

PHYSICALISM

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Sir Peter Medawar (?) said of life that it is not a scientific concept as nothing turns on it; or in Popper's terms it cannot be tested as it makes no practical predictions that could refute it. The same view is often taken of consciousness.

For this to be true no conscious decision must be of critical importance, and of course just that is claimed. Thus a decision is "really" taken at a subconscious physical level & merely recorded later in consciousness. Perhaps the most compelling evidence in favour of that is the fact that the physical changes that prepare for an action start occurring a significant time before the person involved is conscious of deciding to do it. The result of this "physicalist" view is that there is a parallelism of sorts between physiological function and conscious experience, including conscious functions such as making judgements and decisions. The latter are merely epiphenominal, obediently following the former.

We now enlist some terminology. Galileo introduced the distinction between primary and secondary qualities, the latter being what we experience in consciousness such as colour, tone, taste, pain, feeling generally and so on, while the former are the measurable qualities size, quantity and weight. All science seems to be based on employment of the primary qualities and the elimination of the secondary for scientific purposes. In philosophy the term "qualia" is used for the secondary qualities, the singular of which is "quale". Thus a physicist studying the emission of cadmium atoms might refer to electromagnetic waves being emitted of wavelength 479.991 nanometres, whereas another observer might refer to the emission as blue. These two qualities, one "primary" and numerical, the other "secondary" and subjective, are clearly not identical and the relationship between them is purely empirical, which in itself suffers from the fact that the shade of blue experienced depends upon the context or environment. The well-known example of colourful cars appearing to be black at night under an orange sodium light illustrates the problem. Do we associate 589 nm with orange or black? Common sense steps in of course, but it remains the case that an exact parallelism between wavelengths and perceived colours is hard to achieve. The blue and orange parts of the experiences are qualia, in contrast to the numerical primary parts.

Consciousness is required for qualia to be experienced, but not the wavelengths: indeed who seeing a sodium light would exclaim "oh, I experience 589 nano metres!"?

The physicalist position may thus be expressed by saying that the qualia we experience consciously are epiphenomenal secondary qualities that exist (if they can be said to "exist" at all) in parallel with physical processes in the body, mainly the brain. Generally they are regarded as second-class citizens of no scientific worth and little value beyond the subjective. The strong AI camp epitomised by Marvin Minsky takes such a view because it is obvious that secondary qualities cannot be conjured out of a silicon chip, let alone a set of logical statements forming a computer program. So they must at all costs be demoted at least to impotence, and preferably to non-existence, if the claims made for the future of AI are to hold any promise beyond mere instrumentalism.

How good really are these seemingly water-tight views? We will now attempt to dislodge them. For the moment we will provisionally accept the physicalist assertion that there is a parallelism between physiological processes and qualia, and refer to the assumption that the physical processes are primary and the conscious ones secondary and impotent or illusory, as the *physicalist assumption*. We say 'provisionally' as we do not necessarily have to accept the full-blooded dualism which might be read into it.

In contrast the common sense view that the secondary qualities are actually the primary ones through which all else is experienced (including the results of experiments expressed numerically), that we make conscious decisions that the body then implements, and that consciousness is a decisive factor of our existence, we will call the *mentalist assumption*. We use this term rather than *idealist* as we do not need to deny the physical existence of the body.

First we will illustrate the physicalist position with an in-principle solution for colour. It is notorious that colour is context sensitive as already illustrated, so how is any parallelism between its qualia and physical processes possible? Suppose that light from an object X is of hue H_0 in a context of other coloured objects with hues $H_1, H_2 \dots$. The perceived colour of X depends upon the whole context. It is also possible with a different lighting arrangement of the same scene, where the light from X is of hue H_0' and the hues of the other objects are $H_1', H_2' \dots$, that the perceived colour (quale) of X is the same as before. In other words we cannot assume uncritically a one-to-one relationship between physical states and qualia.

