntary action. That seems very sensible, but there are other difficulties with Velmans’ proposed solution to the timing problem. Specifically, it concedes too much: if we can be wrong about conscious experience playing a causal role in our decision to press a button, why shouldn’t we be sceptical about its role in all action? Epiphenomenalism threatens.

A better response would be to resist the conclusion that conscious experience is not playing a causal role in the Libet cases. One could do this in two different ways. One could deny that subjects are infallibly accurate about the timing of their experiences. The fact that the subject takes the experience to be happening when the revolving dot is at a particular location on the screen does not imply that the experience is in fact occurring at the time when the dot is actually at that location — it might be happening about 350 milliseconds earlier than that. Alternatively, one could make the obvious point that conscious experience can play a causal role, even if preceded by a predicting readiness potential. For example, it might be that the readiness potential causes the experience, which itself causes the action. Any dual-aspect theory worth its salt will not be troubled by the fact that there is a neural causal account which explains our action; that is entirely consistent with there also being an experience-involving account.

We agree with Velmans that there are philosophical problems concerning the causal efficacy of the experiential which need to be addressed by any proper theory of consciousness. We also agree that some sort of monist metaphysics, such as is required to explain the relation between virtual machines (in computers, say) and the physical machines in which they are implemented, is required. Despite Velmans' efforts, however, these needs remain unsatisfied. We believe that the clinical, psychological and philosophical methodologies Velmans musters should be supplemented with and informed by experimental, synthetic AI work, in order to facilitate the acquisition of new concepts and refinement of old concepts that are required for advances in our understanding of the place experience occupies in the natural world.

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## BRIDGING EASTERN AND WESTERN PERSPECTIVES ON CONSCIOUSNESS

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The target article by Max Velmans is yet another step in his continuing struggle to understand the complementarity of first-person and third-person aspects of consciousness. This struggle began about a decade ago with his first major effort



in a target article (Velmans, 1991) in *Behavioral and Brain Sciences* and culminated in his *Understanding Consciousness* (Velmans, 2000). The present article, which covers the middle ground, is an instructive summary exposition of his main thesis that relates to the reconciliation of the irreducibility of conscious experience to brain states, on the one hand, and to its inalienable connection to the physical processes in the brain, on the other. In order to understand the full import of Velmans' reasoning and arguments, it is necessary to read the target article along with his earlier publications. Therefore, in the following comments I draw freely from Velmans' other writings.

His *BBS* article was generally misunderstood as espousing epiphenomenalism, even though Velmans was explicit in asserting the irreducibility of first-person conscious experience. The misunderstanding appears to stem from his assertion that information may be processed at all levels without consciousness entering into it, and that consciousness is causally inert when seen from the perspective of the third-person. The book *Understanding Consciousness* may also be misunderstood from the opposite side as tending to support the nonphysical nature of consciousness, and thus appear to espouse some kind of idealism if not dualism, even though Velmans is again forthright in acknowledging his adherence to realism and his rejection of philosophical dualism.

Velmans' views on mind, consciousness and brain may be summarized thus. Mind viewed objectively, i.e. from the third-person perspective, is the brain, its states, associated processes and observable events. Consciousness is the mind viewed from the first-person perspective, one's subjective experiences. Both perspectives represent reality. They are complementary and mutually irreducible, even though one may switch perspectives. On the one hand, our conscious intentions appear to influence our actions. Beliefs appear to have physical effects. Placebos are curative. On the other hand, (1) the physical world appears to be causally closed; (2) consciousness does not seem to enter one's own 'brain/body processing'; and (3) conscious experience seems to follow rather than precede 'brain/body processing'. The latter unlike the former appear to rule out any causal role for consciousness, a role that is experientially evident, taken for granted in folk psychology, and for which there is some credible scientific evidence. Velmans seeks to reconcile these two opposing notions about the causal efficacy of consciousness by (a) advocating the complementarity of first-person and third-person perspectives, (b) introducing the notion of perspectival switching to account for mental→physical and physical→mental causation and (c) postulating preconscious minds. These exercises are interesting in themselves, but are hardly adequate to address the main problem of the causal efficacy of consciousness. Velmans appears to commit category mistakes when he attempts to resolve ontological issues by reducing them to epistemological concerns.

One may be reminded here of a biologist–priest who teaches evolution in his college classes and preaches creation in his Sunday sermons. Obviously, he has two perspectives, one that of a scientist and the other that of a devout Christian. The two are clearly not reducible. If they were, he would not be holding them. From this, can we argue with any degree of conviction that the two perspectives



of the biologist-priest are complementary and that his dual roles in the classroom and the church arise from legitimate perspectival switching?

