The Hidden Premise in the Causal Argument for Physicalism

Robert C. Bishop
Faculty of Philosophy
University of Oxford

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1. The causal argument in favor of physicalism roughly states that all physical effects are due to physical causes, hence anything having physical effects must itself be physical (cf. Papineau 2002). A crucial premise in this argument is known variously as the 'completeness of physics' or the 'causal closure of physics' (CoP), which maintains, roughly, that all physical effects are fully determined by fundamental laws and prior physical events. There are a number of ways to state CoP more precisely, but the following will suffice:

> For any distinct times t_1 and t_2, the physical event $e(t_1)$ together with the fundamental physical laws causes the (chances of) physical event $e(t_2)$.

Some defenders of CoP understand it as an unqualified statement to the effect that there is no room for anything other than physical events and laws to determine the evolution of physical events–that is, physical events are hermetically sealed off from any possible nonphysical influences. This is a very strong construal of CoP and is largely indistinguishable from physicalism, so cannot serve as an independent premise in the causal argument. Many defenders of CoP, however, take a weaker understanding of CoP, namely that physical effects have physical causes and that any other kinds of causes are ineffective in bringing about or influencing physical effects. This latter interpretation is how I will understand CoP in the causal argument.

Furthermore, there has been much debate about how broadly or narrowly 'physics' and 'physical' are to be construed in CoP (e.g., Crane 1991; Jackson 1998; Spurrett and Papineau 1999). I want to argue that independent of how these terms are to be understood, the weaker construal of CoP is flawed and, hence, that there is a hidden premise that must be added to CoP in order for the causal argument to be sound. This hidden premise, however, is indistinguishable from the conclusion of the causal argument, so the argument begs the question regarding physicalism.

2. Stated more precisely, the causal argument for physicalism has the following form (e.g., Papineau 2002, pp. 17-18):

(1) Conscious mental occurrences have physical effects.
(2) All physical effects are fully caused by purely *physical* histories.
(3) The physical effects of conscious causes aren't always overdetermined by distinct causes.

Some form of physicalism then seems to follow (though see Montero 2003 for a number of subtle and not so subtle difficulties). Premise (2) is the crucial CoP and *seems* to be doing important work in the argument.

Physics itself does not imply its own causal closure nor is there any proof within physics of its own completeness, so CoP must be a metaphysical principle. Many philosophers assume the truth of CoP.[1] However, there is a further problem with understanding CoP and its supposed role in the causal argument. In the statement of CoP given above, there is no mention of any other kinds of events than physical ones. There are two ways to read this metaphysical principle: Namely (a) that physical events determine physical events simpliciter, i.e. no matter what other *nonphysical* events[2] might be present or (b) that in the absence of nonphysical influences, physical events will proceed typically; that is, in the absence of nonphysical interventions, the physical event $e(t_1)$ and fundamental physical laws will produce the physical state $e(t_2)$ in the usual fashion (provided that the system in question is appropriately isolated during its evolution from t_1 to t_2).

Does the evidence from physics support one reading of CoP over the other? Everywhere we look in physics (and other physical sciences), laws, symmetries and properties are always qualified (some examples are given later) or heavily idealized (Teller 2004). Also the whole range of our experimental methodologies are built on the idea of isolation–removing or controlling intervening factors. Given these features of physics, the evidence supports (b)–there is no reason to expect CoP to be different and have anything other than a qualified character. The real question is whether these qualifications are always physical in nature, but as a qualified principle, CoP itself does not rule out the possibilities for nonphysical interventions; it only says what happens in their absence (or when they make negligible contributions).

Consider an analogy. Newton's first law of motion states that every body continues in a state of rest or of uniform motion unless acted upon by an external force. It is a typicality condition for the motion of so-called free bodies (i.e., bodies free of any external forces).[3] To require it to say more–e.g., that there are only particular kinds of forces–would be to make the first law of motion include the content of the second and/or third laws of motion.[4] However, if an external force is present, then the game is off. The motion of an unfree body no longer fulfills the condition of the first law.

