The Real Reason for the Standard View

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According to Lynne Baker, there are three main arguments for the ‘standard view’: an argument from metaphysics, an argument from science, and an argument from causal explanation - the last of these (the argument that mental states can have causal powers only if they are brain states) perhaps being the most important. This list, however, is incomplete since it leaves out what I regard to be the most effective argument for the ‘standard view’- the argument from the implausibility of ‘downward causation’. Put in a nutshell, this argument runs like this: If mental properties are causally efficacious and if they are not realized by neurophysiological or other physical properties of persons then there are neurophysiological (chemical, physical) events that cannot be accounted for by neurophysiology (chemistry, physics), i.e. then there are ‘natural’ effects that do not have ‘natural’ causes. Since this is very implausible and since mental properties seem to be causally efficacious, it seems to be very implausible to assume that mental properties are not realized by neurophysiological or other physical properties of persons.

1 Baker on the Arguments for the Standard View

In her recent book *Explaining Attitudes*, Lynne Baker pursues two main goals. On the one hand, she tries to undermine what she thinks to be the three main arguments for the Standard View, the view that mental states are, or at least are constituted by, brain states. On the other hand, she develops an alternative to the Standard View – a view she calls Practical Realism. In this paper, I shall confine myself to the first part of her endeavor, arguing that Lynne Baker has ignored what to my mind is the most important argument in favor of the Standard View. This argument could be called the ‘argument from the implausibility of downward causation’.[1] I shall start, however, by paying a short tribute to the three arguments for the Standard View that Baker addresses.[2]

The first, the *argument from metaphysics* rests on the fundamental premise that mental states are *internal* states. If we think of a person in the Cartesian way as composed of a soul and a body, this premise implies that mental states are either internal states of the soul, as Descartes thought, or internal states of the body. Hence, if we deny the existence of Cartesian souls, we have to conclude that mental states are internal states of the body. And since the organ on which our whole mental life depends is the brain, this seems to amount to the claim that mental states are brain states. The first argument, thus, can be summarized like this:

Argument from metaphysics

(1) Mental states are internal states.
(2) Therefore: Mental states are internal states of the soul or internal states of the body.
(3) There are no Cartesian souls.
(4) Therefore: Mental states are internal states of the body.
(5) Therefore: Mental states are brain states.

The second argument, the *argument from science,* derives its force from recent research in cognitive science. Some people say that cognitive science has been very successful in explaining the cognitive capacities of human beings and other higher animals on the basis of the assumption that the brain works like a computer, i.e., that these capacities are grounded in certain processes of symbol manipulation which, though abstract in nature, have to be implemented in the brain in order to be effective. In the same vein it has been argued that having a certain belief comes down to having a certain mental representation tokened which is processed in a specific way. And representations, too, must be realized by brain states to fulfill the role they are

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1 This argument, of course, is not new. It has been forcefully put forward especially by J. Kim. Cf. e.g. Kim (1992).

2 This tribute is not just a report of what Baker writes in her book, but rather an attempt to work out what to my mind forms the core of her arguments.

supposed to have. Therefore, according to these cognitive scientists, beliefs must be brain states.

There has recently been much criticism of such lines of argument. The critics of the computer metaphor, however, tend to place an even greater emphasis on the role the brain plays in cognition. They hold that it is not abstract algorithms, but concrete brain structures (neural networks, or what have you) that are responsible for cognitive behavior and cognitive capacities. Whatever else they criticize, these critics, therefore, do not take issue with the claim that beliefs and other intentional states have to be brain states if they are real at all. Hence, there are two versions of the argument from science:

Argument from science (1)

(1) Cognitive capacities are grounded in certain processes of symbol manipulation which, though abstract in nature, have to be implemented in the brain to be effective.
(2) Intentional states can play a role in this system of information processing only if they consist in having certain representations tokened which are processed in a specific way.
(3) These representations must be realized by concrete brain states in order to be able to do what they are assumed to do.
(4) Therefore: Mental states are brain states.

Argument from science (2)

(1) Cognitive capacities are not grounded in abstract algorithms, but in concrete states and processes in the brain (neural networks, etc.).
(2) Intentional states can play a role in the production of cognitive behavior only if they are part of this system of brain states.
(3) Therefore: Mental states are brain states.