The fundamental issue is whether conscious experience is ontologically identical to brain states. If it is, mental causation is none other than physical causation. If on the contrary, consciousness belongs to a distinctly non-physical category, then the issue of interaction between the physical and the mental arises. By accepting preconscious minds, Velmans acknowledges that minds are not limited to focal awareness. He, however, appears to be unwilling to give up the notion that consciousness is essentially focal awareness and is reluctant to extend the connotation of consciousness beyond subjective awareness.

Velmans asserts that first-person and third-person accounts are just two different formats of the same information structure. What is that information structure? The mind is stated to be a 'psychophysical process that encodes information' (p. 14 above). What is the process that encodes information from the first-person perspective? Is it also a physical, brain process? If it is, how is it different from the processes that give us information from the perspective of third-person? The notion of switching perspectives is a kind of circularity in reasoning. In order to break the circularity here, the ontological status of conscious experience needs to be expressly addressed and cannot be swept under the carpet.

To be consistent with the notion of irreducibility of conscious experience to brain states, Velmans must accept the primacy of consciousness. In order to overcome the problems he enumerates as confronting non-reductionist accounts of consciousness, he needs to draw a fundamental distinction between consciousness and mind. In the Indian tradition as represented by Samkhya-Yoga as well as Sankara's Advaita Vedanta, we find important ideas that address these issues. I tend to think that Velmans, despite his strong moorings in the western tradition, is not too far apart from the eastern perspective. I will briefly trace the common issues on which Velmans' ideas and Indian thought appear to converge, with some obvious differences.

In the eastern view as well as in Velmans' theory, our knowledge of the universe is perspectival in the sense that it is relative to the observer. It is subjective and personal. The *purusha* as the centre of consciousness is distinct and has unique experiences through its associated mind-body complex. Such observer-dependent relativity, in Yoga as well as in Vedanta, is not absolutely given but a transient condition that can be overcome by disciplined practice. The *purusha* finds itself reflected in the mind illuminating the material forms of the universe. Thus mind becomes as instrument through which the universe reveals itself. Subject-object distinction is not fundamental. It is a contingent manifestation of the mental process by which the universe is revealed. In Velmans' view, consciousness is contained in the subjectivity of data experienced. It is 'knowing what is like to see the beauty in some one's eyes, or hear the nightingale at dusk is a distinct form of knowledge. It differs from abstract knowledge (or "knowledge by description") in an obvious way. . . . It is only where we *experience* entities, events and processes for ourselves that they become *subjectively real*. It is through consciousness that we *realise*' (Velmans, 2000, pp. 259–60). Thus, the

function of consciousness is to confer subjectivity on data processed by our perceptual and cognitive systems. Both the views agree that the mental representations are not things themselves. Whereas Velmans is content with 'the incomplete, uncertain and species specific' representations we have of the universe, the eastern view provides for the possibility of attaining complete and certain knowledge by accessing consciousness-as-such independently of the sensory-cortical processes.

The Indian theories as well as Velmans' make a distinction between consciousness and mind. In the Indian view, the distinction is fundamental and primary in the sense that one is not reducible to the other. In Velmans' view, the distinction is secondary and holds good at the epistemological level and not at the ontological level. Thus consciousness becomes a subcategory or species of the mind. Velmans acknowledges that consciousness is not reducible to brain states or functions. Yet, he considers consciousness an aspect of the mind. The mind in his view is broader to include nonconscious mental activities as well. Here rests the real problem. Consciousness (subjective experience) is irreducible to neural states or brain functions, whereas the nonsubjective states of the mind are in principle reducible. In the light of such a fundamental difference between them, it is hardly plausible to argue that consciousness is a species or an aspect of the mind. The irreducibility of consciousness to physical states entails that the difference between conscious and nonconscious aspects of the mind is one of kind, primary and fundamental. Reducibility or otherwise of one category into another is an ontological matter and not simply an epistemological issue.

The inclusion of consciousness as a subcategory of the mind leads Velmans to equate consciousness with phenomenal data. There appears to be some confusion here between the contents and the container, between substance and form. It is not obvious that consciousness is not distinguishable from its data. Nor is it evident that consciousness is always intentional, i.e., it is about or of something. Intentionality characterizes nonconscious states as well. Conscious mentation has an additional characteristic of being subjectively experienced. Velmans agrees that experiencing the data means bestowing consciousness and subjectivity on them. The tendency to incorporate consciousness as a part or aspect of the mind is consistent with the western equivocation of mind and consciousness (Rao, 1998). This serves well reductionism, which in the final analysis leaves out consciousness all together. It is ill-suited, however, for those that accord primacy to consciousness. By regarding consciousness as a subcategory of the mind, Velmans puts himself in the uncomfortable position of limiting consciousness to a role that in functional terms is utterly insignificant.