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[1]Papineau (2002, appendix) offers substantial arguments as to why some form of CoP has become the 'default position' among so many philosophers (though this is not the same as proving that CoP is true).

[2]'Nonphysical' simply means *not physical* whatever 'physical' turns out to mean.

[3]More precisely, it is a claim that particular kinds of force-free reference frames exist, namely inertial frames.

[4]Technically, the second and third laws place fairly mild constraints on the kinds of forces admissible in Newtonian mechanics. Usually other conditions are added (e.g., that forces must be derivable from central potentials).

Similarly[5], CoP amounts to a typicality condition, guaranteeing that in the absence of nonphysical influences, prior physical events and the physical laws bring about subsequent physical events. To require it to say more, that is, that only physical events are involved in physical effects, would be to make CoP include the content of physicalism. Therefore, a *hidden premise*–that the only efficacious states and causes are physical ones–still has to be added to CoP in order for physicalism to follow in the causal argument.[6] Since CoP is only a typicality condition, the only way to ensure that all physical events are only "fully caused by purely *physical* histories" is by adding the hidden premise.

The work of this hidden premise is tacitly recognized in that so many philosophers give CoP a causal sufficiency construal (e.g., Montero 2003, p. 174). Unfortunately, this construal does not help matters as it only transforms the typicality condition: In the absence of nonphysical influences, the physical event e(t_1) and fundamental physical laws are sufficient to produce the physical event *e*(t_2) in the usual fashion. Indeed, CoP cannot be more than a typicality condition because it would then be too strong and beg the question regarding physicalism. So even under a causal sufficiency construal, CoP does not imply that nonphysical causes somehow are incapable of manipulating or otherwise modifying typicality of physical events. The hidden premise is still needed. Hence, in order for the causal argument to be sound, the hidden premise must be made explicit. However, since the hidden premise is essentially indistinguishable from the conclusion of the causal argument, this would mean that the argument assumes what it seeks to prove.

3. A defender of the causal argument would respond that the argument can do without the hidden premise because (3) can come to the rescue by guaranteeing that physical effects are not systematically overdetermined by two sets of distinct but sufficient causes (physical and nonphysical sufficient causes, say). The no overdetermination prohibition of (3) does not follow from CoP, but is questionable without the hidden premise.

Consider Newton's second law, F=ma, and assume that F is Newton's gravitational force. According to the causal sufficiency reading of CoP, F provides a sufficient cause of an apple's falling from a tree (provided the stem has broken). But if I stick my hand out and catch the apple, I intervene in this causal sufficiency: Newton's second law and the gravitational force together no longer provide causal sufficiency necessitating the apple's fall to the ground. More fancifully, if the apple were charged and I applied an appropriate electromagnetic field, the apple could be kept levitated, again intervening in the supposed causal sufficiency of Newton's gravitational force. No laws of nature have been violated, but neither have I created a situation where the charged apple's behavior is overdetermined–I have simply balanced the force of gravity by an electromagnetic force.

What these simple examples demonstrate is that F=ma with only Newton's gravitational force

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[5]There is an interesting dissimilarity here. For the first law, mention of physical quantities play no role whatsoever in its formulation. In contrast, for CoP, physical quantities are crucially part of its formulation.

[6]This premise could be strengthened to say that there are only physical events, but this would be too strong and obviously beg the question of physicalism.

has a *ceteris paribus* character; that is, typicality holds only under particular conditions (e.g., the absence of charged apples and electromagnetic fields). The obvious response is that one has to put all the allowed forces into F=ma, for example, including the electromagnetic force in the case of the charged apple. Such a modified F′ would again be causally sufficient, necessitating the behavior of the charged apple. The point is that within Newton's framework, we can never demonstrate the needed sufficiency claim in the absence of accounting for all physical forces and each force carries a *ceteris paribus* clause with it, so to speak. In the absence of unaccounted for interventions, the behavior of an object is approximately described by the force law.