Whatever approach we prefer, science seems to tell us that intentional states must be brain states.

The last argument addressed by Baker is the *argument from causal explanation*. There are only few epiphenomenalists around these days. Most philosophers agree that mental states make a difference. People who believe that it will rain tomorrow behave differently from people who believe that the sun will shine. And people suffering from severe headaches behave differently from people who feel relaxed after having taken a soothing bath. The behavior of people, therefore, can often be causally explained by reference to their mental states. And this, in turn, implies that the mental states of persons indeed figure among the causes of their behavior. On the other hand, we know that physical events must have physical causes and that our behavior is, in the end, caused by what is going on in our brains. Mental states, therefore, can be among the causes of our behavior only if they are states of our brains. That is, unless mental states are brain states they cannot be causally relevant to our actions. Put in a nutshell, the *argument from causal explanation*, thus, proceeds like this:

Argument from causal explanation

(1) The mental states of a person are causally relevant for his/her behavior.
(2) The mental states of a person cannot be causally relevant for his/her behavior unless they are brain states.
(3) Therefore: Mental states are brain states.

I am not going to analyze these three arguments in detail, nor am I going to examine Baker's comments on these arguments though this, I think, would be very rewarding indeed. In what follows, I shall rather sketch a fourth argument that, although it is – in a way – related to the argument from causal explanation, enables us to look at the problem of the causal relevance of mental states from a different angle.

Before taking up my argument, I would like to stress two points in which Baker's and my views concur. Let me stress that I wholeheartedly agree with Baker that there is not the slightest reason to believe that mental states are brain states *if* brain states are construed as "spatially and temporally locatable inside a spatiotemporal entity like an organism" (Baker, 1995: 14). In my view, it would be pure nonsense to assume that internal states have the ontological status of physical *particulars* which are part of other physical particulars. Believing something, desiring something, fearing something and all other mental states no doubt have the ontological status of *properties*. This classification marks the second point on which Baker and I are in full agreement. However, I do not see why proponents of the Standard View should be committed to denying this or why they should be committed to the view that mental states are brain states *in the sense mentioned*. Think, for example, of Fodor's Representational Theory of Mind. Fodor is *not* claiming that a belief is, in the end, nothing but a mental representation, i.e. a "spatially and temporally locatable" state of the brain. What he does claim is this: A belief is, in the end, a relational property of an organism, a property the organism has if it stands in a certain relation to a certain mental representation. This brings me to a first point of disagreement – the question of what exactly it is that proponents of the Standard View claim.

2 What the Standard View Really Amounts to

To my mind, the formula “Mental states are brain states”[3] simply is far too vague to be a good candidate for an adequate answer to this question. But what more precise formula would be better suited to this purpose? If we keep in mind what e.g. proponents of Logical Behaviorism or the Identity Theory did in fact say and if we also bear in mind that what is being asked for is an account of mental *properties*, perhaps the following formula would do a better job: “Mental properties are either identical with or reducible to physical properties”. Indeed, this is my preferred reading of what the Standard View comprises. But even this formula is still too vague – at least as long as we do not have a more precise idea of what ‘identical with’ and ‘reducible to’ could mean in this context. I would, therefore, like to start with an answer to this last question.[4]

In my view, the most sophisticated account of the concepts of identity and reducibility rests on a distinction which was first drawn by C.D. Broad some seventy years ago, the distinction between *mechanically explainable* and *emergent* properties.[5] Broad developed this distinction in the context of the debate concerning the problem of Vitalism. With regard to this problem, two factions opposed each other: the *Mechanists*, who claimed that the properties characteristic of living organisms (metabolism, perception, goal-directed behavior, procreation, morphogenesis) could be explained mechanically in the same way in which the behavior of a clock can be explained by the properties and the arrangement of its cogs, springs and weights, and the *Vitalists*, who held the contrary view, namely that an explanation as envisaged by the mechanists was impossible and that one had to postulate a special substance in order to explain life – an entelechy or an *élan vital*. In his theory of emergent properties Broad attempted to create room for a third position mediating between these two extremes.

