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March 9, 2020

In Defense of Reductionism (Prompt 4)

Accused of chauvinism, identity theory has been largely replaced by functionalism as a dominant position in philosophy of mind and cognitive sciences. There are nevertheless some suspicious claims in the functionalist characterizations that should be further examined. In this paper, I argue that the Churchlands rightfully capture the constraint of higher-level accounts of mind posted by the reduction to neurobiology through appealing to 1) elimination of folk psychological theorizing, 2) domain-specific reduction, and 3) co-evolution.

Churchland' Position

The standard deductive nomological (DN) model of scientific explanation presumes a type-to-type identity between a higher-level theory with a lower-level one. Given a reducing theory $T_{R,}$ there is a bridge principle that reduces T_R to a more basic theory T_B that every kind predicate of T_R corresponds to a kind predicate in T_B (P. S. Churchland 278). Psychological theories at the higher-level possess an identification with basics physics theories, between which neurobiological characterizations are a local stop (Fodor 129). Mental states are therefore just physical states, and higher-level theories of the mind are therefore constrained by lower-level characterizations.

P. S. Churchland complicates the outcome of scientific reduction by articulating the possibility of elimination. Medieval conceptions of phlogiston and demon possession theory

of mental illness at the higher-level do not have type-to-type identification with oxygen and dopamine deficiency (P. S. Churchland 282); rather, the concepts of phlogiston and demon possession are eliminated out of the scientific ontology. Given that the higher-level characterizations of phlogiston and demon possession are eliminated by lower-level discoveries in chemistry and neurobiology, it seems reasonable to infer that higher-level characterizations can be constrained by lower-level characterizations. T_B is therefore an appropriate constraint on higher-level accounts of mind and behavior by revising T_R into T_R*. The arguments are presented as followed:

Premise 1: Our lower-level characterizations are based on our best scientific theories

Premise 2: If higher-level characterizations are either reduced or eliminated by lower-level theories, lower-level theories constrain higher-level theorizing.

Premise 3: Mental states as higher-level characterizations are either reduced to physical states or eliminated by lower-level theories

Conclusion: Reduction to neurobiology at the lower level is an appropriate constraint on higher-level accounts of mind and behavior.

Given that Premise 1 is a very plausible claim, and given that Premise 2 is supported by factual evidence in the history of sciences, the validity of the conclusion therefore lies in the truth of premise 3. It is precisely this Premise 1, especially the claim about reduction, that Jerry Fodor and other functionalists take issue with.

Fodor's Rebuttal

In "Special Sciences, or the Disunity of Science as a Working Hypothesis," Fodor claims that reductionism is too strong a constraint posted upon higher-level accounts of mind and behavior. Given that there is a higher-level economics theory T_R, it follows from the

reductionist picture that the T_R will be reduced to the more basic theory of physics T_B. This prospect of econphysics strikes Fodor as misconstrued, as the following three arguments show:

> a) interesting generalizations…can often be made about events whose physical descriptions have nothing in common… b) …whether the physical descriptions of events subsumed by such generalizations have anything in common is…entirely irrelevant to the truth of the generalizations, or to their interestingness…or to any of their epistemologically important properties… c) The special sciences are very much in the business of formulating generalizations of this kind. (133)

Gresham's law of monetary exchange is an interesting generalization at the level of special sciences whose physical descriptions can be wildly constituted by disjunctive physical predicates. To seek an explanation of monetary exchange at the level of physics is then to a) eliminate the ontology of money in return for the physical coextensivity of strings of wampum, dollar bills, the signatures on checks (Fodor 134). It is also not plausible to b) describe the terms of economics in the physical kind terms, let alone that c) "the coextension would be lawful" (Fodor 135).

Fodor moves on to propose a schematic representation of the proposed relationship between the T_R and the T_B. For a reduced law, its antecedent and consequent will "each be connected with a disjunction of predicates in the reducing science" (Fodor 139). The attempt to characterize the higher-level theories in terms of lower-level predicates based on type-to-type identification therefore misconstrue the relationship between sciences, as the natural kinds of special sciences "are not identical to the natural kinds of any other discipline" (Sterelny 197). In the case of psychology, "the discovery of the physical realizers of these kinds will not show, even in principle, that the special kinds, laws, and explanations

distinctive of psychology can be discarded" (Sterelny 198). The claim that mental kind is just physical kind therefore not does stand as a true premise, i.e. the mental kind is irreducible to the physical kind. Given the irreducibility of special sciences, it seems appropriate to claim that lower-level characterizations are not a constraint on higher-level accounts of mind and behavior regarding reduction.