We could imagine a neuron complex N_0 in the brain registering the hue H_0 which has inputs from the neuron complexes N_i registering the other hues $H_1, H_2 \dots$ of the context. If, for example, the state of N_0 that is paired with a quale is a number-triple (e.g. voltages with those magnitudes) which is contingent upon the other N_i , it must be many-one as a complex set of relationships results in a single number-triple. The contingency involved must exactly map that of all possible colour qualia, which means they are represented by physical quantities such as number-triples mapping primary-colour-triples. Thus N_0 can end up with the same triple from some other H_0' and the other H_i' of its context just because it is a many-one relation. A simple example of such a relation is that of the speed of a car which can be the same for two different combinations of road incline and throttle setting. Thus it is quite conceivable after all that a parallelism exists between colour qualia and brain states. Of course the actual processes in the brain may be more complex, or indeed quite different, but that is not the point, which is that logically it is possible in principle to envisage a parallelism as is needed by the physicalist assumption. It is senseless to suppose that there is a merely logical flaw in the assumption, although of course eventually it may turn out to be wrong for other reasons.

If some process can occur purely within consciousness, essentially affected only by the qualia involved, then of course the mental could have a real effect upon the physical. For example one might

1. Change one's mind;
2. Base a decision to act on the perception of a form e.g. the outcome of throwing a dice
3. Base a decision to act on a perceived colour (qualia)
4. Base a decision to act on a presently calculated result e.g. the price of some merchandise

In reply to 1 the physicalist assumption can be upheld by saying that the change of mind was physically caused. Similarly for the others. As we have seen, a perceived colour can be mapped onto a physiological state. The scope of the parallel assumption seems devastating. But we should note that, there must be conscious recognition of the outcome in 2, 3 and 4, and the action taken depends upon that recognition i.e. the action depends upon a judgement (thought). Can such a judgement be made purely physically? i.e. can a brain process occur that is only mirrored in consciousness as an illusion of judgement? This is less clear cut. Also the right of veto on most actions exists, which is exercised in the mental realm.

Can there be relations between qualia that are not reflected physically? If so the physicalist assumption would be undermined. The context dependence of colour could have been promising in this respect, but as we saw it does not hold up.

The operations of logic do not depend upon the structure of the brain as the rules governing e.g. syllogisms are not physical but logical. They can be paralleled in principle by any physical bearer, brain or silicon. But the point remains that the validity of the logic is not determined by brain tissue or silicon: it is purely logical.

None of the above arguments against the physicalist position are conclusive, however.

But, it is assumed that the physical is primary and that the qualia map it; if a structural isomorphism exists as claimed (as e.g. for colour), then there is no logical reason to claim the physical must be primary (the physicalist assumption); the mental realm could just as well be primary (the mentalist assumption) precisely because of the parallelism, with the physical mirroring it rather than the other way round. Our experience supports this more than the physicalist view, particularly where actions depend upon conscious judgements, because consciousness is essential for those judgements to be made. In this way we secure the logical possibility that physicalism is wrong by turning its own argument against it. Arguing from evolution, we may turn another physicalist argument on its head: namely that consciousness has no function if the physical is primary; as Medawar put it, nothing would then turn on it. But then in line with standard evolutionary thinking, consciousness would never have been evolved in the first place if it is useless. That it exists and is experienced by all of us testifies that it is needed, in which case the evidence tips in favour of the world of qualia being primary, and the logic of the physicalist arguments are just as compelling when inverted i.e. every physical process associated with cognition only mirrors a mental process. Should there be a logical flaw in this, that flaw would logically apply equally to the physicalist argument. However, there is a value-added aspect to this view: the mirroring physical processes then serve to produce the physical actions that were decided upon at the qualia or mental level. Occam's razor would cut out consciousness if the physicalist assumption was correct, whereas the mentalist assumption accounts for the existence of consciousness. It also, of course, gives a proper place to a non-physical aspect of the world which is strenuously opposed by the physicalists. But as is recognised by philosophers, qualia can no more be dismissed on logical grounds than can physical states. Indeed it has never been conclusively agreed by all philosophers even that there is a physical world! For example Bertrand Russell (Sir Karl Popper also) was a dualist who accepted the existence both of the platonic world of universals and the world of experience. He produced no logical or philosophical argument to support the existence of the outside world, appealing instead to common sense (Russell undated).