Broad’s first step was to point out that the problem of Vitalism is only a special case of a much more general problem – the problem of how the *macro-properties* of a complex system are related to its *micro-structure*, i.e., of how the macro-properties are related to the *properties of the parts* which make up the system and their *arrangement*. With regard to this relation there is the possibility (which amounts to a vitalistic position) that a macro-property *F* of a system cannot be explained by means of its micro-structure, but only by postulating an additional substance. However, if we disregard this possibility,

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[3] Cf., e.g., Baker (1995, pp. 6-7); and also Baker’s contribution to this volume.

[4] For the following see also Beckermann (1992a; 1992b; 1996; 1997a; 1997b).

[5] Cf. especially Broad 1925.

we are not left with *one* further possibility (mechanism), but – Broad argues – with *two*: the property *F* can be *mechanically explainable*, but it can also be *emergent*. Broad explains the difference between these two positions as follows:

> Put in abstract terms the emergent theory asserts that there are certain wholes, composed (say) of constituents A, B, and C in a relation R to each other; that all wholes composed of constituents of the same kind as A, B, and C in relations of the same kind as R have certain characteristic properties; that A, B, and C are capable of occurring in other kinds of complex where the relation is not of the same kind as R; and that the characteristic properties of the whole R(A, B, C) cannot, even in theory, be deduced from the most complete knowledge of the properties of A, B, and C in isolation or in other wholes which are not of the form R(A, B, C). The mechanistic theory rejects the last clause of this assertion. (Broad 1925: 61)

Broad thus stresses two points:

1. Both mechanically explainable and emergent properties depend nomologically on corresponding micro-structures. That is to say, if a system *S* with the micro-structure [C_1, ..., C_n; *R*][6] possesses a macro-property *F*, the sentence "For all *x*: if *x* has the micro-structure [C_1, ..., C_n; *R*], then *x* possesses the macro-property *F*" is a true law of nature, regardless of whether *F* is mechanically explainable or emergent.
2. Mechanically explainable properties differ from emergent properties in that the former can, at least in principle, be deduced "from the most complete knowledge of the properties of [the components C_1, ..., C_n] in isolation or in other wholes" while this cannot be done for the latter.

Thus, emergent properties are characterized by two features: (a) Like mechanically explainable properties they depend on corresponding micro-structural properties; but (b) in contrast to mechanically explainable properties they cannot even in principle be deduced "from the most complete knowledge of the properties of [the components C_1, ..., C_n] in isolation or in other wholes".

I think that this yields a very illuminating first step towards drawing the distinction in question. But why does Broad use the complicated clause "from the most complete knowledge of the properties of [the components C_1, ..., C_n] in isolation or in other wholes"? And what does he mean by saying that

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6 "System *S* has the micro-structure [C_1, ..., C_n; *R*]" is a shorthand for "*S* consists of the parts C_1, ..., C_n which stand in the (spatial) relation *R* to each other".

certain properties of a system can be “deduced” from the complete knowledge of the properties of its parts while others cannot?

With regard to the first question, what Broad seems to have had in mind is precisely what Hempel and Oppenheim some twenty years after the first publication of *The Mind and Its Place in Nature* phrased thus:

> If a characteristic of a whole is counted as emergent simply if its occurrence cannot be inferred from a knowledge of all the properties of its parts, then, as Grelling has pointed out, no whole can have any emergent characteristics. Thus … the properties of hydrogen include that of forming, if suitably combined with oxygen, a compound which is liquid, transparent, etc. Hence the liquidity, transparency, etc. of water *can* be inferred from certain properties of its chemical constituents. (Hempel/Oppenheim 1948: 260)

In order to avoid rendering the concept of emergence vacuous, inferences of this kind must be blocked. Broad’s formula serves precisely this purpose, since it is obviously designed to guarantee that we cannot have recourse to properties like those mentioned by Hempel and Oppenheim when we attempt to deduce a macro-property *F* of a complex system from the properties of its parts and their structure. However, the question remains as to whether this purpose could have been accomplished with a simpler and more lucid formulation. This much seems clear: It is crucial that in our attempts to deduce some macro-property *F* of a complex object from the properties of its parts and their structural relations, we are not allowed to use ‘ad hoc’-properties such as the property that certain components, if arranged in a specific way, form a complex object which has the property *F*. The question, therefore, is how we can guarantee this without at the same time excluding properties which we may legitimately refer to in such an attempt.

