

What Does the Conservation of Energy Have to Do with Physicalism?

Barbara MONTERO[†]

ABSTRACT

The conservation of energy law, a law of physics that states that the total energy of any closed system is always conserved, is a bedrock principle that has achieved both broad theoretical and experimental support. Yet if interactive dualism is correct, it is thought that the mind can affect physical objects in violation of the conservation of energy. Thus, some claim, the conservation of energy grounds an argument for physicalism. Although critics of the argument focus on the implausibility of causation requiring the transference of energy, I argue that even if causation requires the transference of energy, once we accept the other required premises of the argument that lie behind any supposed argument from the conservation of energy the law of the conservation of energy is revealed as irrelevant to the question of whether the mental is physical.

There once was a ghost who opened Einstein's office door rather than floating right through it. In doing this, he thought he could disprove the conservation of energy law. Some take the philosophical idea motivating this ghost – that non-physical interventions in the physical world would violate the conservation of energy – to be the basis of a powerful argument for physicalism. The point of this paper is to show that the conservation of energy law does not ground an argument for physicalism. This is not because some of the other premises necessary for completing the argument are questionable, as some have argued and as very well may be, but rather because the ghost, as it were, does not achieve his intended goal: the move from the conservation of energy to physicalism is not valid. Moreover, and this is the main point, once one adds the other premises required to make the argument valid, the conservation of energy law is revealed as irrelevant to the question of whether the mental is physical; that is, even without reference to the conservation of energy, these premises alone form a valid argument for physicalism.¹

[†] Graduate Center, City University of New York, 365 Fifth Ave, New York, NY 10016, USA; Email: bmontero@gc.cuny.edu.

¹ Very roughly, I take physicalism to be a family of determination theses about how certain types of higher-level phenomena relate to certain types of lower-level phenomena. For example, physicalism minimally states that the mental is entirely determined in the appropriate way by the nonmental. (See Montero 2001, forthcoming *a*, and forthcoming *b*). For the most part, my argument in this paper, namely, that the conservation of energy law actually does no work in the so-called 'argument for physicalism from the conservation of energy' does not depend on accepting my particular understanding of 'the physical' or of 'physicalism'. However, we will return to the question of what counts as physical in discussing whether conservation laws apply generally or only to the physical world.

1. *The argument for physicalism from the conservation of energy*

The conservation of energy law, the law of physics that states that the total energy of any closed system is always conserved, is a bedrock principle that has achieved both broad theoretical and experimental support. Indeed, leaving aside philosophical worries about whether science ever arrives at truth, it would be fairly accurate to claim today, as Ernst Mach did in 1898, that ‘the law of the conservation of energy, wherever civilization exists, is accepted as a fully established truth and has receive the widest application in all domains of natural science’.² Yet if interactive dualism is correct, it is thought that the mind, the ghost in the machine, as it were, can affect physical objects in such a way so as to violate the conservation of energy. While such reasoning is not the primary motivation for physicalism that one finds in the literature these days (this pride of place is reserved for what is often called ‘the causal argument for physicalism’), it nonetheless is still very influential.³ For example, according to Daniel Dennett, ‘[the] principle of conservation of energy . . . is apparently violated by dualism, . . . [and] this confrontation between quite standard physics and dualism . . . is widely regarded as the inescapable and fatal flaw of dualism’.⁴ Jerry Fodor expresses the same view: ‘How’, he asks, ‘can the nonphysical give rise to the physical without violating the laws of the conservation of mass, of energy and of momentum?’⁵ In Peter van Inwagen’s words, interactive dualism seems to ‘require a violation of well-established physical conservation laws like the law of the conservation of energy’.⁶ And Hilary Putnam states, ‘if interactionism is true, some conservation laws are violated when humans act on the basis of decisions and other thoughts’.⁷ Tim Crane claims that ‘mental causation would . . . have to introduce ‘more energy’ into the physical world, thus violating the conservation laws’.⁸ And, of course, Leibniz, in considering conservation, famously rejected Cartesian dualism because ‘the mind cannot act physically on the body without completely disor-

² Mach 1898/1943. It is worth noting, however, that while the conservation of energy is taken as a bedrock principle in physics, given the Heisenberg Uncertainty Principle, which states that we can only define limits of what the energy of a particle may be in a given period of time, today’s physics allows that the conservation of energy can be violated for a given period of time.

³ Roughly stated, the causal argument for physicalism is this: the physical world is causally closed (i.e. every physical effect that has a sufficient cause at a time, has a sufficient physical cause at a time), minds are causally efficacious, and there is no systematic causal overdetermination (i.e. typically, if there is a sufficient cause for an effect, that effect does not have additional distinct causes).

