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Lowe's argument for dualism from mental causation

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Abstract. E.J. Lowe has argued for dualism by trying to show that decisions are not only not identical to physical properties, but not even grounded in and reducible to them. His argumeknt does not warrant the conclusion. First, psychological evidence suggests that the scenario on which Lowe bases his case does not fit real human actions. Second, the scenario is compatible with the hypothesis that decisions are naturally determined by the brain, in the same sense in which macroscopic physical properties of complex objects are determined by their parts.

Several years ago, E.J. Lowe proposed an argument for the thesis that mental events, in particular decisions, have causal powers that are not only different from the causal powers of the brain but *independent* of them. He suggests that mental features such as consciousness are *strongly emergent*: although they are "produced by the causal interaction of elements of the system" they belong to, they have "independent causal powers" (Lowe 1993, p. 635; 1996, p. 80).

Lowe's argument is important, insofar as it suggests an empirically plausible alternative both to the elimination of the mental and to the type-identity of mental properties with physical properties[1]. However, his argument does not warrant his conclusion that the causal powers of a mental entity, such as a decision, "are not wholly *grounded in* (or "causally reducible to") the causal powers of those elements of the system which produced it" (Lowe 1993, p. 636/7; 1996, p. 82). One can grant new causal powers to a macroscopic feature of a system without denying that those causal powers are "reducible", where "reducible" means that it is in principle possible to explain the causal powers of the whole

[1] Jaegwon Kim (1998) has recently made a strong case for the thesis that reduction leads to the discovery of species-specific identities of mental properties with their neurophysiological realizers.

through the lawful interactions of the parts of the system. Here is an example: the spatial "conformation" of a molecule certainly endows it with specific causal powers. It is the characteristic conformation of the haemoglobin molecule that gives it the power to bind oxygen (and carbon monoxide) molecules. This power may be called "emergent" to the extent that it appears only in molecules of a specific composition, but not in any of their parts. Nonetheless, there is a reductive explanation of the "macroscopic" [2] conformation, which runs through what are called the primary, secondary and tertiary structures of the molecule[3]. At each step, the existence of the structure is explained by virtue of local laws of interaction between the parts of the system. Finally, the interactions of the parts of the molecule, in the positions they occupy within the tertiary structure, lawfully bring about the quaternary overall structure of the molecule: this conformation gives the molecule the causal power of transporting oxygen in our body.

The existence of new causal powers of this kind is not sufficient to establish Lowe's dualist thesis that these new powers are *independent* of the powers of the parts of the system. Rather, the causal powers of haemoglobin molecules seem to belong to the same category of "weakly emergent" causal powers as "the causal powers of liquid water" (Lowe 1993, p. 636; 1996, p. 81): they are new in the sense that they only belong to systems of a certain complex structure but not to any of their parts. H_20 molecules do not possess any of the causal powers of liquid water, such as transparency and a specific viscosity. Nevertheless, they are only weakly emergent because they are "explicable in terms of the causal powers and relations of its constituent molecules" (Lowe, *ibid.*).

Lowe fails to show that mental events are emergent in any stronger sense than such macroscopic physical or rather chemical properties. I do not thereby deny that it would already be a substantial result to show that mental properties are "weakly emergent" in the sense indicated, to the extent that this is incompatible both with eliminativism and the type-identity of mental and neurophysiological properties.

Lowe's main argument for the thesis that some mental events are *strongly* emergent is that it is empirically possible, and plausible, that there are mental and neural processes, such as the processes leading to voluntary actions, in which "it is impossible to map token neural events, or fusions thereof, onto token conscious events in a way which preserves isomorphism between their respective causal liaisons" (Lowe 1993, p. 638/9; 1996, p. 84).

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[2] The conformation of the whole molecule is "macroscopic" relatively to the atoms composing the molecule, although it is of course not "macroscopic" in an absolute sense.

[3] Cf. Rosenberg (1985, p. 76).

The empirical possibility Lowe has in mind has the following structure: if we trace back in time the neural causes of three different voluntary bodily movements B_1, B_2, B_3, which are executed at the same time t, we shall find that these causes quickly spread out over large areas of the brain, and become inextricably intermingled, from t_0 backwards (as sketched in fig. 1).