Even this total accounting of all physical forces is not enough, however. Suppose we now entertain the possibility of nonphysical causes, the kinds of things that generate the overdetermination worries motivating (3). *Prima facie*, when I raise my arm to vote in a meeting, there is a nonphysical cause that is sufficient to determine the motion of my arm (e.g., an intention or desire to vote for my favored option in a voting context). On the physicalist's typical line of argument, this presents a paradigm case of causal overdetermination because there would then be a physically sufficient cause (presumably spelled out in terms of physiology and neurobiology) *and* a mentally sufficient cause for raising my arm. However, just as in the case of the charged apple and the electromagnetic field, CoP is only a typicality condition. Only in the absence of any intervening nonphysical influences, prior physical events and physical laws are sufficient to determine subsequent physical events.

What happened to the supposed overdetermination? In the case of my raising my arm to vote, my intentions modify or coopt this typicality. There is no evidence here for the genuine overdetermination that so many philosophers fear and loath. The evidence from voting behavior, for example, *prima facie* supports the view that in such contexts, mental causes modify or coopt physical causes. On the other hand, after administering particular kinds of drugs, one can induce purely autonomic raising of arms, evidence that *prima facie* supports the view that in such contexts, physical causes are sufficient to produce arm raisings. In other words, the question of overdetermination is a contextual affair, but it does not look like ordinary events in everyday life present any genuine cases of systematic overdetermination. And given that CoP without the hidden premise is, at best, a typicality condition, we should not really expect any genuine overdetermination to arise.

4. The reason why there is no systematic overdetermination worry is the *ceteris paribus* character of the laws in question. The relevant sense in which the laws are qualified is the following. When physicists formulate fundamental laws and forces, they do so in as context-free a way as possible–for example, in the absence of intervening factors, the electroweak force comes to expression as such and such. But we have no purely context-free laws, and this is part of the reason why laws that are formulated to hold in highly abstracted, idealized laboratory contexts often do not fare well in the messier contexts of the outside world.

The "context-free" content of Newton's second law is, roughly, that for any system there is a characterization of the forces acting on the constituents of the system and that the resulting equations have (perhaps only approximate) solutions describing inexactly and in an idealized way the dynamics of the system. Newton's second law (even together with the first and third laws) does not say very much about the actual forces that occur in nature (nor does it rule out the possibility of nonphysical forces).

So in our example of the falling apple, in a context free of electromagnetic effects, the gravitational force is causally sufficient to determine the behavior of the apple as it falls (assuming friction and effects from wind are negligible, another contextual set of factors!). As long as gravitational waves, inertial frame dragging (Lense-Thirring effect) and other effects predicted by general relativity are absent or negligible, the apple's fall will be approximately described by Newton's law of gravity. In terms of what is typically taken as more fundamental physics, in the absence of irregularly curved spacetime, quarks and gluons of quantum chromodynamics appear as excitations in a (highly idealized) quantum field. Isolated neutrons are unstable with a half-life of eleven minutes, but bound in a nucleus they are stable with a half-life on the order of millions of years. As another example, although in isolation, forces and laws of quantum mechanics alone are typically sufficient to determine the behavior of atoms, biological constraints like chirality associated with DNA along with natural selection largely determine the development of DNA codings (sequences of base pairs) and, hence, the arrangements of the molecules composing such structures. Or consider genes, which express themselves differently in isolation than in the presence of other genes in a biological system and different environments (indeed, the causal effects of genes are entirely context-dependent). Finally, in the absence of intentions and desires, the autonomic nervous system is sufficient to determine the behavior of arms and legs.

The upshot of these examples is that all of the forces and laws we take to be important in our sciences always carry tacit clauses of the form "If nothing outside affects the object, then..." where "outside" can be understood as outside the relevant body of theory (other senses of "outside" more relevant to our concerns here would turn on the construals of "physical" and "nonphysical"). In other words, context matters at least as much as laws.