It may be possible to find an answer to this question if we consider which laws we may use in deductions of this type. For here we encounter another possible source of trivializing the concept of emergence. If we could utilize the law mentioned above, i.e. the law “For all *x*: if *x* has the micro-structure $[C_1, ..., C_n; R]$, then *x* possesses the macro-property *F*”, there would not be any emergent properties, either. After all, Hempel and Oppenheim could have formulated their point thus:

> It is a true law of nature that, if suitably combined with oxygen, hydrogen forms a compound which is liquid, transparent, etc. Hence the liquidity, transparency, etc. of water *can* be derived by means of the laws of nature.

Broad, thus, must rule out recourse to laws of this type as well. That he, indeed, sought to do so can be seen from the following passage discussing the properties of clocks.

> We know perfectly well that the behaviour of a clock can be deduced from the particular arrangement of springs, wheels, pendulum, etc., in it, and from *general laws of mechanics and physics which apply just as much to material systems which are not clocks*. (Broad 1925: 60 – italics mine)

Obviously, Broad holds that if we attempt to deduce some macro-property *F* of a complex object from the properties and arrangement of its parts, we may only use *general laws* which are valid for the parts of a complex system independent of the specific configurations of these parts. Hence, the most straightforward answer to the question "which properties of a system's parts may we refer to in such a deduction?" is apparently this: "to those properties which are mentioned in these general laws of nature." I would therefore like to suggest that we replace Broad's clause with the formula "if *F* can be deduced by means of the general laws of nature which are true of the components C_1, ..., C_n from the properties of the components mentioned in these laws."[7]

Even after this point has been clarified, the question remains what Broad meant with 'deduction' in this context. Broad himself does not offer any precise answer. However, it may be possible to reconstruct the missing answer with a little additional consideration. Properties are normally characterized by a set of features:

– something has the property of being a bachelor if it is a man and unmarried.
– something has the property of being magnetic if it attracts iron filings, if it induces electricity in circular conductors and if it shows all the other characteristics which are typical for being magnetic.
– something has a temperature of 300 K if upon touch it induces a certain sensation of warmth, if the mercury column of a thermometer with which it has been thermally balanced reaches the mark 26.85 C, and if it has all the other causes and effects which are characteristic of this temperature.

If we wish to deduce the macro-property *F* of a system from the system's microstructure, it, therefore, is crucial that we succeed in showing that it follows from the general laws of nature that each system which has this microstructure also possesses all features which are characteristic of *F*. On the whole, I take it that Broad's considerations concerning the distinction

7 In the last consequence, this improved version of Broad's formula renders superfluous any reference to admissible properties; if we specify which laws can figure in the derivations in question, we have implicitly determined which properties may play a role in the derivations mentioned.

between mechanically explainable and emergent properties can best be summarized in the following two definitions:

(ME) A macro-property *F* of a complex system *S* with the micro-structure [C_1, ..., C_n; *R*] is *mechanically explainable* if and only if the following is true:

(a) The statement "For all *x*: if *x* has the micro-structure [C_1, ..., C_n; *R*] then *x* has the macro-property *F*" is a true law of nature, and

(b) it follows from the general laws of nature applying to the components C_1, ..., C_n that *S* possesses all features which are characteristic of the property *F*.

(E) A macro-property *F* of a complex system *S* with the micro-structure [C_1, ..., C_n; *R*] is *emergent* if and only if the following is true:

(a) on the one hand the statement "For all *x*: if *x* has the micro-structure [C_1, ..., C_n; *R*] then *x* has the macro-property *F*" is a true law of nature, on the other hand, however,

(b) it does not follow from the general laws of nature applying to the components C_1, ..., C_n that *S* possesses all features which are characteristic of the property *F*.

