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Commentary on Gold and Stoljar, "[A neuron doctrine in philosophy of neuroscience](#)".

## Two Radical Neuron Doctrines

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**Abstract:** Two radical neuron doctrines must be distinguished--strong and weak. G&S direct much of their attack at the former--but the Churchlands only hold the latter. The weak radical neuron doctrine remains a serious possibility.

G&S describe the radical neuron doctrine in a number of slightly different ways, and we think this hides an important distinction. On the one hand, the radical neuron doctrine is supposed to have the consequence "that a successful theory of the mind will make no reference to anything like the concepts of linguistics or the psychological sciences as we currently understand them", and so Chomskyan linguistics "is doomed from the beginning" (**sect. 2.2.2, paras. 2,3**).<sup>[1]</sup> (Note that `a successful theory' must be read as `any successful theory', else the inference will fail.) On the other hand, the radical neuron doctrine is said to be the claim "that emergent psychological properties can be explained by low-level neurobiological properties" (**sect. 2.3, para. 3**). It is clear from the context that this can be more faithfully rendered as: psychological phenomena can be explained in (solely) neurobiological terms. But this formulation of the doctrine does not have the consequence just mentioned. To adapt an example from the Churchlands (1994), that chemical phenomena can be ("in principle") explained in quantum mechanical terms does not

imply that *all* successful theories of chemistry will employ (solely) quantum mechanical concepts and not (classical) chemical concepts. It *does* imply that there is *some* successful theory of chemistry that does not employ chemical concepts, namely quantum mechanics. But it is perfectly consistent with this that classical chemistry is successful--which, of course, it is! Admittedly, if quantum mechanics does explain chemical phenomena, there is a temptation to say that classical chemistry has a "second-rate, or place-holder, status" (**sect. 1, para. 4**). However, this is a somewhat tendentious description, because a quantum mechanical explanation of chemical phenomena need not detract from the explanatory power of classical chemistry.

So two radical neuron doctrines need to be distinguished. The *weak* version says that the mind--psychological phenomena--can be (wholly) explained by neurobiology. The *strong* version is the conjunction of the weak version and the claim that *only* neurobiology can explain the mind. The strong version has the "radical consequences" discussed by G&S; the weak version does not. It seems to us that in the target article G&S's radical neuron doctrine is preponderantly intended to be the strong version.<sup>[2]</sup> However, we think that the Churchlands, and probably some other neuroscientists quoted by G&S, support only the *weak* version.

Now if neurobiology (wholly) explains the mind, then it would seem to follow that any other theory that explains the mind either is *explained by* neurobiology, or else *explains* neurobiology. Therefore although the weak version of the radical neuron doctrine does not have "radical" consequences, it does have a pretty strong one: any true theory of the mind is either explained by or explains neurobiology. And since the psychological sciences certainly don't explain neurobiology, it follows from the weak version that any true psychological theory is explained by neurobiology (or, following the Churchlands' (1994) and G&S's (**sect. 4.2, para. 1**) use of 'reduction', any true psychological theory *reduces* to neurobiology). So, if linguistics cannot be explained by neurobiology (i.e. if linguistics does not reduce to neurobiology), and if the weak radical neuron doctrine is true, then linguistics is false.

With this distinction between the two versions of the radical neuron doctrine in place, consider the reductive formulation of the argument from unification (**sect. 4.2**). As G&S present it, because of the tendency of science toward unification, psychology must reduce to neurobiology, and so *any* successful theory of the mind must be solely neurobiological. G&S reply that by the same logic psychology must reduce to physics and thus *any* successful theory of the mind must be solely a theory in physics. Fair enough--but G&S are taking the conclusion of the argument to be the *strong* version of the radical neuron doctrine.

In fact, as presented by the Churchlands, the conclusion of the argument from unification is only the *weak* version: *some* successful theory of the mind must be solely neurobiological. And therefore if psychology reduces to physics *some* successful theory of the mind must be solely a theory in physics--and so here G&S's reply is of no force. The Churchlands do not think that a (smoothly) reduced theory is thereby rendered explanatorily defective, and so a reduction of neurobiology to physics (or a reduction of the psychological sciences to neurobiology) would not threaten the power of neurobiology (or the psychological sciences) to explain the mind. For example, Patricia Churchland emphasizes that she "does not mean that there is something disreputable, unscientific or otherwise unsavory about high level descriptions or capacities per se" (1997, p. 128).

So the argument from unification in its reductionist formulation, taken as an argument for the weak radical neuron doctrine, is not as easily rebutted as G&S claim. We are not persuaded by it, largely because we think the notion of reduction (or explanation) is badly in need of clarification. But neither have G&S persuaded us that the weak doctrine is false.

Finally, we would like to endorse G&S's appeal for more philosophy of neuroscience--an admirable example of which is the target article.

## Notes

## References

Churchland, P.M., and P.S. Churchland. 1994. Intertheoretic reduction: A neuroscientist's field guide. In *The Mind-Body Problem*, edited by R. Warner and T. Szubka.

Churchland, P.S. 1997. Can neurobiology teach us anything about consciousness? In *The Nature of Consciousness*, edited by N. Block, O. Flanagan, and G. Güzeldere.

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[1] What do G&S mean by `successful'? Do they mean *true*, or rather something like *very useful*, *widely accepted*, etc? We are unsure: for example, G&S's first paragraph suggests the latter interpretation, but **sect. 1.2** suggests the former. In this comment we have adopted the former interpretation, but our point can be made either way.

[2] It is clear from the relation between the trivial and radical doctrines that the second sentence of **sect. 2.2.1**, which concerns the trivial doctrine, can be transformed into the following claim about the radical doctrine: "According to the [radical] doctrine, to the extent that psychological phenomena will be explained at all, the science that will do so is [biological] neuroscience". This is the strong version: *only* neurobiology can explain the mind.