Zooming in on Downward Causation

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Abstract. An attempt is made to identify a concept of ‘downward causation’ that will fit the claims of some recent writers and apply to interesting cases in biology and cognitive theory, but not to trivial cases. After noting some difficulties in achieving this task, it is proposed that in interesting cases commonly used to illustrate ‘downward causation’, (a) regularities hold between multiply realizable properties and (b) the explanation of the parallel regularity at the level of the realizing properties is non-trivial. It is argued that the relation between a realizable property and the property that realizes its effect in a particular case is not usefully regarded as a species of causation and that use of the concept of downward causation deflects our attention from our central explanatory tasks.

Introduction

Several recent writers have proposed that our world contains instances of downward causation. Relatively global facts, e.g., bodily organization, beliefs, or contingencies for survival, are plausibly invoked as causes of behavior or organismic structures, and these effects require motions in or substructures of relatively small parts. It seems, therefore, that properties of larger systems must be causally responsible for some of the properties of events in their subsystems or properties of the parts of which they are composed.

Many other writers, most notably Kim (e.g., 2000), have doubts. In summary form, these doubts stem from the suspicion that downward causation would require violation of the exceedingly plausible principle that what happens in the world is fully determined by what happens in its small parts (where “small parts” can be taken at any of several micro levels, e.g., molecules, or atoms). It is, moreover, held that exceptions to the plausible principle are not empirically supportable and may even fail to be coherently describable.

If proponents of downward causation were unaware of these doubts, we might think that they had simply overlooked a fatal objection to their views.
This situation is emphatically not the one that actually obtains. Contemporary proponents of downward causation routinely acknowledge Kim’s work, deny that their views imply a need to depart from a fully physicalistic view of the world, and insist that they are calling attention to a feature of certain systems that must be recognized as an addition to, not a refutation of, analysis of systems in terms of the interactions of their parts.

This situation suggests that the concept of downward causation is a concept severely in need of clarification. Many other writers have recognized this need, and have responded to it; unfortunately, they do not converge on a single, clear, widely accepted account. Since I believe I must try to clarify the concept, I take the current situation as something of a warning. My response to this warning is to adopt a small change of approach to the question of how “downward causation” is to be understood. My approach will be structured around the following question: Is there any concept of downward causation that is clear, and that applies distinctively to certain complex systems, notably biological systems and cognitive systems? By “applies distinctively”, I mean “applies to the systems typically claimed to exhibit downward causation and does not apply to certain simpler systems that are typically regarded as too simple to exhibit downward causation”.

Meehl/Sellars emergence

Meehl and Sellars (1956) provide a background that we can use to develop a clear concept of downward causation. I hasten to add that this concept is not the one that current proponents of downward causation have in mind. It will, nonetheless, prove useful to have this concept clearly in mind as we proceed. Meehl and Sellars’ title is “The Concept of Emergence” and they do not mention downward causation at all. But as it is well recognized that there is a close connection between emergence and downward causation, it should not be surprising that we can adapt their work to our discussion. These authors were concerned with the possibility that what happens in brains might proceed according to laws different from those that hold for the same constituents when they are not part of such a complex system. The essential idea of their account requires that we may partition the logical space of cases into parts, according to some criterion of complexity. Their treatment is a conceptual one, and is thus meant to be general. Thus, they do not go into a specification of just how much complexity is required to fall on the “complex” side of the criterion. Their point can be made just so long as some criterion divides classes in a way that makes the following remarks applicable.

The key point is that there is no contradiction, and no incoherence, in supposing that, in one portion of complexity space, one set of laws holds,