

## A Response to Vandervert's Critique

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We respond to Vandervert's (2006, this issue) critique of our paper "The Only Objective Evidence for Consciousness" (Kuttner and Rosenblum, 2006) by refuting each of the three points he makes. Namely: (1) he improperly faults our defining of "consciousness"; (2) his complaint that we do not provide "at the outset an explanation of the philosophical–theoretical interpretation of quantum mechanics" misses the crucial point that the evidence we present is *wholly empirical*; and (3) his claim that we suggest data from "impossible experiments could be treated as non-theoretical 'facts'" is a misreading of our paper.

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In the immediately preceding paper in this journal Larry Vandervert comments on our paper, "The Only Objective Evidence for Consciousness" (Kuttner and Rosenblum, 2006). Vandervert neatly summarizes his three points in his abstract. They are that we have not adequately defined our use of the term "consciousness," that our argument needs to present a "philosophical–theoretical interpretation of quantum theory," and that we suggest that impossible data be accepted as facts. Each of these points is in error. We address them in order.

### *Our Use of the Term "Consciousness"*

Vandervert claims we do not properly define "consciousness." In fact our paper defines "consciousness" as precisely as is necessary, or as is possible. We state: "The sense in which we use 'consciousness' is closely related to 'awareness' or 'subjective experience.' It certainly includes the impression of free

will. Ultimately, the term is best defined by its use in the experiments we describe" (p. 43). Need our use of the term "consciousness" be defined more specifically than that? Halfway through her book, *Consciousness: An Introduction*, Susan Blackmore (2004, p. 198) writes: "You may have noticed by now that there is no generally agreed definition of consciousness. Indeed, few authors even attempt to define consciousness." We have defined our use of the term "consciousness" at least as adequately as is commonly done, or possible.

The philosopher Wittgenstein tells us that a word must ultimately be defined by its use in a particular context, or what he called a "word game." Our paper clearly identifies the word game with which we are involved: "Our use of 'consciousness' is the one commonly used in the literature of the quantum measurement problem" (p. 43). The experimental results we discussed in the paper are precisely those basic to the quantum measurement problem. Our use of the word "consciousness" is standard in this context. Vandervert suggests that we should have used the term "working memory" instead of "consciousness." We have never seen "working memory" used in the literature of the quantum measurement problem.

In the context of criticizing our definition of "consciousness," Vandervert questions our interpretation of what Francis Crick meant in the item we quoted:

... "You," your joys and sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules. (Crick, 1994, p. 3)

We quoted this as an illustration of the reductive materialism that is by and large the physicalist position of today's cognitive science. We used Crick's pithy statement to express the attitude that a complete understanding of the neural correlates of consciousness would be as total an understanding of consciousness as is possible. To the extent Crick identifies consciousness with "soul," as Vandervert suggests, Crick apparently believes that consciousness is not independent of the body. Crick is, for example, quoted in the *New York Times* as saying: "In the fullness of time, educated people will believe there is no soul independent of the body . . ." (interviewed by Wertheim, M., 2004, Sec. F, p. 3). If it is indeed true that Crick identifies consciousness with soul, and there is no soul independent of the body, there is then, according to Crick, no consciousness independent of the body. Since the neural correlates of consciousness are a property of the body, the neural correlates of consciousness are then supposedly the whole story, which is precisely the physicalist position we wished to illustrate in quoting Crick. In any event, the actual attitude of Francis Crick himself is not an issue we were ever particu-

larly concerned with. The extent to which we defined "consciousness" in our brief paper seems sufficient to make our point. We devote a whole chapter to the nature of consciousness relevant to quantum mechanics elsewhere (Rosenblum and Kuttner, 2006).

*The Supposed Need for a Psychological, Philosophical, and Theoretical Treatment*

Vandervert believes we should have provided ". . . at the outset an explanation of the philosophical–theoretical interpretation of quantum theory . . ." (p. 167, abstract) and that ". . . the *psychological* gist of the Copenhagen interpretation of quantum theory belonged in the introduction to the problem . . ." (p. 170). Such statements miss the crucial point that our argument *depends in no way* on quantum theory or on any of its interpretations.<sup>1</sup> The objective evidence that we provide for consciousness is *wholly* based on undisputed *empirical* observations. These observations are made in the archetypal quantum experiment, the so-called "two-slit experiment." Not only is any substantial discussion of the quantum *theory* unnecessary in this context, it would be a serious distraction at this point.

