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 ciltrate), 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.

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