A great merit of these two definitions resides in the fact that Broad's distinction between mechanically explainable and emergent properties far better captures the intuitive difference between reducible properties and properties that cannot be reduced to more fundamental properties than all other accounts have been able to, including the ones offered by Logical Behaviorism and the Identity Theory. That is to say, from the definition (ME) we can immediately derive a definition of the concepts of reducibility or realization that is much more in accord with our intuitive preconceptions than any other definition proposed.

(R) A macro-property *F* of a system *S* is at *t reducible to* a micro-structure [C_1, ..., C_n; *R*] (is at *t realized by* a micro-structure [C_1, ..., C_n; *R*]) if and only if *S* at *t* has the micro-structure [C_1, ..., C_n; *R*]) and if it follows from the general laws of nature applying to the components C_1, ..., C_n that *S* at *t* possesses all features which are characteristic of the property *F*.

This definition may also serve as a starting point for a better understanding of what 'identity' can mean in this context. For that *F* is identical with a certain micro-structure [C_1, ..., C_n; *R*] seems to amount to no more than that

F is, for whatever reasons, *always* realized by the same micro-structure [C_1, ..., C_n; *R*]. A simple and adequate definition of ‘identity’, thus, can be given in this way:

(I) A macro-property *F* is ‘identical’ to a certain micro-structure [C_1, ..., C_n; *R*] if and only if any object *x* has *F* if and only if *x* has the micro-structure [C_1, ..., C_n; *R*] and if it follows from the general laws of nature applying to the components C_1, ..., C_n that *x*, if it has the micro-structure [C_1, ..., C_n; *R*], possesses all features which are characteristic of the property *F*.[8]

Perhaps an example may help us to understand better what these definitions – and especially definition (R) – amount to. Take for instance the property of being liquid. Presumably everyone would agree that the liquidity of water is reducible to its micro-structure. But why is this? In general, liquids differ from gases in that their volume is (almost) incompressible. They differ from solids in that their shape is changeable and moulds itself to the receptacle holding them. This is the case because in liquids – as opposed to gases – the molecules are as tightly packed as possible. They cannot get any closer to each other (or rather, they can do so only under very great pressure), because the repulsive forces between the molecules do not permit this. On the other hand, the molecules of liquids can move relative to each other, they can – so to speak – roll over each other freely, while the molecules of solids are prevented from such motion by the forces which hold them in their relative positions. Therefore, the molecules of solids can only move together: the whole object moves, while the relative position of its molecules remains the same, thereby keeping the object’s form constant. Now, almost all scientists would agree that the forces which water molecules exercise on each other under certain conditions follow from the natural laws that are generally true of them. Hence, it also follows from these natural laws that the repulsive forces between the molecules are such that they do not permit them to get any closer to each other, and that the attractive forces are great enough to minimize the distance between the molecules, but not so great as to fix them in their relative positions.

Even this simple example demonstrates clearly that definition (R) encounters a problem concerning interlevel connections. For, obviously, from the general laws of nature applying to the components of a system it only follows how these *components* behave under certain conditions. Thus, the

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8 The term ‘identical’ here is put in scare-quotes because ‘identity’ in the sense of definition (I) indeed is very different from the strict identity of logic.

question remains of how we can infer from the properties of a system's components which properties the system possesses as a whole. Broad does not offer an answer to this question, and perhaps no general answer can be given. Nevertheless, if we consider concrete examples, it can be seen how this problem may be solved in individual cases. In the example just cited, for instance, the inference from the behavior of the system's components to the behavior of the system as a whole is based on a simple principle: If we know which forces the molecules of an object exert on each other, we also know how easily these molecules can move relative to each other. And if we know the latter, we also know whether the object is solid or liquid. Another principle which is very important in a range of similar cases is this: If we know how all constituent parts of an object move, we also know how the whole object moves. This principle is applied in the following case.