We are not the first to point out that the quantum enigma arises directly in the quantum experiment with no need to consider the quantum theory. For example, Greenstein and Zajonc (1997, p. 106) state: ". . . it is the *experiments* that are impossible to comprehend in any normal sense of the term. Even had quantum theory never been invented, these experiments could have been performed, and we would still find ourselves unable to understand them" (*italics in the original*). This emphasizes that it is the empirical results themselves, independent of the quantum theory, that present an enigma and the objective evidence for the involvement of consciousness in the experimental results.

Vandervert suggests that we should have used Henry Stapp's "argument on the evolutionary efficaciousness of a quantum–theoretical consciousness" (p. 171) to help validate our point. While we think well of Stapp's concepts, they are orthogonal to the *quantum/theory-neutral*, *wholly-empirical* issue we develop. Stapp's argument starts out assuming the quantum theory and, in fact, a particular version of the Copenhagen interpretation of the theory (von Neumann, 1955). Discussion in terms of Stapp's work would be irrelevant.

Although a major point of our paper is that the quantum enigma, and the resulting objective evidence for consciousness, arises *directly from empirical*

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<sup>1</sup>Although the Copenhagen interpretation is the orthodoxy we and most other physicists implicitly adopt in teaching and applying quantum mechanics, it is today increasingly challenged (e.g., Zurek, 1999). Various contending interpretations are discussed in Rosenblum and Kuttner (2006), which includes an entire chapter on the Copenhagen interpretation.

*observations* independently of the quantum theory, the issue of consciousness certainly arises in the quantum theory. But it arises only because the theory must encompass the experimental evidence. Even though it is in no way a part of our argument, how the theory involves conscious observation can be interesting. Only because of this *tangential* interest did a final section of our paper provide a very brief discussion of the relevant quantum theory. A more extensive theoretical treatment, as suggested by Vandervert, is not needed for our argument. We give a more extensive, non-technical presentation of the relevant theory elsewhere (Rosenblum and Kuttner, 2006).

#### *Data from Impossible Experiments Were Not Treated as Fact*

Vandervert sees our paper as suggesting that data from “impossible experiments could be treated as non-theoretical ‘facts’” (p. 167, abstract). We never suggested that. Because the objective evidence for consciousness provided by the *actual* quantum experiment is *circumstantial*, and therefore a bit circuitous, we first presented a brief parable with similar logic, but which included a demonstration providing *direct* rather than circumstantial evidence. The demonstration in the parable was identified as “impossible.” The parable was introduced by saying: “The point of the parable is merely to illustrate the chain of reasoning” (p. 45). After the parable, we presented a more extensive discussion of the *actual* two-slit quantum experiment. We thought we were clear that our objective evidence for consciousness was based *solely* on the undisputed results of the *actual* quantum experiment. We regret that our parable may have caused confusion.

Finally, Vandervert’s paper’s title, “Kuttner and Rosenblum Failed to ‘Objectify’ Consciousness,” might be seen as implying that we claimed to show consciousness to be an “object.” We did not so claim. We rather claimed to display *objective evidence* (third-person evidence) for consciousness. (We certainly never used the word “objectify.”) Vandervert also notes that our analysis of the archetypal quantum experiment has not “proved” the “objective existence” of consciousness. This is true. We never claimed *proof*; our claim was objective *evidence* for consciousness. Evidence is not proof. But the evidence presented by the archetypal quantum experiment is the only *objective* evidence for consciousness as an entity beyond its neural correlates that we know of.

#### References

- Blackmore, S. (2004). *Consciousness: An introduction*. New York: Oxford University Press.  
 Crick, F. (1994). *The astonishing hypothesis*. New York: Scribner.  
 Greenstein, G., and Zajonc, A.G. (1997). *The quantum challenge: Modern research on the foundations of quantum mechanics*. Sudbury, Massachusetts: Jones and Bartlett Publishers.

- Kuttner, F., and Rosenblum, B. (2006). The only objective evidence for consciousness. *The Journal of Mind and Behavior*, 27, 43–56.
- Rosenblum, B., and Kuttner, F. (2006). *Quantum enigma: Physics encounters consciousness*. New York: Oxford University Press.
- Vandervert, L. (2006). Kuttner and Rosenblum failed to “objectify” consciousness. *The Journal of Mind and Behavior*, 27, 167–176.
- von Neumann, J. (1955). *Mathematical foundations of quantum mechanics*. Princeton, New Jersey: Princeton University Press. (Originally published 1932)
- Wertheim, M. (2004, April 13). Scientists at work: Francis Crick and Christof Koch [interview]. *New York Times*, Sec. F, p. 3.
- Zurek, W.H. (1999). Preferred states, predictability, classicality and the environment-induced decoherence. *Progress in Theoretical Physics*, 88, 282–312.