On the Autonomy of Cognitive Psychology

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Abstract: Prior to the advent of modern cognitive science, there was much debate about the scientific status of psychology and other disciplines that concerned themselves with intentional concepts. Where physical sciences have a clear chain of causality from discipline to discipline, it is still unclear how the "special sciences" relate semantically. Through a discussion of opposing reductionist viewpoints, we can assert approximately where psychology falls in relation to physics. Hilary Putnam's thesis about the "multiple realizability" of psychophysical kinds is extended by Jerry Fodor to assert the irreducibility of the special sciences, and thus, the semantic "autonomy of psychology". Jaegwon Kim offers a reductionist viewpoint, arguing in favor of micro reductions made possible by disjunctive bridge laws, to refute Fodor's quarantine of psychology. Realizing that psychology is different only in method and not in meaning from the physical sciences, Kim presents a convincing argument through an apt deconstruction of "multiple realizability".

We often hear the contention between hard scientific disciplines and social sciences, the former accusing the latter as lacking explanatory power. The social sciences concern themselves with explaining abstract features of our minds, which often acts as double edged sword, condemning them to scrutiny for an inadequate empirical foundation. This lack of causal explanation for the social sciences has lead philosophers of science to section them off from easily *reducible* science, where bridge laws are few and logically straightforward. Granting this metaphysical and semantic separation, or "autonomy", to psychology and other social sciences can be looked at as the consequence of a larger issue, namely a discussion of the "unity of science". This issue asks if, "we are able to affirm [by reduction] that scientific laws apply on *all* levels of organization" and thus, extending Hilary Putnam's multiple realizability thesis, "if we can indeed reduce 'special sciences' to physical sciences."

Naturally, much of the debate has happened where these scientific connections seem to grow weak. Psychology is the chief "special science" that has served as the battleground for the debate and the one that we will be examining, especially cognitive psychology concerning mental states (esp. pain). We will view the issue through two prominent philosophers of science: Jerry Fodor, an anti-reductionist who extends Hilary Putnam's "multiple realizability" thesis, advocating the disunity of science *because* of the "special sciences", and Jaegwon Kim who refutes Fodor and affirms that reduction of the so-called "special sciences" is possible. Kim's reductionist position rightly allows the special sciences to be semantically connected to physical sciences by asserting that Fodor's extension of multiple realizability is fundamentally misguided. **Fodor's extension does not validly represent the kinds (that are responsible for mental states) utilized in psychophysical reduction, and as Kim**

challenges, some neural kinds are multiply realizable *and* have a basis in the physical sciences.

Context & Definitions

Reductionism spawned as an effect of logical positivism, asserting that all complex things are reducible to a set of parts. In the philosophy of science, this manifests as the issue of all scientific theories being reducible to some more basic theory or set of laws. Biology is said to be reducible to chemistry, which is then reducible to physics. A commonly used example is that Kepler's theories about the motion of the planets are reducible to Newtonian physics. These instances beg the question: is this type of "domino-effect" causality true for all fields of scientific inquiry? Emerging sciences concerning the mind have prompted a reconsideration of what reduction means. The above question about causality is certainly not true if we treat reduction as translation, which continues the thoughts of a strict logical positivism. Reduction as translation, as expressed by Rudolf Carnap, means that, "An object (or concept) is said to be reducible to one or more objects if all statements about it can be transformed into statements about these other objects… science is a unity, that all empirical statements can be expressed in a single language, all states of affairs are of one kind and are known by the same method."[1] So, scientific disciplines must be equal in terms of method (like a language's syntax) and explanation or meaning (semantics). This is the classic reductionist view, that all disciplines can be reduced to physics.

This needed reconsideration about reduction has spawned two redefinitions: reduction as derivation and reduction as explanation. The latter employs heavy emphasis on equal semantics and a loose version of equality in method, stating that if the theory is just as well

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[1] IEP, Reductionism, "Reduction as Translation "

"systematized" in its respective discipline, then it can qualify as reducible. Reduction as derivation is the view debated by Kim and Fodor, that emphasizes semantics and takes similar, but more articulate view of method than espoused by old-school positivists, giving philosophers an entire vocabulary with which to assess the equality of a theory's terms.

This deepening of assessing the equality of method begins with two types of reduction, heterogenous and homogenous. Strict translation of terms was no longer a prerequisite for reduction, and in terms of "heterogenous" reduction, the non-fundamental science in question could have additional terms not included in the base science. Heterogenous reduction allows much more freedom, creating an ever more hotly contested rule for reduction: "As a matter of logic, all that is required for a successful derivation are bridge laws that take the form of conditionals."[2] To put this in a better perspective, here is an the same statement repeated in "logicese"[3] from IEP:

The occurrence of a B1 causes the occurrence of a B2 (a law in the base science).