Among the characteristic features of the property of being magnetic counts the fact that magnetic objects attract iron filings in their proximity. Does this follow from the general laws applying to the parts of magnetic objects? Consider, for instance, a permanent magnet, i.e. a piece of iron which is permanently magnetic. A permanent magnet, as physics informs us, consists of many tiny elementary magnets, which all point in the same direction. The iron filings in its proximity also consist of small elementary magnets, albeit unordered ones. From the general laws which apply to elementary magnets it follows: If the elementary magnets in some piece of iron are directionally aligned, they generate a relatively strong magnetic field around this piece. This magnetic field causes the – previously unordered – elementary magnets in the iron filings to align themselves in such a way that they point towards the permanent magnet with that pole which is opposed to the closest pole of the permanent magnet. This has the following consequence: on all elementary magnets in the iron filings a force is exerted in the same direction, namely the direction towards the permanent magnet. Since this force is not counteracted by any other force, the elementary magnets begin to move in that direction. And if all constituent parts of an object move in a certain direction, the object itself also moves in that direction.

The principles which have so far been illustrated by just two examples do not allow us to deal with all cases, but they may give an impression of how the problem of interlevel connections associated with the definitions (R) and (I) may be solved in individual cases.[9]

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[9] In Beckermann (1992b) the author discusses an example in which the color of a liquid is explained by the chemical structure of the liquid. Obviously, in this example the following principle is used: If we know photons of which wavelength are absorbed by the molecules of a liquid, we also know which color that liquid has.

3 The Real Reason for the Standard View

Having thus elaborated the main thesis of the Standard View, viz. the claim that mental properties are either identical with, or reducible to, physical properties, we can proceed to the question of what arguments can be offered to establish the truth of this thesis. Well, I do not think that the thesis can be given an *a priori* proof. But there are some arguments which indeed lend it a high *prima facie* plausibility. As already mentioned, in what follows I shall concentrate on one of these arguments, since I believe that it supports the Standard View in a very strong way.

In order to understand the argument, it may be reasonable to begin by asking what would follow if the Standard View was false. On the basis of the definitions (R) and (I), there is a plain answer to this question: If the Standard View were false, mental properties would at least be emergent, i.e., they would be properties that, even in principle, could not be deduced from the properties of the parts of the organisms that are their bearers. This is why we should try and be as clear as possible about what it would mean if mental properties were emergent, i.e. what it would mean to claim that at least some macro-properties of physical systems are not realized by their micro-structures. Let us ask, for example, what would be the case if it turned out that the property of being magnetic was an emergent property.

We have already seen that the property of being magnetic is (at least in part) characterized by the fact that magnetic things behave in a particular way:

– Magnetic objects attract iron filings in their proximity;
– the needle of a compass near a magnetic object tends to point in its direction;
– magnetic objects induce an electrical current in coils which they pass through;
– magnetic objects tend to magnetize non magnetic pieces of iron in their vicinity; etc.

Being magnetic, thus, makes a difference especially to the behavior of certain objects in the neighborhood of magnetic things. These behavioral differences, however, do not only concern these objects themselves but also their parts. If a magnetic object induces electrical current in a coil which it passes through, for example, this is so because the magnetic object causes the electrons in the coil to behave differently. And even in the case where a magnetic object causes a nearby compass needle to point in its direction, this can happen only in virtue of the atoms which the needle consists of being caused to move in a specific way.

Now, think of an arbitrary magnetic object *S*. If being magnetic is emergent, then, by definition, *S*'s being magnetic is not realized by its micro-structure. And that, in turn, implies that it does not follow from the general laws of nature applying to the parts of *S* that *S* (and the objects in *S*'s neighborhood) behave the way they actually do. In other words, if being magnetic is emergent (a) the fact that electrical current is induced in a coil which *S* passes through cannot be explained by the general laws of nature applying to the parts of *S*. And, by the same token, if being magnetic is emergent (b) the fact that a nearby compass needle moves to point in *S*'s direction cannot be accounted for by these same laws. But that is not yet the whole story. What is even more important is this: Since a flow of current consists of certain movements of the electrons in the coil and since the movement of the compass needle occurs in virtue of certain movements of the atoms which make up this needle, it follows from (a) and (b) that, if being magnetic is emergent, not even the movements of the electrons in the coil and the movements of the atoms which the compass needle consists of can be explained by the *general* laws of nature applying to the parts of *S*, i.e. applying to the atoms which make up *S*.

