

How Can Physics Underlie the Mind? Top-Down Causation in the Human Context
(George F.R. Ellis 2016)

Javier Sánchez-Cañizares

University of Navarra
CRYF Group at Ecclesiastical School of Philosophy and
“Mind-brain” Group at Institute for Culture and Society (ICS)

js.canizares@unav.es

Scope: Monograph. *Level:* Researcher; Specialist; Scientist.

Despite the title, George Ellis' work does not deal primarily with the physics of the human brain nor the mind. Even if the penultimate of its eight chapters is entirely devoted to such question, this book focuses on the philosophical issue of top-down causation and *strong* emergence in nature; the former enabling the latter. The mind does not stem from the brain alone, but this should not be surprising since nature itself, according to Ellis, cannot be understood in a mere bottom-up fashion. Throughout more than 400 pages with a far from lineal structure, one can find a good number of examples showing that the reductive stance—proper to physics—is found wanting in order to fully understand complex systems.

Whereas many scientists may agree with such philosophical conclusion, it turns out much more debatable that Ellis succeeds in his purpose of unambiguously showing the occurrence of downward causation in physics. To be fair, one must recognize the plausibility of his arguments. However, plausibility is one thing and logical demonstration another. The overall impression is that many of his ontological claims simply are a non sequitur from the premises, either due to some kind of circularity—e.g., the assumption of a hierarchy of levels in nature— or because of flaws in the gist of the proof: for instance, that “one demonstrates existence of top-down causation whenever manipulating a higher level variable can be shown to alter lower level variables” (p. 451), which is logically untenable. In addition, Ellis seems to occasionally defend an odd kind of *supervenience*—“the claim that the higher level states emerge uniquely from the lower level states, so all we need to do is set the lower level states appropriately and emergence will occur” (p. 15)—when averring that human mind acts “in an intelligent way, supervenient on but not causally determined by the underlying physics” (p. 399). But supervenience leaves no room for indetermination at the lower levels: “Supervenience and determination are simply two sides of the same coin” (p. 117).

The topic of indetermination becomes essential in this context if one wishes to dodge the risk of overdetermination. That is the whole point of chapter 5, “Room at the bottom”, which aims to show that physics cannot be causally closed in the bottom-up sense and different kinds of causality are needed. In that regard, the standard interpretation of quantum mechanics

provides a fundamental indetermination in nature. But the point—neglected by Ellis—is that the possibility of a non-local superdeterminism is not logically ruled out. A different matter, of course, is whether such superdeterminism is scientific or not—because non-falsifiable.

The reader also misses a more detailed discussion on the epistemic character of boundary conditions, ubiquitous in physical systems. Ellis implicitly refers to this question from time to time but does not address it thoroughly. Nevertheless, it seems to be the most promising path if one wishes to show ontic emergence in nature via top-down causation. From a realist stance, showing that boundary conditions always need to be treated differently from the internal dynamics of whatever physical system seems to point toward actual emergence, not merely epistemic, in reality. Moreover, no “theory of everything” can break free from some sort of “ad hoc” parameters in order to be operative, falling into the so-called *meta-laws dilemma*.

Last but not least, Ellis’ classification of top-down causation in five classes in chapter 4 seems too far-fetched. One still has the impression that the author simply groups different natural processes, in keeping with his specific lens, which need not correspond to different causation levels in nature unless one has already decided that a *goal* is something different from an *attractor* or of a *selection criterion*, begging the question.

These are the criticisms of the book. Nevertheless, Ellis’ tour de force for the sake of top-down causation in nature deserves more than the usual credit to a book. One is facing up to his utmost effort to bring back a renewed Aristotelian view into science. No wonder that the author tries to dialogue with physics, biology, neuroscience, epistemology and metaphysics; and no wonder if some inaccuracies emerge. However, George Ellis raises some of the deepest issues concerning our scientific interpretation of reality. He assumes the burden of the proof against strong reductionism. Can reductionists do better? I doubt it.