⁴ Dennett 1991, 35.

⁵ Fodor 1994, 25.

⁶ van Inwagen 2002, 196.

⁷ Putnam 1999, 79.

⁸ Crane 2001, 48. Although Crane takes interactive dualism to be incompatible with the conservation of energy, his primary argument for physicalism is the causal argument.

dering the laws of nature'.⁹ Even among those who accept interactive dualism, some claim that this comes at the price of rejecting the conservation of energy.¹⁰

Again, most physicalists do not rely on arguments such as those above in order to reject interactive dualism. However, as is made clear by its pedigreed list of supporters, many still hold that the conservation of energy law is inconsistent with interactive dualism. And assuming that there are causal relations between the mental and the physical, the inconsistency with interactive dualism would lead to an argument for physicalism, quite generally.¹¹ My aim here is to put an end to this view once and for all.

What is the argument that is supposed to show that nonphysical minds cannot causally affect physical bodies without violating the conservation laws or, assuming that there are causal relations between the mental and the physical, that physicalism must be true in general?

While the premises are usually not stated explicitly, I take it that most who assume that the conservation of energy is inconsistent with physicalism have something like the following argument in mind:

ACE: The Argument from the Conservation of Energy

1. Energy is conserved in any closed system.
2. The universe is a closed system.¹²
3. There are causal relations between the mental and the physical.
4. Causation involves the transference of energy.

Thus: The mental is physical.

⁹ Leibniz 1952, par. 61. The particular conservation law that Leibniz thought Descartes' theory violated is what we would now call 'the conservation of momentum'. For simplicity, I focus primarily on the conservation of energy, however, as Leibniz's objection to Descartes illustrates, arguments against interactive dualism can be phrased in terms of other conserved quantities; when they are, my argument can be re-phrased in terms of the relevant conserved quantity or quantities. A significant difference between Leibniz's use of conservation laws to argue against interactive dualism and contemporary uses of such laws, however, is that as Leibniz saw it, conservation laws applied only to the physical components of a system, whereas contemporary views, as I will argue, do not have this restriction.

¹⁰ See, for example, Ducasse 1951, 241.

¹¹ For other examples of reliance on the conservation of energy law to support physicalism see Searle 2004, 42; Churchland 1994, 20; Flanagan 1991, 21; Pollock 1990, 18–19; Bunge 1980, 17; Cornman 1978, 274; Russell 1945, 568. Helmholtz 1847/ 1971, 120–121 at least suggests such a view, as does Levine 2001, 5. Also see Papineau 2002, who, while claiming that the conservation of energy is not strictly inconsistent with interactive dualism, nonetheless claims, 'there is certainly some tension between the two doctrines'.

¹² Note that the notion of being a closed system here is distinct from the notion of being causally closed as it is used in the argument for physicalism from causation (see fn. 3). In the latter argument, the physical world is said to be causally closed, roughly, if every physical effect that has a sufficient cause has a sufficient physical cause. Here, 'a closed system' means that the system neither affects nor is affected by anything from outside of it.

While I think that if pressed most of those who reject physicalism because of the conservation of energy law have such an argument in mind, not all do. And so, before addressing ACE directly, let us look at some alternative forms of the argument, lest one think that it is not ACE that is at stake but some other argument for physicalism in which the conservation of energy law really does play an essential role.

Sometimes loosely stated versions of ACE claim, not that the universe is a closed system, but rather that the physical world is a closed system.¹³ However, given mind-body causal interaction, physicalism would follow immediately from the addition of this premise alone: for to say that the physical world is a closed system is to say that nothing intervenes in or is affected by the physical world that is not itself physical. So if the mental causally interacts with the physical, the conclusion that the mental is physical follows without any assumption about the conservation of energy. While I think that the conservation of energy law is, in fact, irrelevant to the supposed argument for physicalism from the conservation of energy, I do not think the proof of this is quite so easy as proponents of ACE can assume a closed universe rather than a closed physical world. Moreover, as the universe is the only completely closed system that we know of, this is all they should assume.

Of course, the physical world may be closed; and if it is, we could deduce physicalism from mental-physical causal relations alone. But whatever else one may think about this approach to arguing for physicalism, it is not an approach that depends on the conservation of energy.