Again, the distinction between first-person consciousness and third-person consciousness adds little to the clarity of the concept of consciousness. Consciousness is consciousness whether we look at it from a first-person or the third-person perspective. It may manifest different characteristics at different levels of observation, but it underlies all awareness. Consciousness is what makes awareness possible. It is the ground condition for all forms of awareness, like matter which is the ground condition for all the material forms we

experience. Velmans himself does not seem to be excited about the notion that consciousness is something that emerged at a certain point in the evolution of the brain. Rather, he appears to favour the view that consciousness is in some primal form there from the beginning of the universe, and that evolution only accounts for the different *forms* that consciousness takes and not for consciousness-as-such. If one accepts the notion that consciousness in some form is coextensive with the universe, then it is likely that it is fundamentally different from anything that is essentially reducible to physical forms, including the mind.

The Indian views make this point emphatically and insist that the distinction between mind and consciousness is fundamental. The mind, unlike consciousness, is physical in that it can be described in material forms and accounted for in physical terms. Therefore, the interaction of the mind with other physical systems poses no special problems. The reflexivity is not between the mind with its cognitive and perceptual systems and the physical objects, events and processes. Rather it is between mind and consciousness. Consciousness does not causally interact with the mind. It has a reflexive relation with the mind. Again, the mind with its cognitive and perceptual systems is peculiarly human. The presence of mind in a rudimentary sense in other forms of life or matter in general may not be ruled out. The notion that *sattva* component in varying proportions is believed to exist in matter implies the existence of minds in less developed forms than in humans. Velmans' views appear to be consistent with the eastern accounts on this point, when he suggests that the different forms of consciousness may have an evolutionary origin, with the difference that what evolves in the Indian view is not consciousness but the mind.

Velmans as well as Samkhya-Yoga philosophers emphasize the role of the mind in connecting consciousness with the brain. I described the role in the Indian view as one of *interfacing* (Rao, 2002). Velmans' describes it as *intertwining*. There may be subtle differences between the two phrases, but they do not seem to be significantly different. However, the differences in the connotations ascribed to these two concepts, mind and consciousness, in the Indian theories and in Velmans' accounts have far reaching implications. As mentioned, Velmans seems to equate consciousness with phenomenal data. He leaves no room for possible dissociation between consciousness and contents of consciousness. The western bias that emphasizes intentionality as the defining characteristic of mind/consciousness has limited Velmans taking the next step of accepting the possibility of pure conscious experience and the existence of consciousness-as-such. If consciousness is dissociable from sensorially processed data as provided for in the Samkhya-Yoga view, all kinds of possibilities that give us knowledge of different sorts will open up. Paranormal awareness is one such form.

Velmans speaks of direct and indirect knowledge, as the Indian theories do. He points to the asymmetry of access in the two forms. We have direct access to our experiences and only indirect access to experiences of others. This seems to be so because one's consciousness is bound to and associated directly with his/her brain and not with the others. In Yoga theory, even the so-called first-person

experience is indirect, because what the mind presents to consciousness are representations mediated by the perceptual and cognitive systems. Consequently, awareness arising from such mediation is also indirect. In other words, in Velmans, the direct acquaintance is with the representations, whereas in Yoga it is with the things themselves. Such direct knowledge results when the mind detaches itself from the sensory inputs and makes contact directly with the objects, events and processes in the universe. This is what may be labelled a paranormal process, distinguished from the normal process in which there is the involvement of the sensory processes. The assumption that consciousness can exist apart from the phenomenal data leaves the possibility for the existence of pure conscious states and extraordinary experiences that are not constrained by the limits of sensory processing.

In Velmans, the material universe is '*rea-ized*' through consciousness. In the Indian view, the universe is *realized* by accessing consciousness-as-such. In the former, the universe becomes *subjectively real*. We have representations that are at best incomplete approximations of things themselves. In the latter, we become one with reality and have perfect, complete and direct acquaintance with the things themselves and not merely with their representations.

In sum, Velmans took one important step forward by asserting the irreducibility of consciousness to physical states and brain functions and by pointing to the immediacy and directness of conscious experience. If he took another step to provide for consciousness-as-such and its existence apart from its contents, his views would have been a lot closer to the eastern view as represented by Yoga, Advaita and Buddhist systems of thought. Such a step would have extended his theory to account for extraordinary experiences, including the paranormal, and at the same time made sense of the eastern disciplines for cultivating consciousness such as yoga practice that have gained in recent years a measure of acceptance in the West. Also, the additional step, it seems to me, is needed to avoid some of the inconsistencies in Velmans' account of consciousness and to render the distinction between mind and consciousness more meaningful. Moreover, his obvious enthusiasm for first-person consciousness would have been better served if he considered the possibility of separating consciousness from its contents. At any rate, the step he did take is a giant step for the one with a western mindset, indeed a welcome step for bridging the gap between eastern and western perspectives of consciousness.

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