Title: Ontological Indeterminism undermines Kim's Exclusion Argument

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http://philosophycommons.typepad.com/flickers_of_freedom/2013/10/tse-and-levy-on-criterial-causation-and-the-exclusion-argument.html#sthash.w7cA9pPy.dpuf

Kim (1993) applies his 'exclusion argument' to logically rule out that mental information can be causal. (Note that this argument could also be used to argue that genetic information is epiphenomenal, though no one argues that, probably because we understand the genetic code). The argument rests on a premise of the causal closure of the physical. "Causal closure" means that causality at the level of particles is *sufficient* to account for all outcomes and interactions at the level of particles. Kim (2005, p. 17), applying Occam's razor, advocates the "exclusion of over-determination" when modeling physical causation. In his words: "If event *e* has a sufficient cause *c* at *t*, no event at *t* distinct from *c* can be a cause of *e*." Note that without the sufficiency of *c*, Kim cannot apply the "exclusion of over-determination" principle, so cannot rule out mental causation. The sufficiency of *c* is crucial if the exclusion argument is to succeed at excluding mental causation. If particle-level causality is sufficient to account for particle behavior, and neurons are made of particles, mental events, assuming that they supervene on neuronal events, can play no causal role in neuronal behavior. In other words, mental events cannot cause fundamental particles to behave differently than they otherwise would have if they had only interacted according to the laws obeyed by particles.

Put succinctly (Kim, 1993, pp. 206–210): If (i) the "realization thesis" is the case, then each mental state is synchronically determined by underlying microphysical states, and if (ii) "the causal or dynamical closure of the physical thesis" is the case, then all microphysical states are completely diachronically necessitated by antecedent microphysical states, then it follows that (iii) there is no causal work left for mental states as such to do. If the logic here is valid, then only if either (i) or (ii) is incorrect, is there potentially room to develop a theory of mental causation. So any theory of mental causation that attempts to meet "Kim's challenge" must explicitly state which premise, (i) and/or (ii), is incorrect.

If quantum domain indeterminism is correct then (ii) is incorrect, because any particular present microphysical state is not necessitated by its antecedent microphysical state or states. In other words the traditional definition of causal closure that "every physical event has an immediately antecedent sufficient physical cause" is not satisfied, because when a cause *c* can be indeterministically followed by any number of possible effects e_i, then *c* is not a sufficient cause of any of the possible e_i, because they might not happen if they have not yet happened, and they might not have happened even after they have happened. Papineau (2008) tries to handle the problem of causal non-sufficiency of *c* introduced by indeterminism by appending a qualifier to the more traditional definition of causal closure as follows: "Every physical effect has an immediate sufficient physical cause, in so far as it has a sufficient physical cause at all." A similar attempt to make—in this case Davidson's—definition of causal closure consistent with indeterminism is to say that 'every physical event *that has an explanation* has a physical explanation'. But neither of these attempts to dodge the non-sufficiency of *c* imposed by indeterminism gives existing physical explanations enough credit. Quantum-domain effects are

not unexplained. It is not the case that just anything can happen inexplicably. Rather, the set of possible outcomes and their likelihoods of occurrence are very precisely defined by quantum theory, arguably the most accurately predictive theory in the history of science.

Classical deterministic laws are laws among sufficiently causal actualia, where both *c* at *t1* and *e* at *t2* are actual events. Quantum mechanical laws are deterministic at the level of possibilia, but indeterministic at the level of actualia, because which possible outcome will occur upon measurement is only probabilistically specifiable. Nonetheless, under quantum mechanics *c* is sufficiently causal of its entire set of possible outcomes e_i with their associated probabilities of occurring. It is just that *c* is not a sufficient cause of any particular one of its many possible effects that happens to happen when measured. Classical deterministic and modern quantum mechanical laws both operate deterministically, and causation is sufficient, but over different types of physical entities. Actualia and possibilia, while both physical, have mutually exclusive properties. Actualia are real and exist now or in some past moment; they have a probability of 1 of happening or having happened. Possibilia are not yet real and may never become real, and exist in the future relative to some *c*, and have a probability of happening between zero and one. A given event cannot be both actual and possible at the same time.

Closure, therefore, applies to different types of physical events under ontological determinism and indeterminism. "Closure" entails that the set of physical events is closed; Any particular effect will be a member of the same set to which a sufficient cause itself belongs. Determinism is closed at the level of actualia; Any particular cause or effect will be a member of the set of all actual events in the universe across all time. Indeterminism, in contrast, is not closed at the level of actualia because a non-sufficient actual cause and one of its possible outcomes that may never happen are not both members of the set of actualia. Rather, quantum theory is closed (and deterministic) at the level of possibilia: Any particular outcome or event will be a member of the set of all possible outcomes or events in the universe across all time, and any possible cause is sufficient to account for the set of all of its possible effects. Under indeterminism physical explanations are of a different type than under determinism, though both actualia and possibilia are physical, and theories of either are physical explanations.

An indeterministic causal closure thesis could be restated as follows: "(ii*) the set of all possible microphysical states is completely diachronically necessitated by antecedent possible microphysical states." The realization thesis for the indeterministic case might be: "(i*) all mental states are synchronically determined by underlying sets of possible microphysical states." But claim (i*) is contrary to the definition of supervenience. Mental events do not supervene on sets of possible physical states, they supervene on specific, actually occurring physical states. Since it is absurd to maintain that mental events synchronically supervene on sets of possibilia, we can rule (i*) out. It remains to be shown whether (i), i.e. supervenience on actualia, can be combined with (ii*), i.e. causal sufficiency and closure among possibilia, to yield (iii).