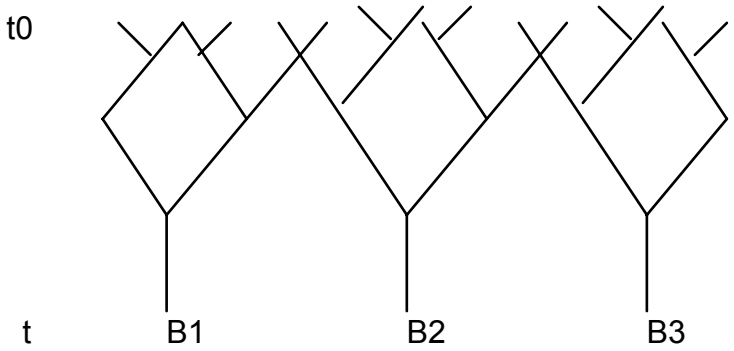

fig 1. From Lowe (1993, p. 639 and 1996, p. 85).

There are likely to be many single-neurone events taking place some time before these movements (earlier than t_0), that are part of the causal antecedents of *all three* movements. If this is the case, none of the complete physical causes of B_1 occurring before t_0 is entirely separate (non-overlapping) from the complete causes of the other bodily movements B_2 and B_3. But the mental causes, the decisions for each of these movements are completely separate and do not partially overlap. The decision to move B_1 is not at the same time a decision to move B_2, and neither do these decisions have any common parts, insofar as decisions do not seem to have any "parts" at all. Therefore, concludes Lowe, the decision to move B_1 is not identical with any of the complete physical causes of B_1. In Lowe's words, "we could discover that whereas the putative mental causes of token bodily movements are distinct and separable, the neural causes are inextricably entangled" (Lowe 1993, p. 639; 1996, p. 84). I think that the situation sketched by Lowe is indeed incompatible with the *identity* of one of the mental causes with a physical event (conceived of either as a conjunction of microscopic events occurring in individual neurons or as a fusion of such events), insofar as the entangled physical events are partially identical (i.e. have identical parts) whereas the decisions are not.

However, this is not sufficient to establish Lowe's dualist conclusion that there can be no reductive explanation of the decisions in terms of the set of underlying physical events and their interactions.

I will first offer some empirical considerations against the hypothesis that Lowe's scenario applies to the causal processes induced by human decisions. Then I will argue that even if it turned out to be empirically correct that some cases of human simultaneous actions have the structure indicated by Lowe, this wouldn't establish dualism: it would not establish that mental properties are emergent in any stronger sense than that in which the three-dimensional conformation of haemoglobin molecules is emergent with respect to the properties of the atoms that compose it, or in any stronger sense than that in which the macroscopic properties of liquid water, such as its viscosity and transparency, are emergent with respect to the properties of the individual H_2O molecules that compose it.

There are empirical reasons for doubting that the causal processes originating from, or evolving under control of, human decisions ever exhibit the structure that Lowe needs for his argument. Extensive psychological research has shown that there are severe limitations to the human capacity of performing two or more tasks simultaneously. "Is it possible that with increased practice and skill we can do as many things as we like at the same time ? The answer is probably 'no'." (Smyth et al. 1994, p. 153). To which extent it is possible to do two things at once depends on many factors, such as the similarity of the tasks, the difficulty of the tasks, and the amount of automaticity that has been reached by a subject in performing the tasks. Let me mention some relevant findings from psychology. Subjects can learn to perform tasks simultaneously although initially execution of one disrupts the other: beginning drivers have difficulties in driving and talking simultaneously without suffering from interference in each of these activities, while more expert drivers have acquired that capacity. But such learning to perform (what appears to be) two things simultaneously seems to be possible only in two ways, neither of which complies with Lowe's scenario. Either the causal pathways leading to the execution of what is initially described as two tasks are really intermingled but it turns out that the subject really performs one complex task rather than two independent tasks, or there are really two tasks performed in parallel but it turns out that the causal pathways leading to their execution are *not* intermingled.