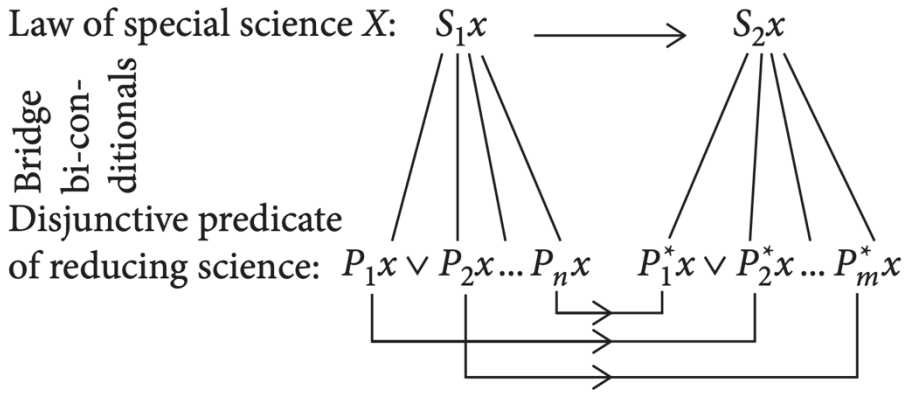

Figure of Fodor's Special Sciences

Churchland's Defense

One of the responses offered by P. S. Churchland is that reduction is domain-specific. Temperature in gas is the mean molecular kinetic energy, and temperature in a solid is identical to mean maximal molecular kinetic energy (P. S. Churchland 356). Similarly, there is no good reason to assume that pain in human is the same in octopus whereas their corresponding physical predicates are heterogeneous. Variable realization is not proven (Zangwill 214). To claim that the same mental state can have disjunctive physical realizers is to adopt a coarse-grained description of mental state and assume that mental states are the same across species and time (Bechtel & Mundale 203). A revised version of the reductionist conception can be multiple local reductions of special sciences T_R to lower-level

characterizations of T_B rather than a global reduction (Kim 20). Given that disjunctive physical predicates can have corresponding disjunctive higher-level characterizations, it is appropriate to claim that higher-level accounts of mind and behaviors are not ontologically autonomous.

Also, with respect to Fodor's point about the Gresham's law of monetary exchange, the appropriate characterizations at the level of economics may not be the same at the level of the mind. To assume that psychological characterizations are the correct level of explanation as economics does is to operate in a contextual vacuum when one has no good reason to presuppose the supremacy of psychology among the level of membrane, cell, organ, and system etc.

Another argument against the ontological autonomous view posts the question of whether disjunctive physical predicates exist, even if we accept the claim that there are the same mental states. The use of random dot motion tests in monkeys to investigate the neural basis of decision making in human based upon the similar psychophysical profile (Roskies 110). The functionalist conception of multiple realization of special sciences will render the neuroscientific study of vision useless, whereas the latter has enormous success.

Special sciences also do not have methodological autonomy. Neuroscientific discoveries about vision "provide more complex account of the processing pathways involved in vision," which is traditionally the field of cognitive psychology and the artificial intelligence program (Bechtel & Mundale 199). Co-evolutions of transmission genetics and molecular genetics also reveal that genes should not be conceptualized as a singular entity residing within the cell; rather, genes should be viewed as a "virtual governor" involved in the complex dynamics of genetic operations (P. S. Churchland 365). Given that special sciences in various disciplines are substantially enriched and revised by theories at the lower

level, there is no good reason to presume a methodological autonomy either. Therefore, both the ontological and methodological constraints at the lower level are posted upon higher-level accounts of the mind, let alone the plausible falsity of folk psychological theorizing.

Conclusion

The standard DN model of bridge principles is attacked by functionalists. To claim that the mental is autonomous is to make both an ontological claim and a methodological claim that higher-level characterizations of mind are in no way constrained by neurobiology. P. S. Churchland has defended the reductionist position by appealing to domain-specific reduction and co-evolutions between theories. Given that folk psychological characterizations can also be erroneously postulated, it is appropriate that reduction to neurobiology should be a constraint on the higher-level accounts of mind and behavior.

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