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Editorial

Computationalism: An Overview

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DESCRIPTION

Computer science has been notably successful in building devices capable of performing sophisticated intellectual tasks. Impressed by these successes, many philosophers of mind have embraced a computational account of the mind. Computationalism, as this view is called, is committed to the literal truth of the claim that the mind is a computer: Mental states, processes, and events are computational states, processes, and events.

An example should make the central idea clear. A physical system computes the addition function if there exists a one-to-one mapping from numbers to physical state types of the system such that any numbers n, m, and n+m related as addends and sums are mapped to physical state types related by a causal state-transition relation. In other words, whenever the system goes into the physical state specified under the mapping as n, and then goes into the physical state specified under the mapping as m, it is caused to go into the physical state specified under the mapping as n+m.

Traditionally, computational processes have been understood as rule-governed manipulations of internal symbols or representations what computer scientists call data structures. Though these representations typically have meaning or semantic content, the rules apply to them solely in virtue of their structural properties, in the same way that the truth-preserving rules of formal logic apply to the syntax or formal character of natural language sentences, irrespective of their semantic content. Computationalism thus construes thinking as a type of mechanical theorem-proving.

Computationalism has been the predominant paradigm in cognitive psychology since the demise of behaviorism in the early 1960s. The failure of behaviorism can be traced in no small part to its refusal to consider the inner causes of behavior in particular, the capacity of intelligent organisms to represent their environment and use their representations in controlling and modulating their interactions with the environment. Computationalism avoids this failing, explaining intelligent behavior as the product of internal computational processes that manipulate (construct, store, retrieve, and so on) symbolic representations of the organism's environment.

Many philosophers of mind find computationalism attractive for two reasons. First, it promises a physicalistic account of mind; specifically, it promises to explain mental phenomena without positing any mysterious nonphysical substances, properties, or events. Computational states are physically realized in the computer; they are just the physical states specified by the mapping I. Computational operations, as noted, are purely mechanical, applying to the objects in their domain typically, symbols in virtue of their structural properties. Moreover, computationalism, if true, would show how it is possible for mental states to have both causal and representational properties to function as the causes of behavior, and to be about things other than themselves. Mental states, on this view, are relations to internal symbols, and symbols have a dual character: They are both physically constituted, hence causally efficacious, and bearers of meaning.

A commitment to computationalism by philosophers of mind has frequently taken the form of a commitment to a computational construal of the Representational Theory of Mind (hereafter, RTM-C), which is an account of propositional attitudes, such states as beliefs, desires, hopes, fears, and so on. According to RTM-C, propositional attitudes are relations to internal representations for example, to believe that P is to bear a certain relation to a token of an internal representation that means that P. Each attitude type is construed as a distinct computationally characterizable relation to an internal representation; thus, believing is one type of computational relation, and desiring another. The RTM-C has been advertised, by, for example, Jerry Fodor in Psychosemantics (1987), as a scientific vindication of the commonsense practice of explaining a subject's behavior by appealing to his or her propositional attitudes. If true, it would underwrite the practice of individuating propositional attitudes along two distinct dimensions, by attitude and by content. Subjects can hold various attitudes toward a single proposition; they may believe, doubt, or fear that the conflict in the Middle East will never by resolved. And subjects bear the same relation belief, say to many different propositions. On the RTM-C, the various attitudes

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correspond to distinct computational operations, and distinct data structure-types over which these operations are defined have distinct contents. The transparency of the relation between the commonsense explanatory scheme and the underlying computational realization of human psychology is an attractive feature of the view. However, it may also seem rather surprising that the two explanatory structures are virtually isomorphic.