Alternatively, one might replace the conservation of energy law in ACE with the principle that states that in any closed system, energy is conserved *among the physical components of that system*. For if energy is conserved among the physical components of the universe, and if the mental causally affects the physical, and if causation requires the transfer of energy, it would seem that unless the mental only acts as a kind of energy conduit – siphoning energy from one physical thing every time it causally affects another physical thing – the mental must be physical.¹⁴ But is this an argument from the conservation of energy?

As I see it, the principle that energy is conserved among the physical components of any closed system and the conservation of energy law are distinct, the manifest difference being that ‘the principle of physical conservation’, as I’ll call it, applies to a restricted class of phenomena, while the conservation of energy law applies to all phenomena. And while physics gives us reason to believe the latter, it does not seem to give us reason to believe the former. As Richard Feynman once put it, ‘[t]here is no theorem that says that the interesting things in the world are

¹³ See, for example, Campbell 1984, 54.

¹⁴ I thank Robert Passanau, my commentator at the 2003 Pacific APA, for raising this issue.

conserved – only the total of everything’.¹⁵ Unless we are assuming the truth of physicalism at the start of the argument, we have to leave it open that the physical components are only some interesting components of the system and not the total of everything. In other words – and we’ll return to this point later – if there were nonphysical mental forces, the conservation of energy law should be understood as applying to them as well.¹⁶ Thus, the conservation of energy law and the principle of physical conservation are distinct. Of course, if one is a physicalist, everything is physical, and so if energy is conserved, it is conserved only among physical things.¹⁷ But in arguing against dualism, it would be begging the question to assume the truth of physicalism.

The idea that the conservation of energy law need not apply to only the physical world might not seem obvious, to say nothing of true, to everyone. Indeed, for some it is obvious that the law applies only to the physical components of a system. I think that the reason some think this is that they understand the physical components of a system to be those components that are accounted for by physics and that the laws of physics are, trivially, about that which is accounted for by physics. As I have argued elsewhere, however, I think that this view of the physical is mistaken because it would, for example, categorize fundamental consciousness as physical as long as it was accounted for by physics.¹⁸ What ought to count as physical? There is little agreement as to the correct answer to this question, however, many agree the it does not suffice to say that fundamental physical properties are those properties captured in the laws of fundamental physics.¹⁹ If more need be said, the principle of physical conservation is distinct from the conservation of energy law.

But although the principle of physical conservation is not the same as the conservation of energy law, if we have reason to believe physical conservation, we have an argument for physicalism nonetheless (assuming the other premises are true). Do we have reason to believe it? For many, one of the attractions of arguing for physicalism based on the conservation of energy law is that this law can, for the most part, be accepted without question. The principle of physical

¹⁵ Feynman 1992, 83. For others who argue that conservation laws should not be restricted to only physical phenomena see fn. 34.

¹⁶ Moreover, it certainly does not follow logically that a law that applies generally also applies to a restricted class. For example, it may be true that all students at Party State University date only other students at Party State University, but from this it does not follow that all students in Philosophy 101 at PSU date only other students in that class.

¹⁷ I’m speaking loosely here because not all physicalists take the scope of physicalism to be everything. Some are content for physicalism to be a theory of merely the concrete world, while others, for example Melnyk 2003, take physicalism’s scope to be the concrete and/or causal world.

¹⁸ See Montero 1999.

¹⁹ See Montero 2001, forthcoming *a*, and forthcoming *b*.

conservation, however, being a philosophical principle rather than a law of physics, is not like this. Moreover, it is not apparent how to argue for it without taking physicalism as a premise. One might argue that as all close observations that support the conservation of energy have been of entirely physical systems, all of our evidence for the conservation of energy is also evidence for physical conservation. However, it doesn't follow that when evidence for a theory is consistent with another theory (for which there is no countervailing evidence), the other theory is justified by this evidence. For example, the evidence for the conservation of energy is consistent with the theory that energy is conserved only until 2020 (and not afterwards) but no physicist would take the latter view to be justified by this evidence. Significantly, just as the crucial 2020 experiment has not been performed, the crucial case of mind-body causal interaction, which if the mental is not physical could provide evidence against physical conservation, has not been carefully examined. Thus, if we are to leave open the possibility of non-physical minds – as we must in order to avoid circularity – the principle of physical conservation requires its own justification, empirical, or perhaps otherwise. It may be justifiable. However, unlike the conservation of energy law, it cannot be merely accepted as given to us by physics and thus cannot simply replace the conservation of energy law in arguments for physicalism.