Something's being a B1 = its being a T1. (bridge law)

Something's being a B2 = its being a T2. (bridge law)

∴ The occurrence of a T1 causes the occurrence of a T2 (a law in the target science).

On an underlying logical level, the contention is, if can we be warranted in creating bridge laws that are identity statements, biconditionals or even disjunctions as Kim proposes. Clearly, this form of reductionism is absolutely dependent on these bridge laws, which Nagel says can be "be (1) logical or analytic connections between terms, (2) conventional assumptions created by fiat, or (3) empirical hypotheses."[4] It is only possible that the special

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[2] IEP, Reductionism, "Reduction as Derivation"

[3] *Ibid*

[4] *Ibid*

sciences be connected with harder disciplines through this method of reduction. What then seems to alienate the "special sciences" from being included in the reducible, physical sciences, is that the abstract terminology, say, mental states described by cognitive psychology, must have a bridge law that "gives a physical correlate." So, when one seeks to reduce special to physical, the gap from the abstract to a concrete correlate is what looms large. Putnam and Fodor use this to their advantage, while Kim rebukes the special/physical separation by using heterogenous reduction using disjunctive statements as bridge laws.

Putnam extended by Fodor: Disunity of Science by Multiple Realization

Hilary Putnam and later, Jerry Fodor, slowly alienated the social sciences, namely psychology and economics, from other tried and true, reducible sciences via "multiple realization" (MR). This was not the aim of MR, although it was a consequence of this thesis put forth by Putnam that states, "a given psychological [or second-order] kind (like pain) can be realized by many distinct physical [or first-order] kinds: brain states in the case of earthly mammals, electronic states in the case of properly programmed digital computers, green slime states in the case of extraterrestrials, and so on."[5] On Putnam's view, we can see that states described by psychology do not have any *single* causal origin and may arise from any one of the "many levels" also set forth in Putnam's article. Each of these levels are used to separate certain disciplines from those that underlie them.

He gives six levels: social groups, living things, cells, molecules, atoms and particles.[6] In order to give some structure to reductionism as derivation, Putnam devised these levels as conducive to the recently introduced emphasis on bridge laws. The most crucial features of

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[5] SEP, Multiple Realizability

[6] Putnam 9

the levels are that they naturally exist in such a way observable by empirical science while reduction must only take place from higher to lower levels. For example, this simply means that concepts in physics cannot reduce to laws in biology, necessitating an impossible *reduction* from level 1 to 5. He bolsters his many levels by saying that they are practical, giving a "good synopsis of scientific activity" and that they are compatible with the tendency towards reduction inherent in science, "to explain apparently dissimilar phenomena in terms of qualitatively identical parts…"[7]

Putnam reaches multiple realization in a separate discussion of mental states, but Fodor shines a light on the implications of the thesis for Putnam's overall view on the unity of science. The unity of science is absolutely dependent on the fact that all scientific disciplines are reducible, and Fodor asserts that if second-order properties such as brain states are not reducible, then the disciplines that house them surely are not. Fodor does not have any disagreement about their scientific status, rather, he seeks to "give" the special sciences an out from the constraint given to physical sciences (that they *must* be reducible to the last of Putnam's many levels).[8] So, it becomes clear that in order to mitigate the problem of uncomfortably wedging these special sciences into the many levels, he grants the semantic "autonomy" of psychology.

Fodor explains that the point of psychophysical reduction is not to reduce a concrete correlate in a lower discipline for every theory but to "explicate the physical mechanisms by which events conform to the laws of the special sciences."[9] In effect, Fodor discerns that psychology and economics cannot be inserted in one of Putnam's levels, rather that they are

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[7] Putnam 16

[8] Fodor 1

[9] Fodor 107

concerned with the unpacking, or realizing, the meaning of physical events on all of the many levels. This essentially validates Putnam's assertion that second-order properties are multiply realizable, releasing psychology of the "physical reduction" constraint, and imbuing it with the freedom to be applicable in any physical discipline. However, this puts the special sciences out of the running to qualify as reducible, which alienates them from the physical sciences.

Kim: Refutation of Multiple Realization

To summarize the viewpoint that Jaegwon Kim takes issue with, he quotes LePore and Loewer, "It is practically received wisdom among philosophers of mind that psychological properties (including content properties) are not identical to neurophysiological or other physical properties. The relationship between psychological and neurophysiological properties is that the latter *realize* the former."[10] Since we have already sketched out a rudimentary understanding of what realization is, we can see that the reductionist view Kim holds is one that rejects the autonomy of special science, putting it back into the running to be reducible. The gist of Kim's view is this, that properties of non-physical science are *not* of a different explanatory type, so that the explanations cannot reconcile, but are *coextensive* with first order physical properties, making them second-order. He argues that bridge laws can be disjucntive, which implies the following: "there is no single neural kind *N* that "realizes" pain, across all types of organisms or physical systems; rather, there is a multiplicity of neural-physical kinds such that N_h realizes pain in humans, N_t realizes pain in reptiles…"[11] Alternatively, Fodor would have us believe that bridge laws cannot be disjunctive, which implies that there would indeed have to be some *single, causal* neural kind *N,* that has a physical correlate in all

[10] Kim 2

[11] Kim 5

organisms. As Kim posits, the *multiplicity* of laws bridging special to physical must be disjunctive.