Notice that in these examples there are no violations of fundamental laws, but, rather, a modification or coopting of such laws. In the case of falling charged apples, when the electromagnetic field is turned on, Newton's gravitational force responds immediately so that the combination of forces is now sufficient to determine the behavior of the apple. Similarly when I form my intention to vote, the autonomic nervous system and whatever principles typically govern it respond immediately so that the latter plus my intention are jointly sufficient in the new context to determine the behavior of my arm. Hence, when contexts are taken into account with respect to the sufficiency of laws and forces expressed in relatively context-free formulations, we see that there are no threats of systematic overdetermination.

5. Can the hidden premise be defended, perhaps along the lines that the evidence supports it? In laboratory physics experiments, the evidence *prima facie* suggests that the world behaves approximately as if the hidden premise is true. In contrast, the evidence of psychology *prima facie* suggests that the world does not behave as if the hidden premise is true. So such a defense looks difficult at best and question-begging at worst. One might argue that the inductive strength of support for the hidden premise derived from detailed investigation in physics, chemistry, biology and physiology is very strong. Unfortunately, it can have no strength against possible 'nonphysical' influences without invoking the hidden premise itself. All the detailed investigations trotted out from these fields involve serious idealizations, much isolation and models that are heavily qualified in order to obtain their results.

Among these idealizations and qualifications is that no nonphysical influences are present.[7]

My argument is largely independent of how widely or narrowly 'physics' is construed in understanding the scope of CoP. However, it is worth pointing out some implications of various readings of 'physics'. If by 'physics' we mean something like the current subject matter of the discipline of physics, then 'nonphysical' could refer to broader material events and factors such as those found in biology or physiology. If by 'physics' we mean anything that is capable of quantitative characterization, then 'nonphysical' could refer to any events or factors that are fundamentally qualitative. If by 'physics' we mean everything that is non-mental, then 'nonphysical' refers to all influences and factors falling in the domain of the mental. If by 'physics' we mean everything that is natural–a category presumably including both the mental and non-mental–then perhaps 'nonphysical' could mean anything supernatural (e.g., God).

6. Proponents of the causal argument see CoP as a crucial premise ensuring that all physical effects are produced by physical causes, but CoP, as a typicality condition, is insufficient for this conclusion, even in conjunction with the no overdetermination premise. They could get the conclusion they with the help of a hidden premise–that the only efficacious states and causes are physical. But this premise is indistinguishable from the conclusion of the causal argument, so the argument would assume what it purports to prove.

The defender of the causal argument might object that the above argumentation appears to rely heavily on *prima facie* evidence (e.g., psychology evidence as not supporting the hidden premise), or on analogies (e.g., intentions in voting behavior not presenting cases of systematic overdetermination like electromagnetic fields and charges do not present cases of systematic overdetermination in Newtonian mechanics). It could very well turn out to be the case that we discover good physical evidence for the hidden premise being broadly applicable or that voting behavior is fundamentally determined by physical forces and laws.

If this response is meant as a reminder that there are many open questions remaining to be adequately addressed as well as much uncertainty on these matters, then well and good. Both advocates as well as opponents of the causal argument would do well to remember this point because future evidence could bear either for or against the argument.

On the other hand, if this response is meant to imply an attitude or intuition that all there really is at the end of the day is just 'physics' (whether narrowly or broadly conceived) and is meant to cast the burden of proof on the shoulders of opponents of the causal argument, then opponents have every right to be nonplused. Either the response is question-begging by presupposing context-free laws or a future completed physics that unequivocally rules out any nonphysical factors, or it places a demand on opponents that proponents have failed to meet–namely, a clear-cut, unequivocal demonstration of the

[7]The same considerations hold for inductive arguments supporting construal (a) of CoP mentioned earlier, that physical events determine physical events simpliciter.

truth or falsity of the hidden premise for some specification of 'physics.'[8]

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