

REDUCTIONISM AS EXPLANATION AND THE MIND/BODY PROBLEM

by

Shandon L. Guthrie (1996)

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OPENING REMARKS

Certain features of explanation-seeking science have caught our attention in the past century, issues of explanation in such fields as cosmology, astrophysics, quantum physics, and, more recently, neurophysiology. This has prompted philosophers of science to attempt to define what exactly is an *explanation*. Indeed, if one were to ask a general quorum of scientists what exactly counts as an explanation, the responses would be quite mixed. Although science itself entails numerous formulas concerning explanation, we will only be concerned with the explanatory theory of *reductionism* and how it fails to explain the existence of a *soul*.⁽¹⁾ As a preliminary, it is unimportant to presuppose the *scientific realist*⁽²⁾ position in order to advance arguments concerning reduction as explanation. That is, it will be unimportant to question the veridical nature of realism, *nonrealism*, or nonrealistic interpretations of explanation in order to validate this thesis. Further, all other scientific views of explanation will not be discussed in this paper although some alternatives to reductionism will be mentioned. The main goal or thesis I will present in this work is that reductionism as explanation fails to accurately describe the human intellect. I will begin by presenting the arguments favoring reduction followed by arguments dismissing reduction. The dualist thesis will be made evident as the arguments unfold. For the sake of brevity I will comment on each argument following its presentation. Due to spatial constraints in this paper only the portions of the arguments that focus directly on the acceptance or rejection of reduction will be presented.⁽³⁾

I. REDUCTIONISM DEFINED

Reduction as explanation of theory. The most prominent philosopher on neurophysiology (and perhaps the most famous for his articulation of reduction as *intertheoretical*), Paul Churchland, defines the basic picture of reductionism in the following manner:

A new and more comprehensive theory *reduces* an older theory just in case the new theory, when conjoined with appropriate correspondence rules, logically entails the principles of the older theory. (The point of the correspondence rules or "bridge laws" is to connect the disparate ontologies of the two theories.⁽⁴⁾

Churchland's point here is that statements of identity are seen as "logically entail[ing]" the underlying principles the initial higher-level theory requires.⁽⁵⁾ This reductionist picture, however, requires "limiting assumptions or counterfactual boundary conditions"⁽⁶⁾ in order to avoid an overly strict deduction of high-level theories. Basically, there seem to be exceptions to every rule. David Charles and Kathleen Lennon, no friends of reductionism as explanation, define it as follows:

Reductionist accounts aim to show that where we thought we had two sets of concepts, entities, laws, explanations, or properties, we in fact have

only one, which is most perspicuously characterized in terms of reducing vocabulary.⁽⁷⁾

The passage here suggests that upon defining a high-level theory, the reductionist explanation then seeks to show *why* the theory is explained in the combination of lower-level theories. In Churchland's example of temperature (see n. 5), we see that temperature, as a theory, is explained in terms of statistical thermodynamics.

That is to say, a reduction consists in the deduction, within T_n [the new theory], not of T_o [the old theory] itself, but rather of a roughly equipotent *image* of T_o , an image still expressed in vocabulary proper to T_n .⁽⁸⁾

Churchland suggests that emergent properties (such as temperature) are really reduced to a subset of causal powers (the notion of emergent properties will be discussed later). So, something that is considered *warm* is really a reduction of "molecules [that] have such and such a mean kinetic energy and will collectively emit electromagnetic radiation at longish wavelengths."⁽⁹⁾ Churchland stipulates, however, that the property of *warmth* is not *deductively* granted (something he believes does not assist the anti-reductionist position), rather reduction is simply found *in* deduction in specific instances of entity-emitting properties. More on the particulars as the comparison unfolds.

II. ARGUMENTS FAVORING A REDUCTIONIST EXPLANATION

Paul Churchland, the primary advocate of reductionism in this paper, argues in favor of reduction as a response to the Cartesian model of the mind/body problem and to what has been called *folk psychology*.⁽¹⁰⁾ But with Churchland we can confidently join with him when he says, "But my opinion is only one of many alternatives. I invite you to make your own judgment."⁽¹¹⁾ This is precisely what we ought to do. We now turn our attention to typical arguments defending reductionism.