We have a case of the first type when a piano player learns to execute qualitatively (in particular, in terms of rhythm) different movements with her two hands: she accomplishes this by integrating "the two elements into an integrated whole so that there is no longer a dual-task situation" (Smyth et al. 1994, p. 129). Several studies of the capacity of expert musicians to execute different rhythms with the two hands have led to the hypothesis that "a central counting mechanism is required from which the complex counting of the skilled musician must be derived" (Smyth et al. 1994, p. 130). This means that the subject executes one

integrated action which controls the movements of both hands. In cases of the second type, tasks can be executed simultaneously insofar as their execution draws on separate cognitive resources: "Tasks can be carried out at the same time provided it is possible to prevent each processing system (sometimes known as a module) from picking up interfering by-products from other processing activities" (Smyth et al. 1994, p. 152). Therefore, learning to do two or several things at a time begins with learning to separate the cognitive resources used in processing the two actions. The expert chess player who chooses his move in a "blitz" game in a second has learnt to organize his capacities efficiently: he draws directly on his memory of similar positions instead of going through lengthy calculations of alternative possibilities[4]. This frees his other processing capacities for other simultaneous tasks.

Neither of these ways in which a subject may eventually come to be able to do "two things at once", complies with Lowe's picture: the first possibility is that the neural pathways leading to the two patterns of movement (say of the two arms) are indeed intermingled, but that there is only one action, and only one decision, not several as in Lowe's scenario. The second possibility is that there are indeed two (or more) actions caused by two decisions, but that these actions are executed in the absence of any interference between the cognitive resources used for each. In this case the decisions give rise to independent neural pathways; but then, nothing prevents us from making the hypothesis that the independent decisions are naturally determined by distinct sets of neural events, situated in Lowe's schema *below* the split of the pathways leading to the different actions. In other words, Lowe's argument requires that the mental decisions occur earlier than t_0, which is the time before which the neural antecedents of the different simultaneous actions are completely intertwined. However, the psychological finding according to which two actions can be executed simultaneously (without one disrupting the other) only if they draw on separate resources, suggests to locate the decisions at a time where the neural pathways have already split.

Let us now put these empirical issues aside. For there is also a conceptual way to escape Lowe's dualist conclusion even if one accepts his premise that some real situations have the structure sketched above. One can account for the situation of several simultaneous actions B_1, B_2, B_3, which are caused by independent decisions occurring before t_0, at a time when the neural antecedents of the bodily movements B_1, B_2 and B_3 are completely intertwined, without accepting dualism. Lowe gives us no reasons against the hypothesis that

[4] Cf. Smyth et al. (1994, p. 150).

the mental property of deciding to move B_1 is in humans *naturally determined*[5] by a specific complex pattern of neural events, in the same sense in which the (relatively macroscopic) conformation of a complex haemoglobin molecule is determined by the (relatively) microscopic properties of its atomic parts and the laws governing the interactions of these parts by virtue of their properties. A property *P* of a complex object is said to be naturally determined by the properties of its parts and relations among its parts, if and only if there are laws of nature to the effect that every complex object whose parts have such properties and stand in such relations, has *P*. The possibility that decisions are naturally determined by interactions between parts of the body and in particular the brain is perfectly compatible with the fact (if it is a fact) that *two* patterns determine two distinct macroscopic properties, each with its distinctive causal powers. In this case, the decisions for B_1 and for B_2 may have different causal powers although it is possible to explain each reductively in terms of its causal bases, the conjunction of neural events. Such a reductive explanation consists in spelling out the details of the relation of natural determination. This conception is compatible with the fact that the reduction bases partly overlap, in the sense that they share some of their constitutive local neural events.

There are analogous situations in physics. The electrical and thermal conductivities of a given piece of metal are causally responsible for - and allow causal explanation of - quite different phenomena. The electrical conductivity is responsible, together with the tension across the wire, for the current flowing through it. Its thermal conductivity is causally responsible, together with the presence of a heat source on one side and a heat sink on the other which maintain a stable temperature gradient across the wire, for the flow of heat across it. Both of these conductivities are global properties of the metal that are causally efficacious at a macroscopic level. They are naturally but non-causally determined by different aspects of the underlying microphysical structure, which is in both cases the electronic configuration of the atoms making up the metal. Without going too much into the details, and using the model of reduction proposed by Drude in 1900, both the macroscopic electrical conductivity σ and the thermal conductivity κ of metals are naturally determined by (different) properties of the "free" electrons (i.e. electrons not chemically bound to individual atoms) in the metallic grid: the electrical conductivity σ is naturally determined by the microscopic properties *n* (the

