Consciousness confounded
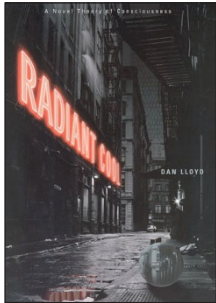
Radiant Cool: A Novel Theory Of Consciousness

by Dan Lloyd

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Reviewed by Andrew Matus

The subtitle of Dan Lloyd's book reflects its eccentric nature; it is two-thirds fiction and one-third theoretical appendix. The origins of the book are similarly unconventional: Lloyd is a philosopher who won an award from the fMRI Data Center at Dartmouth College in New Hampshire for the most innovative use of its giant archive of raw data sets. Like many contemporary philosophers, Lloyd is much concerned with the problem of how the physical tangle of neurons in the brain can produce the apparently ethereal state of consciousness. But unlike many others, he rejects as time-wasting the seemingly endless argument over whether a science of consciousness is possible, and he proposes instead that we should get busy analyzing the existing data. Indeed, he declares robustly that the data on consciousness are already in, literally in the raw data from fMRI studies using conscious humans made in laboratories across the world and held in archives like the one at Dartmouth. Lloyd claims that despite their diverse objectives, all of these studies contain data about consciousness that can be 'mined' to yield insights into its neural correlates. In his award-winning example, originally published in the *Journal of Cognitive Neuroscience*[1], he took four unrelated data sets from the Dartmouth archive and re-analyzed them for signs of consciousness-related activity.

What will these signs be like? Lloyd's starting point is the phenomenological philosophy of Edmund Husserl (1859–1938), which he discusses in the book's appendix, focusing on three major postulates from Husserl's work that, in his opinion, define the 'consciousness' for which we should be seeking neural correlates. Briefly, they are intentionality (what the conscious state is 'about'), superposition (the 'layering' of multiple perceptions that make the totality of conscious experience) and temporality (the constantly progressing flux that characterizes the conscious state). Lloyd is an effective advocate for these ideas as forming a genuine point of contact between philosophical reason and scientific experiment. However, I gained this insight from reading the appendix to the book, not from

the story itself, where Husserl's phenomenology also looms large but is completely incomprehensible to those who are not already familiar with its concepts.

Lloyd's mining of the Dartmouth datasets is focused on temporality, which he looks for in the raw data of the four selected studies using a mathematical procedure of multivariate analysis and an independent method based on neural networks. Does he succeed in his stated aim of discovering consciousness-related neural activity? It is not entirely clear. One requirement for this analysis is that the time scale of the recorded fMRI scan series must match that of the temporal flux in consciousness. In discussing temporality, Lloyd considers a photograph of a pocket watch dangling at the end of its chain. Without a series of photographs taken at successive time intervals, there is no way of knowing whether the watch is standing still or swinging to and fro. But distinguishing the two cases depends on the pictures in the time series being taken at appropriate intervals—at least each second. If the pictures were taken many seconds apart, you would learn nothing. In the context of fMRI scans and consciousness, the problem is that the fMRI signal rises and falls over several seconds, whereas measures of the time constant for conscious awareness generally fall in the region of a half-second or less. Nevertheless, Lloyd finds a monotonically decreasing correlation between his multivariate measures of the individual scans and the time interval between them. I am no expert in the complex mathematics of fMRI analysis, but it seems to me that any dynamic multivariate system, examined over time, would show a monotonic decrease in similarity between observations made at increasing intervals. Therefore, I am not convinced that Lloyd's analysis really tells us anything about consciousness. Despite these reservations, the appendix to Lloyd's book makes a persuasive case for maintaining open-access raw fMRI data archives like the one at Dartmouth for the analysis of cognitive function. This opinion seems to be shared by the authors of the studies he analyzed, who wrote short commentaries that accompany his *Journal of Cognitive Neuroscience* paper[1].

The dominant feature of Radiant Cool is not its appendix, but the opening story—an Agatha Christie-like detective mystery in which a phenomenologist philosopher (what else could he be?) may or may not have been murdered. A key feature of any successful modern novel is that its personalized narrative embodies in literature the naturally evolved mechanism that human minds use to investigate the workings of other minds. Therefore, writing a novel that deals directly with consciousness sounds like a great way of shedding light on the underlying mechanism. But despite the play on words in the book's subtitle, *Radiant Cool* is not a novel; it entirely lacks the essential elements of character and viewpoint. Indeed, its characters are little more than mouthpieces for the author's own voice. Moreover, they are conceived with irritating idiosyncrasies (*e.g.*, one character speaks entirely in the banalities of a computerized psychoanalysis program) that quickly induce the wrong kind of page turning. Instead, you could try *Thinks…* by David Lodge[2], a real novel that entertainingly teases apart the tangled arguments of the consciousness debate through the minds of fictional yet vibrantly realized characters.

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1. Lloyd, D. *J. Cogn. Neurosci.* **14**, 818–831 (2002).
2. Lodge, D. *Thinks…* (Penguin, London, 2002).