An actual microphysical state and the set of all possible microphysical states are different kinds with mutually exclusive properties (e.g., real/~real; present/~present). The essentially syllogistic structure of the exclusion argument requires staying within a logical kind. It is logically valid to draw from the major premise (ii) 'All physical events are caused by preceding sufficient physical causes' and the minor premise (i) 'mental events are realized in physical events' the conclusion (iii) that 'the physical events that realize mental events have preceding sufficient physical causes'. But now we are splitting 'physical' into two types with mutually exclusive properties, possibilia and actualia. The conclusion (iii) of the syllogism holds only if both the major and minor premises hold and are both are about actualia as in (ii) and (i), or

both are about possibilia as in (ii*) and (i*). If one premise is about possibilia and the other about actualia, the conclusion does not follow, because the premises are about exclusive entities. For example, (ii) and (i*) would read 'All actual physical events are caused by preceding sufficient actual physical causes' and 'mental events are realized in sets of possible physical events,' which violates syllogistic logic as much as 'all men are mortal' and 'Socrates is a robot'. Conversely, (ii*) and (i) would read 'The set of possible physical events are caused by preceding sufficient possible physical causes' and 'mental events are realized in actual physical events,' which similarly violates syllogistic logical form.

There is another argument that (i) with (ii*) cannot logically entail (iii). Obviously, causes must precede effects. The usual exclusion argument is that (ii) diachronic actual elementary particle interactions *preceding* the moment *t* of (i) synchronic mental supervenience on actual particle configuration *p* leaves no room for mental events as such to have any causal effect since those preceding physical interactions are sufficient to cause *p*. However, if (ii*) is taken to refer to a diachronic set of possible events preceding (i) mental supervenience on *p*, then there is a problem, because possibilia do not exist in the past of *p*, only actual events, such as those described in (ii) do. Once we have reached time *t* and *p* is not a possibility but an actuality, then all events prior to *t* must also be actual. Events in the past are actual events that happened and are no longer possible. If they were possible they would lie in the future. Possibilia only exist in the future relative to some actual or possible event. But *p* we agree is actual since supervenience makes no sense for possibilia, as in (i*), which we have rejected. Alternatively, if we want to think of the possibilia in (ii*) 'collapsing' into *p*, where *p* was one among many possibilities, much like the quantum mechanical collapse of the wave function, we are again left with the problem that the set of possibilia is not sufficient to cause *p* per se, because *p* might not have happened at all and some other possible outcome might instead have happened. However, if the possibilia in (ii*) are taken to temporally follow (i) the actual *p* at *t*, well, that is certainly consistent with the idea that possibilia can exist in the future of *p*. But then possibilia in the future of *p* would be seen as being sufficiently causal of *p*, which would entail impossible backward causation in time. Thus the possibilia described in (ii*) can neither pre- nor post-cede the actualia described in (i) and be sufficiently causal of them. In sum, (i) and (ii*) do not together entail (iii), whether on logical (syllogistic) grounds or on the grounds that possibilities can only exist in the future and not in the past of actual events such as those on which mental events supervene. In conclusion, assuming indeterminism, mental causation is not logically ruled out by Kim's argument.

Neil Levy wrote that this argument "...is badly confused. It rests on a misunderstanding regarding the causal closure principle. Tse understands the principle to claim that physical causes are sufficient for the occurrence of physical effects. If indeterminism is true, then physical causes sometimes or often are not sufficient for the occurrence of later events. Tse therefore concludes that the closure principle is false for indeterministic systems, so it is no obstacle to mental causation. But the causal closure principle is, roughly, the principle that physical events can be accounted for by physical causes, or (equivalently) that physics is causally complete. It is silent on whether physics is deterministic or not. The brain may be indeterministic; causal closure remains an obstacle to mental causation."

In response, I did not invent the definition of causal closure as "every physical effect having an immediately antecedent sufficient physical cause"; many philosophers have written variants of just such a definition, including Papineau and Kim, cited above. If we eliminate the requirement that *c* be sufficient to cause its physical effects, we lose Kim's elegant "exclusion of over-determination" argument against any possible causal role of the mental, and can no longer rule that out. In addition, as a physicalist I agree that "physical events can be accounted for by

physical causes". But there is an ambiguity in Levy's phrase "accounted for" here. Deterministic physical laws account non-probabalistically (or with a probability of 1) for a deterministic succession among actualia, whereas indeterministic physical laws account probabilistically for an indeterministic succession among actualia; Or, as is the case with the evolution of the wave function in quantum mechanics, physical laws account deterministically for a changing probability distribution of possible outcomes of measurements. If we are to take the idea of closure of the physical seriously, then a physical cause *c* and its physical effect(s) must belong to the same closed set. We agree that this closed set includes only physical events whether determinism or indeterminism is the case. But under determinism that closed set of physical events includes physical actualia across time whereas under indeterminism it includes physical possibilia across time. In principle, classical physics is a causally complete account of the sequence of actualia over time, and quantum physics is a causally complete account of the sequence of possibilia over time. But standard versions of quantum physics do not give a complete account explaining why one possible outcome becomes actual upon measurement rather than other possible outcomes that did not occur. It just happens, with no reason given beyond chance. If *c* does not provide sufficient grounds for why one possible outcome occurs over another, exclusion of overdetermination cannot be used to rule out the possibility that the physical realization of present mental events might bias which particle possibilia will become actualia in the imminent future. Note that this does not require positing any bizarre notions like consciousness collapsing the wave packet. It just requires that present physically realized informational criteria placed on inputs can be met in the future in multiple possible ways.