The irritating consequence, then, is this: if being magnetic is emergent, then nuclear physics is incomplete in a disturbing way. Each time the movements of certain atoms are caused by a certain object's being magnetic, these movements *cannot* be accounted for by the relevant general laws of this part of science. Or, to put it another way, since movements are always caused by corresponding forces, the emergent character of being magnetic would imply that atoms are sometimes moved by forces the existence of which cannot be derived from the general laws of nuclear physics.

And this, of course, can be generalized. *Each emergent property which is at least in part characterized by the fact that objects having this property move in a certain way leads to a gap in nuclear physics, i.e. leads to the assumption that atoms are sometimes moved by forces that cannot be explained by means of the general laws of this science.* The only proviso that should be added is perhaps that this conclusion can be drawn only if the macro-behavior characteristic of the emergent property in question can take place only if the atoms which the corresponding macro-systems consist of themselves move in specific ways.

Some might think, however, that there is a way to bypass this consequence. Broad himself admitted that emergent properties are nomologically dependent on micro-structural properties. That is, according to Broad's account, for each emergent macro-property *F* there exists a set of micro-structures ***M*** such that the following holds:

1. A system *x* can possess *F* only if it has one of the micro-structures belonging to ***M***.
2. For each member M_i of ***M***: if *x* has M_i, then *x* has *F*.

Even if being magnetic is emergent, our system *S*, therefore, can have this property only if it has one of the corresponding micro-structures, i.e., if it consists of certain atoms arranged in a specific manner *R*. In order to explain the movement of the electrons in the coil or the movement of the atoms of the compass needle we thus need not leave the level of atoms. For, instead of accounting for these movements by reference to *S*'s being magnetic, we can explain these movements just as well by tracing them back to the fact that the atoms *S* consists of are arranged in the manner *R*. Thus, in contrast to what has been claimed so far, all effects of emergent properties can be accounted for at the level of atoms.

This objection, however, would miss a decisive point. For the most intriguing upshot of the argument is not that the existence of emergent properties would imply the existence of effects at the atomic level that cannot be explained at this very level, but that the existence of emergent properties would imply the existence of effects at the atomic level that cannot be accounted for by the *general laws* of nuclear physics, but only by what might be called *special laws*, i.e. laws that tell us nothing but that certain (unexpected) effects E_1, ..., E_m occur if particles of kind C_1, ..., C_n are arranged in the manner *R*. According to Broad's account of emergent properties, the movement of the electrons in the coil or the movement of the atoms of the compass needle can, of course, be explained by the fact that *S* consists of certain atoms arranged in a certain manner. But if being magnetic is indeed emergent, the law which tells us that atoms of this kind, arranged in this way, cause these kind of movements *itself* cannot in any way be derived from the laws that generally hold for particles of this kind. For if it could, it would follow from these general laws that objects that consist of atoms of this kind arranged in this way would have all features that are characteristic of being magnetic. And this in turn would imply that being magnetic is not emergent.

Thus, a better way to make the essential point of the argument would be to say that the existence of emergent properties would destroy the *homogeneity* of nuclear physics. It would make nuclear physics a science with some general laws and a whole bunch of exceptions, i.e., it would make physics what may justly be called a *weird* science. To take a simple example, in classical mechanics, the law of gravitation

$$F = \frac{m_1 \cdot m_2}{r^2}$$

is thought to hold quite generally for all masses m_1 and m_2 and all distances r. It would strike us as very strange if it turned out that there were some masses and distances for which the force exerted on the two bodies would not conform to this law. Say, if it turned out that for m_1=1 and m_2=10 and r=1 the force exerted would amount to 5 instead of 10 *N*. Or, to take another example, we are all fairly convinced that the principle of the parallelogram of forces applies to all bodies and all forces whatsoever. Thus again, it would be very strange indeed if it turned out that for certain pairs of forces F_1 and F_2 the resulting force did not equal the vector sum of F_1 and F_2.