[5] The qualifier "natural" is meant to distinguish my suggestion from Yablo's idea that the relation between the mental and the physical is determination in a *logical* sense: Yablo (1992) suggests that mental properties are determinables with respect to underlying physical properties of the brain which are their determinates, in the sense in which scarlet is a determinate of the determinable red. "Natural determination" binds together logically independent properties by virtue of laws of nature.

number of free electrons per cubic centimetre), *e* (unit electric charge), τ (relaxation time or mean free time of the free electrons, i.e. the average time interval between two collisions) and m (electron mass), according to the formula[6] $\sigma = \frac{ne^2\tau}{m}$; the thermal conductivity κ is naturally determined by *n*, τ, *m* and *T* (temperature), according to the formula[7] $\kappa = \frac{3n\tau k_B^2 T}{2m}$ (k_B is Boltzmann's constant). Temperature is a macroproperty which is naturally determined by the mean kinetic energy of both the metallic ions and the free electrons. True, the complete microscopic state of affairs *P*, conceived as including the values of all microscopic properties, determines both macroscopic properties σ and κ. Lowe's reasoning, as applied to this case, is correct insofar as *P* cannot be identical to either σ or κ, given that the latter differ from each other. However, nothing precludes *P* from *naturally determining* two different macroproperties σ and κ, by virtue of two determination relations each of which exploits a different aspect of *P*. The electric conductivity σ is determined by, among other things, the charge of the electrons but not by (what determines) the temperature of the metal, whereas the thermal conductivity τ is determined by, among other things, (what determines) the temperature of the metal, but not by the charge of the electrons.

The analogy with the natural determination of mental decisions by distinct though maybe overlapping aspects of the underlying pattern of neural activities should be clear. If I take several decisions at the same time, these decisions may be naturally, and non-causally, determined by different parts of the same conjunctive neural property *P*. The decisions are different because they differ with respect to the lawful dependencies in terms of which they are identified, both in terms of macroscopic causal laws and in terms of laws of natural determination. Lowe's argument refutes only theories which *identify* the macroscopic property with its microscopic basis. On such a theory, the intermingling of the microscopic base properties would indeed entail that the macroscopic properties are also partially identical,

[6] Cf. Ashcroft and Mermin (1976, p. 7).

[7] Cf. Ashcroft and Mermin (1976, p. 23). Menzies (1988) who gives credit to David Lewis for the example, offers this as a case where two distinct higher-level properties supervene on one set of base-level properties, i.e. "the cloud of free electrons which permeates the metal and which holds the atoms of the metal in a solid state " (Menzies 1988, p. 567). Menzies presents it as a refutation of the doctrine of supervenient causation according to which "if any higher-level event of an event-tree is causally related (or fails to be causally related), either as cause or effect, to another event, then it is so only in virtue of the fact that the basic event of the tree is causally related (or fails to be causally related) to that event" (Menzies 1988, p. 564). The case of the two conductivities refutes it because it is "an example of two events, supervening on the same basic event of the same event-tree, which differ in either cause or effect: if the two supervenient events differ in their causal relations with other events, they cannot both derive their causal role from the basic event." (Menzies 1988, p. 565). However, as I show in the text, the case does not quite fill the bill because the base level properties that nomologically determine the two macroscopic properties are distinct though they share some constituents.

which is difficult to accept, both in the case of physical and mental macroproperties. However, no such problem arises for an account which conceives of the relation between the microscopic base properties and the macroscopic properties in terms of natural determination. The fact that two macroscopic properties P_1 and P_2 are naturally determined by overlapping microscopic determination bases does not prevent them from being different properties.