1. The dualist model is insufficient to account for the correlation between damage to brain parts and human behavior, but the reductionist model can. Churchland argues that dualism fails to account for the relationship between trauma to the brain and human behavioral reaction (i.e. if someone suffers a blow to the head, she may suffer memory loss or other mental deficiencies).⁽¹²⁾ Since neurology can explain this phenomenon in a system *both* non-reductionists and reductionists agree on, and since we know that the brain exists and some "spirit" does not, then the neurological reduction of human behavior is both the simpler and better explanation.⁽¹³⁾ I think there are essentially three problems with this position.

First, I had suggested in footnote 12 that anti-dualist arguments present no *necessary* assistance to the anti-reductionist thesis. Such coexisting worlds are, according to Churchland himself, at least *theoretically* possible. Secondly, Churchland's attribution of human behavior to neurological entities seems to be a possible case for reduction, but ultimately it sidesteps the point. The causal connections between "mind" and body present no difficulty for non-reductionists and dualists alike. Indeed, the notion of *causal connection* simply does not demand ontological equality. Consider a glass of sugar-water that is being saturated with red food coloring. Although the sugar and the water are affected by the coloring, it does not require that the sugar and water be identical or possess ontological equality.⁽¹⁴⁾ Thirdly, it does not make sense to discuss causality between ontologically identical substances anyway. It seems that the images and intentions that we have are defined as *mental* states, and the neurological network of the brain is defined as *brainstates*. It is tacitly plausible in the light of causal connectivity that precisely the "two" substances said to be ontologically separate affect one another bearing special causal relations, something only true if the "two" substances are separate. Therefore, the notion of causal connectivity between brain damage and human behavior actually bespeaks the separation of mental and brain states.

2. *Emergent properties are theoretically reducible "entities."* Churchland claims that *emergent properties*,⁽¹⁵⁾ such as color and sound, are ultimately explained in reduction. Here is one example of this type of reduction as seen in the concept of sound:

Consider the enormous increase in discriminatory skill that spans the gap between an untrained child's auditory apprehension of a symphony, and the same person's apprehension of the same symphony forty years later, when hearing it in his capacity as conductor of the orchestra performing it. What was before a seamless voice is now a mosaic of distinguishable elements. What was before a dimly apprehended tune is now a rationally structured sequence of distinguishable and identifiable chords supporting an approximately related melody line.⁽¹⁶⁾

Here the features of sound are nothing more than a string of sinusoidal wavelengths at such and such Hertz. In this example Churchland shows that a perception of certain sounds, such as music, is a result of being "untrained" in auditory perception. Therefore, we may say

Sound $A = 132 \text{ kHz @ } -44\text{dB}$.

If the symphony is represented by A , then the "melody" or "tune" heard is simply a matter of perceptual comprehension; a series of wavelengths are acting on the ear. The same could be said about colors and additional emergent properties.⁽¹⁷⁾ But is such an analysis a true explanation? A few factors suggest that it is not.

First, philosopher of the social sciences at Yale University, Alan Garfinkel, says that although emergent properties may be *composed* of "substratum,"⁽¹⁸⁾ it does not mean that the substratum *explains* them.⁽¹⁹⁾ For Garfinkel, explanation deals with *reason*. It becomes absurd to think that 132 kilohertz at -44 decibels really *explains* or *gives a reason* for a musical symphony.⁽²⁰⁾ It seems to be true that if we take an example of some mathematically proportionate equation, then it appears that the result does not solicit an explanation. For example, if we examine Ohm's Law in an electrical circuit, then we may come up with something like this:

$$(33\text{k W}) \times (15\text{mA}) = (495 \text{ kV})$$

But there seems to be something wrong with the idea that 495 Volts is explained by 33k Ohms times 15 milliamperes. In fact, these numbers tell us nothing about voltage except that a specific ratio or proportion exists between both sides of the equation. If one were to object to the analogy based on the idea that ohms and amperes do not *compose* volts, then simply replace the analogy with something like:

$$2 \text{ cups of water} + 2 \text{ tps. tea powder} = 2 \text{ cups iced tea}$$

In this example it is apparent that iced tea is not *explained* by its components; rather, it is the fact that *the tea is mixed in such a way as to satisfy some idea of what tea is*. The task for the reductionist becomes increased since tea can be explained by both flavor and smell independently (i.e. it is tea because it tastes like my idea of what tea tastes like; or, it is tea because the aroma confirms my idea of aromatic tea). With a reductionist view, it is not apparent on the level of composition (water and tea powder) *why* tea is obtained. There seems to be no *reason* for tea given its composition alone. Therefore, reductionism fails to deliver any real explanation and does not take into account philosophical idealism.⁽²¹⁾

Although many philosophers and neurologists have adapted the reductionist model with sophisticated arguments, such presentations will only belabor our topic.