Finally, another change to ACE one might be tempted to make is to state the conservation of energy law in such a way so that it applies only to physical systems, namely, that in any closed physical system energy is conserved. But if one does this, interactive dualism will not count as a counterexample to conservation as for the dualist the mind-body system is not a physical system.²⁰ For this reason, and, again, because the statement of the law in physics mentions nothing about the particular nature of the closed system, the statement of conservation in the first premise should be as I have presented it, that is, in a general form.

It is interesting to note that ACE, as opposed to the causal argument for physicalism, is just as much an argument against epiphenomenalism (understood as the view that nonphysical mental phenomena are caused by, but have no causal affect on, the physical) as it is an argument against interactive dualism.²¹ This is because the causal argument for physicalism depends on there being mental to physical causation while ACE depends only on there being causal relations in one direction or the other: even if there is no mental to physical causation, as the epiphenomenalist holds, yet there is physical to mental causation, the conservation of energy along with the other premises of the argument, would according to the proponents of ACE, require that the mental is physical. According to the propo-

²⁰ See Averill and Keating 1981 who make a similar point in arguing against Cornman's 1978 interpretation of the conservation of linear-momentum law.

²¹ This is sometimes denied in the literature on ACE-like arguments. See Rosenthal 1998 and P. McLaughlin 1993.

nents of ACE, if the mental were not physical, the energy from the motion of physical particles in the brain, which, if epiphenomenalism is correct, can move a nonphysical mind into a state of pain, for example, would seem to disappear. Yet energy, as the slogan form of this conservation law states, is neither created nor destroyed. Because epiphenomenalism has its share of fans, ACE would appear to be quite important, perhaps even more important than the causal argument for physicalism, the conclusion of which is only that mental phenomena that have physical effects are physical.²² Thus, ACE might seem to accomplish something that the causal argument for physicalism cannot: disprove not only interactive dualism, but epiphenomenalism as well.²³

The idea that there is a tension between certain forms of dualism and certain principles of conservation is quite an old one. Indeed, an argument related to ACE seems to be part of the motivation behind Leibniz's theory of pre-established harmony, the theory, roughly, that God set up the mind and body so that, while they remain causally isolated from each other, they are perfectly correlated. So, for example, when my desire to flee from a situation fills my mind, for example, my legs are set in motion, not because the mental causally affects my legs, but because this is the way the world has been set up.²⁴ As Leibniz saw it, Descartes' interactive dualism, while consistent with a conservation law that Descartes accepts, the conservation of the quantity of motion, nevertheless violates the conservation of the direction of motion, what we now call 'the conservation of momentum'.²⁵ Leibniz, being committed to the irreducibility of the mental, sees that one way to admit nonphysical minds yet not violate any conservation laws is to accept the irreducibly mental and deny mind-body causal relations entirely, which is what his theory of pre-established harmony accomplishes. Moreover, Leibniz – not a modest man – tells us that if Descartes had been aware of the conservation of the direction of motion, he would have been led to the theory of

²² See fn. 3 for a statement of the causal argument. The causal argument leaves open epiphenomenalism because it leaves open the possibility of nonphysical minds that have no effect on the physical world. For a defense of epiphenomenalism see Jackson 1982 and Chalmers 1996.

²³ Epiphenomenalists, of course, might reject the idea that causation between the neural and the mental involves energy transference. The point is merely that ACE would seem to be just as powerful against epiphenomenalism as it is against interactive dualism, which is not true of the causal argument.

²⁴ Further motivation comes from his theory of substance, which held that substances are self-sufficient, and his desire to avoid occasionalism – the view that God intervenes to, say, make my body move towards water when my mind feels thirsty – which he disliked because it requires continuous miracles on the part of God. Moreover, as occasionalism posits God's constant intervention in the physical world, an argument along similar lines to ACE would seem to apply to occasionalism, if God is nonphysical.

²⁵ See Leibniz 1925. I should note that there is a debate over whether Leibniz has correctly interpreted Descartes; see, for example, Garber 1983, who argues that he has not, and P. McLaughlin 1993 who argues that he has.

pre-established harmony as well.²⁶ As we will see, however, Descartes, even if he were aware of the conservation of the direction of motion, could have – if he were willing to give up some of his other views – been led in still a different direction. Nonetheless, given that pre-established harmony denies causal relations between mind and body, the problem of how to account for mind-body interaction (when the mind is nonphysical) is clearly avoided.