The issue with disjunctive bridge laws is that they are not a simple, finite set of conditional statements. Rather, they may be a seemingly infinite succession of statements as seen in the above example with pain. Challenging Fodor, it is not that we cannot reduce psychological theories, but when they expand into such a multiplicity that it is difficult to ascertain any, single, "across-the-board" truth. Clearly, this is a result of pain being multiply realizable. What we can say with certainty is that, considering mental states, that neural kind, $N_{h,}$ realizes pain in humans. We know what realizes pain in humans, namely perception, and that this kind is a feature physical science. Echoing Kim, to bridge the psychophysical gap, we need to recognize that reduction does not operate in the same way as it does *within* the physical sciences, and that we may need to enjoy the few "micro"-reductions that are possible. Kim does not deny Fodor's explanation by denying the existence of the psychophysical gap, rather, this is what defines reductions made from the special sciences to the physical. What Kim does reject is that these reductions cannot be made, as more specific, narrow reductions are possible.

One such micro-reduction is that of the neural kind, perception, prompting a mental state in humans. In an analysis of Kim's argument, Ned Block gives an example that illustrates just how powerful the human faculties of perception are. "[I]f a hand is amputated, the amputee later feels the sensation of the hand being touched when his cheek is touched…The reason that the hand sensation "migrates" to the cheek is that the hand receptors and the cheek receptors in the sensory cortex happen to be adjacent."[12] Block calls this the hand/

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[12] Block 3

cheek phenomenon, an effect of phantom limb, which is clearly tied to a psychological cause. In the most simple psychological terms, the habitual behavior of touching the cheek still persists in the mind even after the hand ceases to exist physically. As Block explains, it is as though the hand is still very much alive within the *brain also*, which sends the appropriate neural response through the arm which now terminates before the hand. For many dealing with phantom limb, this also manifests in pain in the amputated area.

It is clear through this example that there are *actual* physical correlates for pain, at the very least, that can be empirically verified. This definitely constitutes a relationship between the special and physical sciences, which is a far cry from Fodor's assertion, but as Block moves through his argument, he asks: does this relationship constitute a valid reduction? After nearly affirming Kim's view, Block takes a skeptical turn, "The fact that kinds are relative and graded shows that there is something wrong with the analytic apparatus common to Fodor and Kim. If talk of reduction presupposes a non-relative non-graded notion of a kind, then there is no matter of fact about reduction."[13] This means to say, not every phantom limb hurts and not every touch of the cheek gives a conditioned response from the brain. Conversely, every object in the cosmos reacts with a reasonably predictable response to gravity. This would be the type of reduction sought by Fodor, Putnam and Block. Kim remains sure that psychology should remain semantically connected, because of the fundamental disagreement with the three others about the implications that MR has for reduction.

Kim revels in micro-reductions, asking, "Do our considerations show that psychology is a pseudo-science like astrology and alchemy? Of course not. The crucial difference, from

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[13] *Ibid*

the metaphysical point of view, is that psychology has physical realizations, but alchemy does not." [14]Fodor and company would claim that because neural kinds are multiply realizable, it is unclear whether they can be reduced. Kim would retort with the fact that reduction, especially psychophysical reduction, is about "physically grounded and explainable [kinds] in terms of the processes at an underlying level."[15] It is not necessary to make sweeping claims about truth when asserting the reduction of a multiply realizable thing, because the truth of the matter lies at a more local, narrow level.

Block's claim that validity of psychological reductions is dubious because of the relativity of mental states, undermines the whole of psychology. It seems that Block falls victim to the slippery slope, because if his claim were true, how could we make any truthful assertions in psychological disciplines, when behavior differs from being to being. Kim accounts for this in a similar fashion by saying that psychological laws are often seen as statistical and non-deterministic, as are laws in physiology and anatomy. In psychophysical reduction, it is clearly important that we privilege the discipline "bridged from" (the one higher in Putnam's many levels) because of this fact.

Harkening back to pain, if it is realized by perception, despite the multiplicity of bridge laws, then we have made a psychophysical reduction. Kim asserts the validity of reduction on a more local level, showing that it can be just as powerful as the large, objective truths set forth by inter-physical reductions. Psychology does not need to be granted autonomy by Fodor, because its semantic connection is readily apparent on a smaller scale. Reduction may not work the same from "special" to physical, but it is still valid.

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[14] Kim 36

[15] *Ibid*

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