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SOLUTIONS TO THE HARD PROBLEM OF CONSCIOUSNESS

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Abstract: Solutions to the 'hard problem' of consciousness must accept conscious experience as a fundamental non-reducible phenomenon in nature, as Chalmers suggests. Chalmers proposes candidates for an acceptable theory, but I find basic flaws in these. Our own experimental investigations of brain processes causally involved in the development of conscious experience appear to meet Chalmers' requirement. Even more directly, I had previously proposed a hypothetical 'conscious mental field' as an emergent property of appropriate neural activities, with the attributes of integrated subjective experience and a causal ability to modulate some neural processes. This theory meets all the requirements imposed by the 'hard problem' and, significantly, it is experimentally testable.

The 'hard problem' in dealing with consciousness, as presented by Chalmers (1995), is that of subjective experience. It is agreed that experience arises from a physical basis but there is no good explanation of why or how it so arises.

At first glance the hard problem appears to be a metaphysical one, scientifically insoluble. Chalmers agrees to that aspect, pointing out that even for fundamental phenomena in physics, such as mass or electromagnetism, there is nothing to tell us why matter may have properties of mass or electromagnetism in the first place. That is, we simply accept such fundamental properties or phenomena as 'givens' and develop theories to explain various facts related to these fundamental properties.

The meaningful, workable crux of Chalmers' hard problem is then to deal with subjective experience as another fundamental property in nature, one that is not reducible to or explainable by any other known physical phenomena. Chalmers states this position well but it is not without precedent. I had myself explicitly stated it as a required basis for any valid study of conscious experience (Libet, 1987; 1989; 1992). And that view of conscious experience as an independent non-reductive phenomenon was an essential one in our own experimental investigations of brain processes that mediate conscious experience, starting in the late 1950s (Libet, 1965; 1973; 1993a,b).

So, what kinds of theories does Chalmers propose as possible gateways to the solution of the 'hard problem'? He presents three candidates for 'psychophysical principles, connecting the properties of physical processes to the properties of experience'. I suggest all three of his principles contain fundamental flaws.

1. The 'principle of coherence between the *structure of consciousness* and the *structure of awareness*' seems to be essentially meaningless, under the usual sense of the term 'awareness'. Chalmers begins by making a sharp distinction between awareness and experience. He wants to use the term 'awareness' for the 'straightforward phenomena' described in his listing of the 'easy problems of consciousness'. But most if not all of those straightforward phenomena can and often do occur without any awareness (e.g. Velmans, 1991). In any case, awareness is a *subjective* phenomenon; it is accessible only to the individual who has it and is thus indistinguishable from conscious experience. I have repeatedly insisted that the phenomenon of 'detection' (whether of weak signals, colour differences, etc.) must be distinguished from 'awareness'; that distinction is based not upon theory but upon a large variety of experimental evidence (e.g. Libet *et al*., 1991). Chalmers completely blurs this distinction. Chalmers finally concludes that ' if we accept this coherence principle, we have reason to believe that the processes that *explain*

awareness will at the same time be part of the *basis* of consciousness'. Of course, since awareness and conscious subjective experience refer to the same phenomenon!

2. 'The principle of organizational invariance . . . states that any two systems with the same fine grained *functional organization* will have qualitatively identical experiences'. Chalmers then describes a thought-experiment designed to reduce an alternative hypothesis to absurdity. But thought-experiments are only as good as the *assumptions* that underlie them; only an actual experiment, properly designed, can firmly settle an issue.

Chalmers admits that it is logically possible that his principle is incorrect. However, acceptance of his principle is based on a behavioural criterion for conscious experience. That is, if two different systems like the human brain and a silicon chip computer/robot are both 'functionally isomorphic', the principle states they both also 'will have the same sort of conscious experience'. But we have evidence that such a behavioural (functional) criterion for conscious experience can be misleading (see Libet, 1987; 1993b; Libet *et al*., 1991). There are numerous examples of functional behaviour that appear to be associated with conscious experience when in fact the human subject reports being completely unaware, non-conscious of the process (see also Velmans, 1991). The distinguishing feature for a conscious experience is an introspective report by the individual who alone has access to the subjective experience. That is what makes it so difficult to distinguish a conscious experience from a non-conscious behavioural event even in non-human primates. Acceptance of this Chalmers principle, therefore, requires by-passing the distinction between purely behavioural criteria and criteria that indicate subjective experience in a more convincing manner.

3. 'The double-aspect theory of information' proposes that 'we can find the *same* abstract information space embedded in physical processing and in conscious experience'. So Chalmers 'natural hypothesis is that information (or at least some information) has two basic aspects, a physical aspect and a phenomenal . . . Experience arises by virtue of its status as one aspect of information, when the other aspect is found embodied in physical processing'. Chalmers admits that this 'double-aspect principle is extremely speculative', but that does not prevent him from extending it to an inference that experience may be widespread, like information; that perhaps even a thermostat . . . might have maximally simple experience'.

Chalmers' linkage between information and experience is in part based on his principle of organization invariance. But, as I indicated above, that principle may itself be subject to serious argument. The formal 'isomorphism between certain physically embodied information spaces and certain *phenomenal* (or experiential) spaces' is again a functional relationship, and it ignores much similar isomorphisms between physical information and non-experiential (i.e. non-conscious) phenomena (see also Velmans, 1991; 1995). To then propose that experience emerges as a phenomenal aspect of information is not convincing.

Are there, then, other theories or lines of evidence that meet the requirements of the 'hard problem', treating conscious experience as a fundamental property in nature? Chalmers accepts 'that the processes that *explain* awareness will at the same time be part of the *basis* of consciousness'. On that view, our own experimental discoveries, of time factors in cerebral processes involved in producing the independently measured conscious experience (Libet, 1993a, b) would qualify as providing some partial answers to the hard problems.

An even more direct theory was advanced by me, published in the first issue of this same journal (Libet, 1994). I proposed that a 'conscious mental field' (CMF) emerged from the appropriate neural activities or the brain. That hypothetical field would be a new

fundamental phenomenon, not reducible to or explainable, by any known physical processes. (A somewhat related theory has been proposed by Popper; see Popper *et al.,* 1993). The field would have the attribute of integrated subjective conscious experience, and it could also act back on the brain so as to provide a basis for conscious modulation of some neural processes. This theory is certainly speculative. But, unlike Chalmers' double-aspect theory of information, my theory is testable; indeed, my paper included a detailed experimental design that could potentially confirm or falsify the theory. I was unable to arrange to carry out that difficult though feasible experiment; my hope is that a qualified neurosurgery group will perform that fundamentally important experiment. For investigational purposes, it should be noted that non-human animals are not excluded from having their own kinds of CMF; however, nothing precludes the possibility that only the human brain, or all vertebrate brains, produce a CMF, since these brains have unique structural and functional characteristics. If some convincing criteria of conscious experience can be developed for a non-human primate it would become possible and much more feasible to test the theory with such an animal.

In conclusion, my theory takes the 'hard problem' seriously; it does *not* 'deny the phenomenon, explain something else, or elevate the problem to an eternal mystery'. I believe Chalmers has eloquently drawn attention to a fundamentally important issue in the attempts to deal with conscious experience, even though I am critical of some of his proposed solutions. And I endorse his final statement, that 'The hard problem is a hard problem, but there is no reason to believe it will remain permanently unsolved.'

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