2. *ACE and transference theories of causation*

While it is often thought that ACE (or some closely related argument for physicalism from the conservation of energy or any other conserved quantity) is valid, some object that it is not sound. Perhaps the main target today is not, as it was for Leibniz, mind-body causal relations, but rather causation as involving the transference of energy or any other conserved quantity.²⁷ As Keith Campbell tells us, ‘arguments [for physicalism] from the conservation of energy [fail because] . . . changes in the distribution of energy, and hence causal changes can be brought about without supplying any energy’.²⁸ And, indeed, there are some compelling examples of apparent causal processes that do not involve the transfer of energy, such as when a switch being turned off causes the lights to go out, or, more germane for our purposes, when an interruption of blood flow to the brain causes one to faint.²⁹ Neither of these processes seems to involve energy (or any other conserved quantity) being transferred from cause to effect. In fact, just the opposite seems to be true: the flow of energy is staunched. Others have argued that even if actual examples of causation always involve energy transference, there are counterfactual situations in which we would say that causation has occurred yet there was no transference of energy. For example, in studies subjects are inclined to say that billiard ball *A* has a causal effect on billiard ball *B* even if the situation is rigged so that *A*’s impact does not transfer energy to *B*, indicating that our concept of causation is broader than a transfer of energy account implies.³⁰

²⁶ Leibniz 1925, sec. 80.

²⁷ Somewhat anachronistically, this may describe Descartes’ strategy: according to Leibniz, Descartes was not aware of the conservation of the direction of motion and thus in positing that mind-body causation only affects the direction of motion but not its force, Descartes is apparently trying to give an account of causation that does not involve transfer of any known conserved quantities.

²⁸ Campbell 1984, 52. See also Broad 1925, 103–109 and Rosenthal 1998.

²⁹ The light switch example is taken from Ehring 1986, who presents a number of powerful arguments against the transference theory of causation.

³⁰ See Earman 1976, 23–25, who discusses and elaborates on these studies. In the literature one also finds arguments that are intended to show how mind-body causation, in particular, could occur without the transference of energy. For example, see Rosenthal 1998 who suggests that the nonphysical mental could affect the physical without transferring energy into a physical system by affecting only how that energy is distributed within that system.

One might argue, however, that these and other objections that one finds in the literature to the transference theory of causation are not fatal.³¹ For example, given that our concept of cause is not entirely clear-cut, one can often argue that apparent examples of causation without energy transference are not actually examples of causal relations. Alternatively, with the light switch example, it seems that there is a description of what occurs that does involve energy transference: the light's going out, one might argue, consists of energy being diverted elsewhere and that the energy involved in the flipping of the switch is transferred to the mechanism responsible for this diversion. Moreover, even if there are counterfactual cases of causation that do not involve energy transference, one might still hold that ACE is an argument that physicalism is true of our world. And as most physicalists hold that physicalism is a contingent thesis, this conclusion would be strong enough. For this reason, the crucial premise is not that causation necessarily *requires* the transference of energy but rather that, as a matter of fact, it *involves* it. Finally, even if in this world causation, in general, does not involve transference of energy, some mind-body causal relations may. For example, when one's desire to ask a question causes the raising of one's arm, perhaps this type of causal process involves the transference of energy. If so, one might reformulate premise 4) of ACE to state that some mind-body causal processes involve energy transference and thus conclude that at least these mental processes are physical.

3. ACE's missing premise

Whether the transference of energy theory of causation (in general or even for particular types of causation) can be justified, however, is not what is at issue here. Rather, what is at issue is the role of the conservation of energy law in arguing for physicalism. Many believe that if causation does involve the transference of energy, ACE would go through. This, however, is not the case.

By way of illustrating this, let us ask, what would happen if the nonphysical mental were to intervene in the physical world to cause bodies to move? Would this be taken as a violation of the conservation of energy law? It is not clear that it would. About a century ago, Poincaré claimed that we would never reject the conservation law for energy because any apparent violation would be rectified by positing a new form of energy. Poincaré took this to show that the law of the conservation of energy is 'outside of the reach of experiment and reduces to a sort

³¹ For a defense of various forms the transference theory of causation see Kistler 2001, Dowe 2000, Fair 1979 and Aronson 1971. I should point out that most of these authors defend theories of causation that involve the transference of some conserved quantity or other, rather than the transference of energy in particular. But, as Leibniz saw, arguments from the conservation of energy can be reformulated in terms of the conservation of any conserved quantity.

of tautology'.³² And in 1930, to some extent bolstering Poincaré's view, Wolfgang Pauli rectified certain apparent violations of the laws of conservation of energy and momentum by positing a new, virtually unobservable form of energy, the neutrino. Eventually, empirical support did emerge when in 1956 huge detectors revealed that neutrinos exist. Nonetheless, the history of the neutrino indicates that the conservation of energy law, if not tautologically correct, will most likely not be given up easily.³³ In particular, it seems that if it were revealed that nonphysical mental phenomena actually do affect the energy of bodily movements, we would say that the nonphysical mental has energy. This could lead us either to say that the nonphysical mental has some familiar form of energy or to posit a new form of energy, mental energy, perhaps.³⁴