The assumption that there are emergent properties, however, would yield exactly this result. It would imply that the general laws of physics have quite a number of exceptions. For emergent properties, at least if they are in part characterized by the fact that objects having this property move in a certain way, cause the parts of the systems whose properties they are to move in ways that cannot be accounted for by the general laws of the relevant sciences. Each such case, therefore, constitutes an exception to these laws; which is why we need a special law to account for it.

Returning to the Standard View, we only have to apply the result of the foregoing considerations. For it is one of Baker's main claims that mental properties make a difference, that more often than not we are able to causally explain the behavior of persons by reference to their intentional attitudes. And there can be no doubt that when I raise my arm because I want to call someone's attention this can happen only if the muscles, cells and atoms which make up my arm move in a certain way. Thus, if the Standard View is false, i.e. if at least some mental properties are emergent, then there are movements of the muscles, cells and atoms which make up the limbs of persons that cannot be explained by the general laws of neurophysiology, biochemistry or physics. The falseness of the Standard View, thus, would imply that all these sciences are weird sciences in the sense explained.

Just to make this quite plain, I am not maintaining that this is impossible, that there is an *a priori* proof that at least physics is not a weird science. (Empirical research *may* show that indeed it is.) But I do think that, for all we know, this is a highly implausible idea. Therefore, I *do* claim, that there is a high *prima facie* plausibility to the position that the Standard View is true.

Perhaps Baker would answer that only someone who is already in the grip of what she calls 'methodological physicalism' is prone to think so.

> The methodological physicalist starts with a theoretical picture based on a philosophical idea of fundamental physics. He looks to see what general principles – like the closure of the physical and strong supervenience – that picture implies. Then, for any putative kind of phenomena, he checks to see how it fits the picture. If he

> cannot imagine how some putative phenomena fit the microphysical world, then it is deemed unsuited for “serious science”. And according to the methodological physicalist, nothing unsuited for serious science can play an ineliminable role in a complete description and explanation of all phenomena. (This volume, p. 23f.#)

But this is not quite the truth. The ‘argument from the implausibility of downward causation’ does not rest on “a *theoretical* picture based on a *philosophical* idea of fundamental physics”. Just like the argument against the Standard View put forward in Baker’s contribution to this volume, it rather rests on “an empirical conjecture about the future of neuroscience” (this volume, p. 19 or, in the end, about the future physics. The argument does *not* run: According to my theoretical picture, complete physics will have such and such features; therefore downward causation is impossible; therefore there are no emergent properties. Instead its main premise is empirical: For all we know, it seems plausible to assume that within complete physics all microphysical phenomena will be explainable by means of a certain set of fundamental laws.

Thus, in the end there seems to be a clash of empirical conjectures concerning the future of certain sciences. Baker thinks that “neuroscientists in the long run will *not* be able to identify particular neural tokens as tokens of the belief that *p* (for any belief that *p*)” (this volume, p. 8#). And she argues that this, together with her other arguments, shows that the Standard View is false. Defenders of the ‘argument from the implausibility of downward causation’ on the other hand think that within complete physics all microphysical phenomena will be explainable by means of a certain set of fundamental laws. And they argue that this implies that there are no emergent properties, i.e., that the Standard View is true (if there are any mental properties at all). Do we have to acknowledge a stalemate? Or is there any means of resolving this difficulty?

There is. For, in my view, defenders of the Standard View are not committed to the thesis that for each token of a mental state there is a corresponding neural token to which it is identical or by which it is realized.[10] Defenders of the Standard View only have to claim that mental properties are not emergent. Whether, e.g., a certain belief is emergent or not, however, does not depend on whether there is a corresponding neural token, but only on whether it follows from the fundamental laws of nature that a person who is made up of such and such cells arranged in such and such a manner possesses all features which are characteristic of someone who has this belief. That is, if a belief is realized at all it may well be realized not by a *particular neural*

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10 The talk of ‘types’ and ‘tokens’ in this context has aptly been criticized in Andreas Kemmerling (1997).

state, but by the *overall state of the person's body*. I am not sure whether Baker would also claim that scientists in the long run will *not* be able to show that a person who is made up of such and such cells arranged in such and such a manner possesses all features which are characteristic of someone who has a certain belief. Maybe she would. But I feel that such a claim would be hard to substantiate.

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