III. ARGUMENTS AGAINST A REDUCTIONIST EXPLANATION IN FAVOR OF SUBSTANCE DUALISM

It is true that most philosophers and thinkers have accepted an explanatory view that is not reminiscent of reductionism. In fact, many have chosen the Cartesian or more mainstream substance dualist positions (this has certainly been pervasive in the Middle Ages). In keeping with the spirit of such a historical rival, the first argument will be presented from a dualist perspective, although dualism is not the necessary option for the reductionist as mentioned above. In the second argument there will be a dualist-independent presentation.

1. *Mental properties and physical properties appear to be distinct.* Philosopher of science and theology, J. P. Moreland, used perhaps one of the oldest forms of distinction in order to substantiate the idea that mind and body were different. In his presentation, he relies heavily on the Leibnizian account of identity:

$(x) (y) [(x = y) \rightarrow (P) (Px \leftrightarrow Py)]$ ⁽²²⁾

The formula expresses an equation suggesting that any difference in property automatically negates the identity in question. If I know that Shandon Guthrie exists and that the author of this paper exists, then anything that is true of Shandon *must* be true of this paper's author if the "two" persons are identical. Something true of one and not the other logically dismisses identity between them (i.e. if Shandon is not married and the author of this paper is, then the two persons are not identical). Moreland's case rests on this principle and suggests the following:

The difficulty for physicalism is that mental events do not seem to have properties that hold for physical events. The difficulty for physicalism is that mental states do not seem to have properties that hold for physical events. My thought of Kansas City is not ten centimeters long, it does not weigh anything, it is not located anywhere (it is not two inches from my left ear). Nor is it identical to any behavior or tendency to behave in a certain way (shouting "Kansas City" when I hear the name *George Brett*). But the brain event associated with this thought may be located inside my head, it may have a certain chemical composition and electrical current, and so forth.⁽²³⁾

It would seem that there is something true of mental states that is not true of brain states thereby concluding false identity. But such a theory has not convinced reductionists. Paul Churchland has objected to the premise that brain states cannot have semantic properties. For Churchland, if it can be proved that brains states can have the same *function* or *role* as mental states, then it is irrelevant for the "two" to be identical in a complex system.⁽²⁴⁾ He claims that just like two different sentences play an identical role in a cognitive economy (i.e. "le pomme est rouge" = "the apple is red"), likewise mental states possess equal role-playing capacities, the same as brain states. Simply, the terms "mental" and "brain" are just different terms for different roles. Yet they can possess the *same* role for certain semantical items.⁽²⁵⁾ I think there are a couple of things that can be stated in response.

First, even if one were to grant Churchland's position on *role-playing*, it does not necessarily solve the problem. Consider a counterexample to Churchland's view:

- (1) I enjoy playing football.
- (2) I enjoy playing baseball.

In this example, it is clear that both sentences possess the same role (e.g. both employ enjoyment in the presence of a sport). But, both sentences are not relating or even discussing the same thing (i.e. what I enjoy playing is different between 1 and 2). In the case of mental and brain states, consider:

- (x) I have an image of a ball.
- (y) I have neurons firing in my brain.

It appears that the two sentences are irreconcilable *even on a role-playing basis*. That is, (x) and (y) are neither identical nor functionally equivalent. There is simply not enough evidence supplied by Churchland, or other reductionists for that matter, to link the two together (with the exception of causality which I showed earlier that such a connection bespeaks ontological separation).