This is not in any way a defense of the view that the nonphysical mental has energy or that there is such a thing as mental energy. Rather, it merely opens the possibility that it could and thus illustrates that ACE, as presented so far, is not yet an argument for physicalism. For Einstein's ghostly visitor failed to make his point: if ghosts actually exist and are found to open doors, the conservation of energy need not be abandoned because such circumstances could, and given the history of the conservation of energy, it would not be surprising if they would, lead to positing a new form of energy: ghost energy, perhaps, which probably would be no more ghostly than some current forms of energy studied by physicists today. As with ghosts, so with the nonphysical mental: if what counts as energy could include the energy of nonphysical minds, interactive dualism would be consistent with the conservation of energy (as well as the other premises of the argument).

One might object that ACE still applies, as anything with energy is physical; even mental energy, if it is to count as a form of energy, must be physical. But

³² Poincaré 1952.

³³ This can also be illustrated by looking at the role the principle of energy conservation plays in field theories where part of the definition of field energy is that it is conserved.

³⁴ Papineau 2002, B. McLaughlin 1992, Horgan 1982, and Averill and Keating 1981 also argue that conservation does not imply that the source of the conserved quantity must be physical. Beyond this, Papineau 2002 argues that even if the conservation of energy is consistent with irreducible mental energy (and thus consistent with interactive dualism) the law implies that this energy must act only according to deterministic law. As he argues, 'the content of the principle of the conservation of energy is that losses of kinetic energy are compensated by build-ups of potential energy, and vice versa . . . [and that] we couldn't really speak of a 'build-up' or 'loss' in the potential energy associated with a force if there were no force law governing the deployment of that force'. Perhaps one way around this for someone committed to indeterministic mental forces would be to find room for them in possible violations of conservation that are allowed by the uncertainty principle (see fn. 1). Nonetheless, Papineau's claim is significant because if he were correct it would mean that (given no violations of conservation) ACE implies that an *indeterministic*, mental force cannot exist. However, as Papineau points out, as a non-physical mental force could be deterministic, this is not an argument against nonphysical mental forces.

this is a further premise: anything with energy is physical. And, as we will see shortly, it is actually this premise, and not the conservation of energy premise that is doing all the work. Right now, however, let us ask whether we should accept this premise. That is, must we say that the ghost who opens Einstein's door would be physical simply if he possesses energy? If physicalism is true, this premise is clearly true. However, here again we have a view that is difficult to defend when we leave the question of physicalism open. For example, if we do not assume the falsity of panpsychism, the antiphysicalist view that at the most fundamental level everything is at least in part mental, we must leave open the possibility that everything, including energy as we now understand it, is nonphysical.

To be sure, given Descartes' view of the mental as pure thought, the notion of a nonphysical mind with energy might not make sense. However, if Descartes' view of the mind does conflict with certain conservation laws, rather than following Leibniz's path and reject mind-body causal interaction, one can reject Descartes' view of the mental and allow for it to have energy. And this, it seems, need not turn one into a physicalist. The mental would still count as nonphysical as it is at its most fundamental level necessarily mental, yet it happens to have energy. If so, having energy does not suffice for being physical.

Of course, if we define the physical over a true and complete physics, and take a true and complete physics to account for everything including mental energy (if it exists), then having energy would trivially suffice to make something physical. But there are good reasons to reject such a definition of the physical, not the least of which is that it makes physicalism itself trivially true: for a theory that accounts for everything surely accounts for everything.³⁵ Moreover, while a number of philosophers define the physical in terms of some future physics, most who have reflected upon this actually exclude fundamental mental forces from the relevant physics that is to serve as the dependence base for physicalism; physicalism is true, it is said, if everything is accounted for by a physics that does not posit fundamental mental forces.³⁶ As such, even for these philosophers, irreducible, or fundamental, mental energy would be a counterexample to physicalism and thus, if it were to exist, should count as nonphysical.