To illustrate his claim that mental properties have causal powers that "are not wholly grounded in […] the causal powers of those elements of the system which produced it", Lowe offers the analogy with a spider's web. Contrary to the liquidity and transparency of water, which are causal powers that *are* wholly grounded in the powers of the water's constituent molecules, the web has "a life of its own" (Lowe 1993, p. 636), an expression Lowe takes over from Searle. However, the analogy is misleading and leads to a confusion that Lowe seems to share with Searle. The spider's organs *produce* the web by way of a causal process extended in time, starting with events in the spider and ending with the existence of the web. This means that the events that cause the web occur *earlier in time* than events in which the web exerts its causal powers, e.g. when it supports the spider moving over it. Indeed, Searle - and Lowe's analogy suggests that he follows him at this point – takes consciousness to originate *causally* from events in the brain in the same sense in which the spider's web originates from events in the spider's organs: "Consciousness gets squirted out by the behaviour of the neurons in the brain, but once it has been squirted out, it then has a life of its own" (Searle 1992, p. 112). However, we have no reason to think that the mental events brought into existence by neural activity in the brain are *caused* by this activity in the sense in which this implies that the mental events occur *later in time* than the relevant neural activity. On the contrary, we have every reason to believe that mental events are strictly simultaneous with the neural events determining them and cannot, therefore, be caused by them[8]. The same reasoning shows that the electric and thermal conductivities of a metal bar are not caused by properties of the bar's microscopic parts. They bring them into existence through a relation of simultaneous determination. The relation between neural activity in the brain and the mental events it brings into existence belongs to the same kind of synchronic non-causal

[8] I cannot justify this thesis here. Hume (1739, p. 76) argues that if simultaneous causation were possible, there could not be non-simultaneous causation : a cause sufficient for its effect could not precede it by a finite delay, because given that it is sufficient, no supplementary condition intervenes at the time of the effect. But then there is no sufficient reason for the effect to happen just then rather than earlier or later. A different and more indirect way to argue against simultaneous causation is by arguing for the thesis that causes and effects are events, i.e. particular entities occupying definite space-time zones. Then simultaneous causation is impossible because the effect could neither occupy the same space as the effect nor a different space : the former is impossible because the effect must be distinct from the effect ; the latter is impossible because physics forbids simultaneous action at a distance. For discussion, see Kistler (1999).

determination, which may well be called "emergence", in the synchronic sense of that term: mental events have their own causal powers although they are wholly grounded in neural events, and should ultimately be explainable in terms of them. However, rather than leading a life of their own, mental events and states are dependent on the underlying brain events and states: once we take the neural activity away, the mental phenomenon goes instantaneously away too, just as electric conductivity goes away instantaneously once you take away the underlying electrons. This makes the relation of the mind to the underlying neural activity (and the relation of a metal to its underlying molecular and electronic activity) very different from the relation of a spider's web to the organs that have produced it, for the web persists even when the spider's organs that have produced it cease to exist. This suggests that the causal powers of the mind of a person are related to the causal powers of the person's neural parts in the same kind of way as the causal powers of water or haemoglobin are related to the causal powers of theses substances' atomic and molecular parts. The argument for dualism fails.

References

- Ashcroft, Neil W. and Mermin, N. David (1976), *Solid State Physics*, Saunders College, Philadelphia, 1988.
- Hume D. (1739), *A Treatise of Human Nature*, Oxford, Clarendon Press, 1888, second edition, L.A. Selby-Bigge and P.H. Nidditch (eds.), 1978.
- Kim, Jaegwon (1998), *Mind in a Physical World*, Cambridge (Mass.), MIT Press.
- Kistler, Max (1999), *Causalité et lois de la nature*, Paris, Vrin. English translation forthcoming, London, Routledge.
- Lowe, E.J. (1993), The Causal Autonomy of the Mental, *Mind* 102, p. 629-644.
- Lowe, E.J. (1996), *Subjects of Experience*, Cambridge, Cambridge University Press.
- Menzies, Peter (1988), Against Causal Reductionism, *Mind* 97, p. 551-574.
- Rosenberg, Alexander (1985), *The Structure of Biological Science*, Cambridge, Cambridge University Press.
- Searle, John R. (1992), *The Rediscovery of the Mind*, Cambridge, Mass., MIT Press.
- Smyth, Mary M., Collins, Alan F., Morris, Peter E. and Levy, Philip (1994), *Cognition in Action, 2nd Edition*, Hove, Lawrence Erlbaum Associates.
- Yablo, Stephen (1992), Mental Causation, *Philosophical Review* 101, p. 245-280.