Secondly, it seems that Churchland's example disproves the very thesis he submits. If I suggest that "le pomme est rouge" and "the apple is red" are not identical because the property of role-playing in the French phrase is not identical to the role-playing property in the English phrase, then there seems to be no real problem to begin with. When we deal with identity of language, it would seem absurd to suggest that these two sentences are equal. After all, the French sentence contains letters not found in the English one. If one were to object by saying, "Well, the subject of identity is not *language* but, rather, *function*," then this is simply skeptical hypocrisy. The objector is merely selecting those portions of the two sentences that are identical, namely the function. But, function is something *about* the object or sentence, not the object or sentence itself.

2. *Reduction does not explain variable realization.* Justin Broackes, in his essay "The Autonomy of Colour," shows how explanation exists on a higher level. He states:

Why . . . deny that colours explain what they seem to? Of course they are not fundamental physical properties, like mass and charge. But we should not need reminding that good explanation is not always explanation in terms of basic physics.⁽²⁶⁾

As he continues, he quotes Hilary Putnam who says that we can explain why a square peg will not fit into a round hole by using terms such as "rigid" and comparative phrases such as "the round hole is smaller than the peg." This, according to Broackes, cannot be explained in the substratum of the physical world, rather such explanations are found only on a higher-level theory thus making it *autonomous*.⁽²⁷⁾

With this in mind, Broackes suggests that colors possess the same employment of explanation *regardless of the fact that there are microstructures for them*. In this sense it may be adequate to suggest that Broackes makes explanation on a higher level sufficient (i.e. "He stopped at the traffic lights because they were red").⁽²⁸⁾ That is, explanations for color-producing behavior is not necessarily found in reduced theories. At this point I must concede that Broackes' view is interesting in its own right but weaker than Putnam's view. In either case, while Broackes provides evidence for explanation on a potentially reducible theory, Putnam uses the example of a square peg and a round hole to illustrate the ultimate shortcoming of higher-level theory reduction.

One possible objection may arise in this instance. It may be that it is precisely the reduced theories that work together to bring about a variably realized situation. Therefore, reduction obtains when one considers *why* rigidity and roundness are present. How is this done? Consider:

%---%-----%
%---%
%%-%-----%
%---%-----%
%---%-----%

The presence of "Hi" exists on a higher level but not on a lower level. It may be that the presence of "Hi" can be reduced to each "%" and still maintain an explanation. That is, "Hi" would not exist had it not been for the proportion and presence of multiple %'s.

My response to this is simple. The concept of explanation is not being utilized in this example which is also the case with reductionism in general. It is true that an assimilation of %'s occurs as to produce a recognition of the whole entity ("Hi"). But the question still remains: Does the assimilation of %'s provide a *reason* for *why* we recognize "Hi"? A random assortment of %'s does not yield something recognizable unless there is another source for this information. Again, it seems as though there is a retreat back to some form of idealism. Idealism is mind-dependent and requires an active intellect possessing the ability to "have" any thoughts whatsoever. The presence of "Hi" makes much more sense if we encapsulate the holistic image simultaneously on our consciences. This, I think, provides good evidence to suggest that reductionism as a theory of explanation is false and that some form of dualism is preferable in regard to the intellect.

IV. CONCLUSION

We have looked at the theory of reductionism and examined arguments on both sides. While some assert that reductionism fulfills the task of explanation, others have maintained that it fails. I conclude with J.P. Moreland and Justin Broackes that reductionism does not explain higher-level theories and entities. I also conclude that substance dualism or "the soul" provides a more accurate description of mind-dependent observations. It is my contention that the soul exists and continues to be the better explanation in the mind/body problem.

END NOTES

1. *Soul* is usually characterized by Christian parameters. For our purposes here, I will presuppose the nature of *soul* as an immaterial, cognizant essence categorized as being from the order of "mind." While a weak dualism will be defended, a Christian dualism will not necessarily be the result of this paper's cumulative arguments.

2. *Scientific realism*, or *rational realism* as it is sometimes called, is the view that verified scientific theories correspond to the real world (some adherents are Karl Popper, Richard Boyd, W. H. Newton-Smith, Rom Harre, Ernan McMullin, and Hartry Field). This is a rough and ready definition and there are many different versions of it. However, it would be beyond the scope of this paper to concern ourselves with each version. Reductionism as a theory usually cooperates with realist versions of scientific methodology and presents us with an important picture of the world if it is proved to be true.