³⁵ As my main purpose here is to show that the conservation of energy law is irrelevant to the so-called argument for physicalism from the conservation of energy – which will involve accepting for the purposes of argument that anything with energy is physical – above I will just touch on why I think that in an argument for physicalism we should not accept the view that anything with energy is physical. That there could be something nonphysical with energy, however, follows from my view that, to put it very roughly, we should understand physicalism as the thesis that everything is either fundamental and nonmental or is composed in the relevant way out of such nonmental fundamental phenomena. If there were fundamental mental energy, it would, then, be a counterexample to physicalism, and thus would not count as physical.

³⁶ See, for example, Papineau 2002 and B. McLaughlin 2001 and Kirk 1994.

These views notwithstanding, there still may be a good argument for the premise that anything with energy is physical, an argument that neither assumes the truth of physicalism nor relies on an unworkable understanding of the physical. But in any event, the premise that anything with energy is physical is needed in order to make ACE valid. Thus, adding this premise to ACE we arrive at:

VACE: The Valid Argument from the Conservation of Energy

1. Energy is conserved in any closed system.
2. The universe is a closed system.
3. There are causal relations between the mental and the physical.
4. Causation involves the transference of energy.
5. Anything with energy is physical.

Thus: The mental is physical.

4. Conservation of energy is superfluous

The argument is now valid. However, it should be apparent that its first two premises are superfluous. While many think that the conservation of energy law is essential in the so-called argument for physicalism from the conservation of energy, it is actually doing no work. Rather, it is the assumption that anything with energy is physical that does the real work, as the following argument makes clear:

RAP: The Real Argument for Physicalism

1. There are causal relations between the mental and the physical.
2. Causation involves the transference of energy.
3. Anything with energy is physical.

Thus: The mental is physical.

Thus, the real argument for physicalism that lies behind the supposed argument for physicalism from the conservation of energy does not depend on what Dennett refers to as a 'confrontation between quite standard physics and dualism'.³⁷ Rather, it reduces to the above three premises, which are not part of physics, standard or otherwise. Needless to say, whether RAP is sound is an open question. I have just hinted at some reasons to deny 3) and, as I pointed out earlier many

³⁷ The conservation of energy law may still play a role in supporting the view that causation requires the transference of energy. If energy were not conserved, we would not think that when *A* causes the energy level of *B* to change, *A* transfers energy to *B*. But this, of course, does not show that interactive dualism is inconsistent with the conservation of energy.

reject 2). But RAP is valid: given mind-body causal relations, that causation involves the transfer of energy, and that anything with energy is physical, it follows that the mental is physical. Moreover, without any one of these three premises VACE would not succeed. For if there is no mind-body causation or if energy is nonphysical or if causation (in particular mind-body causation) does not require the transference of energy, physicalism may be false, even if the conservation laws are true.

So in response to my title question, 'what does the conservation of energy have to do with physicalism?' the answer is, 'nothing whatsoever'. Physicalism, in many people's minds, must be correct because of a virtually undeniable principle of physics, the conservation of energy law. However, as I have shown, the conservation of energy law, as splendid as it may be, is irrelevant to the question of whether the mental is physical.*

REFERENCES

- ARONSON, J. 1971, 'On the Grammar of Cause', *Synthese* **22**, pp. 414–430.
- AVERILL, E. and KEATING, B. F. 1981, 'Does Interactionism Violate a Law of Classical Physics?' *Mind* **90**, pp. 102–107.
- BROAD, C. D. 1925, *The Mind and Its Place in Nature*, London: Paul, Trench, Trubner.
- BUNGE, M. 1980, *The Mind-Body Problem*, Toronto: Pergamon Press.
- CAMPBELL, K. 1984, *Body and Mind*, Chicago, IL: Notre Dame Press.
- CHALMERS, D. 1996, *The Conscious Mind*, Oxford: Oxford University Press.
- CHURCHLAND, P. M. 1994, *Matter and Consciousness*, Cambridge, MA: MIT Press.
- CORNMAN, J. 1978, 'A Nonreductive Identity Thesis About Mind and Body', in: J. Feinberg, ed., *Reason and Responsibility: Readings in some Basic Problems of Philosophy*, Encino, CA: Dickenson Publishing Company.
- CRANE, T. 2001, *Elements of Mind*, Oxford: Oxford University Press.
- DENNETT, D. 1991, *Consciousness Explained*, Boston, MA: Little, Brown and Company.
- DOWE, P. 2000, *Physical Causation*, New York: Cambridge University Press.
- DUCASSE, C. J. 1951, *Nature, Mind, and Death*, La Salle, IL: Open Court.
- EARMAN, J. 1976, 'Causation: A Matter of Life and Death', *Journal of Philosophy* **73**, pp. 5–25.
- EHRING, D. 1986, 'The Transference Theory of Causation', *Synthese* **67**, pp. 249–258.
- FAIR, D. 1979, 'Causation and the Flow of Energy', *Erkenntnis* **14**, pp. 219–225.
- FEYNMAN, R. 1992, *The Character of Physical Law*, Cambridge, MA: MIT Press.
- FLANAGAN, O. 1991, *The Science of the Mind*, Cambridge, MA: MIT Press.
- FODOR, J. 1994, 'The Mind-Body Problem', in: R. Warner and T. Szubka, eds., *The Mind-Body Problem*, Cambridge, MA: Blackwell.
- GARBER, D. 1983, 'Mind, Body and the laws of Nature in Descartes and Leibniz', *Midwest Studies in Philosophy* **8**, pp. 105–133.
- HORGAN, T. 1982, 'Supervenience and Microphysics', *Pacific Philosophical Quarterly* **63**, pp. 29–43.
- JACKSON, F. 1982, 'Epiphenomenal Qualia', *The Philosophical Quarterly* **32**, pp. 127–136.
- HELMHOLTZ, H. 1847/1971, 'The Application of the Law of the Conservation of Force to Organic Nature', in: R. Kahl, ed., *Selected Writing of Herman von Helmholtz*, Middletown: Wesleyan University Press.

