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# Response to my commentator

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# Response to my Commentator

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Brian MacPherson's summary and framing of my position give me an opportunity to clarify it.

First, I do not accept a division of arguments into deductive and non-deductive arguments. Rather, inferences in arguments of all stripes are to be appraised by whether their conclusion follows from the given reasons, either necessarily or with some sort of modal qualifier like 'probably' or 'presumably' or 'possibly'.

Second, I would not identify the material consequence relation as I define it with one in which the *implicatum* follows *deductively* from the *implicanta*. Material consequence as I define it is broader than deductive consequence as ordinarily understood: a conclusion follows deductively if and only if it follows in virtue of the meaning of the premises, but it can follow materially in virtue of laws of nature or contingent facts about the world.

Third, my account of material consequence is an existential generalization: there must be *at least one* covering generalization of the argument with neither actual nor hypothetical counter-examples. In general, there is more than one covering generalization of any argument, typically many more than one—depending on which components of the associated conditional one generalizes over and on the range of each variable. So it is not a question of whether *the* covering generalization of an argument lacks counter-examples but of whether *a* covering generalization of the argument lacks them.

Fourth, I do not conceive of instances of a generalization as *substitution* instances. Substitutional conceptions of consequence involve substituting a grammatically parallel content expression for a given content expression. My conception of consequence uses schemata. I have not clarified how instances of schemata are to be constructed, but I would not like to restrict them to the resources of a given language. If there are actual or hypothetical states of affairs that would make the existential quantification of the antecedent of a covering generalization true, then there is an instance of the covering generalization to be considered. If the language lacks the resources to express this instance, then the language should be enriched so that it has the needed expressive resources.

With those clarifications, I am happy to agree with MacPherson that there are many good arguments where the conclusion is not a consequence of the premises, either formally or materially. However, I believe that my account of material consequence can be extended to cover such arguments, by allowing inference-

licensing covering generalizations to hold for the most part or *ceteris paribus* or even sometimes. For example, the conclusion of a good argument to the best explanation is made plausible by its premises in virtue of the generalization that explanations of data that meet the criteria for argument to the best explanation are generally correct.

MacPherson raises a number of difficulties with applying structural equations modelling (SEM) semantics to determine whether a counter-factual singular conditional is true. With respect to the hypothetical situation where Vladimir Putin lives in the White House, he notes that there are other causal pathways than the one on which I focus, including the pathway in which Putin takes over the United States after a major war. This point seems perfectly correct. Perhaps it is problematic in both possible-worlds semantics and SEM semantics to determine whether Putin would live in Washington if he lived in the White House. And perhaps the reason for the determination being so problematic lies in the unclarity of the question. Intuitively, I for one am baffled about what to say if I were asked: If Vladimir Putin lived in the White House, would he live in Washington, D.C.? I would want more clarification: How are you supposing that the current President of Russia would have come to live in the official residence of the President of the United States? It seems that one can only give a determinate answer to the question with any confidence if one knows the causal mechanisms by which Putin is supposed to have come to live in the White House. If so, that is a vindication of SEM semantics, since it is just the sort of information that SEM semantics needs for the evaluation of counter-factual singular conditionals.

MacPherson raises as a difficulty for SEM semantics that it does not straightforwardly apply to counter-factual conditionals in mathematics. Perhaps, however, one can extend causal modelling to the modelling of non-causal determination relations. I used the example of the counter-factual situation in which a figure was a circle with non-zero radius and simultaneously a square with sides of non-zero length. The situation is mathematically impossible, but intuitively one can see that, if there were such a figure, it would necessarily have a non-zero area, but would not necessarily have an area greater than nine square centimetres. Within an extended SEM semantics, one might model the relation between the radius of a circle and its area, as well as the relation between the length of the sides of a square and its area, in terms of determination relations, which in each case would go in each direction. So the graph would be cyclic (i.e. non-recursive).