3. The reasoning here is due to the nature of some anti-reductionist arguments that presuppose some other position thereby suggesting a dualist thesis (more on this later). For example, discarding reductionist theory due to the existence of near-death experiences (NDE's) assumes substance dualism, a position that would beg the question if a positive case were not presented.

4. Paul Churchland, *A Neurocomputational Perspective*, p. 47.

5. Churchland presents the example that temperature is really a mathematical proportion of different theories: $\text{Temperature} = mv^2/3k$ (see *Ibid.*).

6. Ibid. p. 48.

7. Charles and Lennon, eds., *Reduction, Explanation, and Realism*, p. 2.

8. Churchland, *A Neurocomputational Perspective*, p. 49.

9. Ibid., p. 51.

10. For an evaluation of folk psychology, see Scott M. Christensen and Dale R. Turner, eds., *Folk Psychology and the Philosophy of Mind* (California: University of California, 1993).

11. Paul Churchland, *Matter and Consciousness*, preface to revised edition.

12. Churchland has a more modest thesis than what I have stated. He states that dualism *is* a theoretical possibility regardless of the implications of reductionism. He simply prefers a non-Cartesian model (see Churchland, *A Neurocomputational Perspective*, p. 72). Likewise, reductionism is not logically contradictory to dualism. Indeed, two cooperating worlds (one seen and the other not) can operate in union, each being subject to their respective conditions.

13. Ibid., pp. 18-19.

14. Without creating a false dilemma, it is possible to be an anti-reductionist *and* an anti-dualist (see Lennon, "Reduction, Causality, and Normativity," Charles and Lennon, eds., *Reduction, Explanation, and Realism*, p. 226). For example, one may be an *eliminative materialist*.

15. Emergent properties are said to be a characteristic of some whole not present in any of its parts. Such properties require both the whole object itself and the person viewing it. See David Hull, *Philosophy of Biological Science*, pp. 125-41.

16. Churchland, *A Neurocomputational Perspective*, p. 53.

17. Cf. David Hull, *Philosophy of Biological Science*, pp. 125-41.

18. *Substratum* is Garfinkel's term for the phenomenon that exists in composing lower-level theories (see Garfinkel, *Forms of Explanation*, pp. 14-16).

19. Garfinkel, *Forms of Explanation*, p. 60.

20. Churchland suggests that *explanation* does not deal with sentences and their relations, rather it deals with "activation patterns" across a concentration of neurons (see Churchland, *A Neurocomputational Perspective*, pp. 197-230). But, do our "activation patterns" dictate such a view? Is Churchland's synthesis of "explanatory understanding" and "perceptual recognition" really the road of explanation? It seems that Churchland relies heavily on memory as the model of recognizing when and how something is explained. But, in order to suppose such a view, the memory mechanism *itself* must be reduced in an orderly fashion. That is, certain elements of recall demand associations of thoughts with reality not present at the neurological level (i.e. "I think of sleeping when I submit to a sociology lecture" \neq a collection of perceived data). Something else seems to be taking place between the intentional and the physical (for a more detailed response, see Lennon, "Reduction, Causality, and Normativity," Lennon and Charles, *Reduction, Explanation, and Realism*, pp. 225-38).

21. *Idealism* is the epistemological viewpoint that objects of perception are defined by the assumptions people have about them. This is the extent to which I am using *idealism*.

22. J.P. Moreland, *Scaling the Secular City*, p. 83. Also see Churchland, *Matter and Consciousness*, pp. 29-35.

23. J.P. Moreland, *Scaling the Secular City*, p. 84.

24. Again, as with reductionism in general against dualism, Churchland gives only a modest thesis that mental and brain states *may* logically be identical. Such a view does not inform us whether or not it is *preferably* identical.

25. See Churchland, *Matter and Consciousness*, pp. 29-31.

26. Broackes, *Reduction, Explanation, and Realism*, Lennon and Charles, eds., pp. 422-3.

27. *Ibid.*, p. 423. H. Putnam quoted from "Philosophy and our Mental Life," in Putnam, *Philosophical Papers*, ii: *Mind, Language and Reality* (Cambridge: Cambridge University Press, 1975), p. 296.

28. Broackes, *Reduction, Explanation, and Realism*, Lennon and Charles, eds., pp. 422.

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