* I would like to thank the anonymous *dialectica* referees for comments.

- KIRK, R. 1994, *Raw Feeling: A Philosophical Account of the Essence of Consciousness*, New York: Oxford University Press.
- KISTLER, M. 2001, 'Causation as Transference and Responsibility', in: W. Spohr, M. Ledwig and M. Esfeld, eds., *Current Issues in Causation*, Paderborn: Mentis.
- LEIBNIZ, G. 1925, *The Monadology and other Philosophical Writings*, R. Latta trans., Oxford: Oxford University Press.
- LEIBNIZ, G. 1952, *Theodicy: Essays on the Goodness of God, the Freedom of Man and the Origin of Evil*, A. Farrer ed., E. M. Huggard trans., New Haven, CT: Yale University Press.
- LEVINE, J. 2001, *Purple Haze*, New York: Oxford University Press.
- MACH, E. 1898/1943, *Popular Science Lectures*, La Salle, IL: Open Court.
- MCLAUGHLIN, B. 2001, 'Physicalism and Alternatives', in: N. Smelser and P. Baltes, eds., *International Encyclopedia of the Social and Behavioral Sciences*, Pergamon: Oxford.
- MCLAUGHLIN, B. 1992, 'The Rise and Fall of British Emergentism', in: A. Beckerman, H. Flohr, and J. Kim, eds., *Emergence or Reduction? Essays on the Prospects of Non-reductive Physicalism*, Berlin: De Gruyter.
- MCLAUGHLIN, P. 1993, 'Descartes on Mind-Body Interaction and the Conservation of Motion', *Philosophical Review* **102**, pp. 155–182.
- MELNYK, A. 2003, *A Physicalist Manifesto: Thoroughly Modern Materialism*, Cambridge: Cambridge University Press.
- MONTERO, B. 1999, 'The Body Problem', *Noûs* **33**, pp. 183–20.
- MONTERO, B. 2001, 'Post-Physicalism', *Journal of Consciousness Studies* **8**, pp. 61–80.
- MONTERO, B. forthcoming a, 'Physicalism in an Infinitely Decomposable World', *Erkenntnis*.
- MONTERO, B. forthcoming b, 'What is the Physical?' in: B. McLaughlin and A. Beckermann, eds., *Oxford Handbook of the Philosophy of Mind*, Oxford: Oxford University Press.
- PAPINEAU, D. 2002, *Thinking about Consciousness*, New York: Oxford University Press.
- POINCARÉ, H. 1952, *Science and Hypothesis*, New York: Dover Press.
- POLLOCK, J. 1990, *How to Build a Person: A Prolegomenon*, Cambridge, MA: MIT/Bradford Books.
- PUTNAM, H. 1999, *The Threefold Cord: Mind, Body, and World*, New York: Columbia University Press.
- ROSENTHAL, D. 1998, 'Dualism', in: E. Craig, ed., *Routledge Encyclopedia of Philosophy*, **3**, London and New York: Routledge, pp. 133–138.
- RUSSELL, B. 1945, *A History of Western Philosophy*, New York: Simon and Schuster.
- SEARLE, J. 2004, *Mind: A Brief Introduction*, Oxford: Oxford University Press.
- VAN INWAGEN, P. 2002, *Metaphysics*, Boulder, CO: Westview Press.