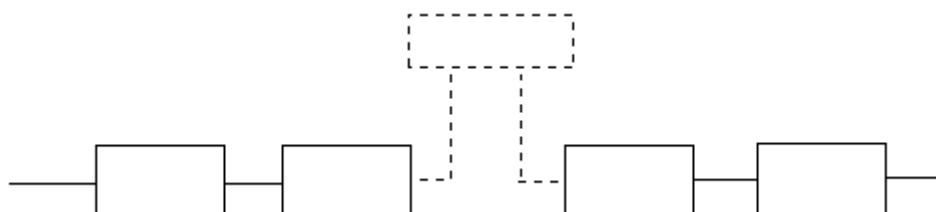
Interesting evidence is often cited from the study of ill people, where it is clear that there is a break-down of the normal parallelism between the physical and the mental. In such cases it is surely not surprising that either the one or the other can "go it alone", so hands can grasp objects not consciously seen, and withdrawal into the mental world can happen which is not paralleled by physical events. Such fascinating studies can throw much light on the way the parallelism works, or not, but they need to be treated with great caution when used to support either the physicalist or the mentalist assumption precisely because they are pathological. Clearly the physical can then dominate in some cases, but that does not prove physicalism as a whole any more than exceptions really prove the rule. Equally, as in the studies of Oliver Sachs (*Awakenings*) for example, total withdrawal followed by later re-awakening does not prove the correctness of the mentalist assumption. Pathological conditions are just that: pathological.

So far we have accepted the idea of parallelism postulated by the physicalists to the full, and we have seen that it is two-edged. But the full-blooded acceptance of dualism seems unsatisfactory as either assumption requires actual connections between the physical and mental, or there is no satisfactory reason why the parallelism should be maintained. Russell remained a dualist because he could find no connection between the platonic and experiential worlds, although he came within a hairs-breadth of finding it (*op cit*). Steiner (1992) did find the bridge, namely the activity of thinking. Thinking in its various manifestations clearly has access to the platonic world or we would be unaware of that and certainly unable to employ universals

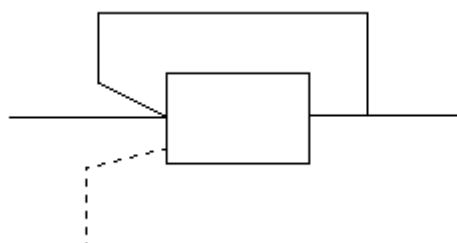
successfully. Yet we can also experience our own thinking activity by thinking about it (otherwise we would never use the term “thinking”), so it is also part of the world of experience, and thus bridges the two. When a judgement is made in the mental world that process affects the physical directly (e.g. suppression of alpha rhythm in the brain for most people during concentrated thought), so an intimate connection exists between the mental and physical. The short-circuiting or bridging of the two worlds raises questions about the whole dualist assumption, and suggests instead that we do not have a parallelism so much as a symbiosis. But the earlier logical arguments related to parallelism are not thereby undermined, but even strengthened as symbiosis is more intimate than parallelism and so the two-edged argument remains.

The strongest card in the physicalist’s hand is that mentioned at the start: that the physical preparations for action start significantly earlier than the reported time of the consciously taken decision. The difference is of the order of two tenths of a second (Norretranders 1998). However it should be remembered that bodily activity expressing *will* is for the most part unconscious e.g. exactly how muscles are co-ordinated etc., and a decision is an act of will in the mental realm which perhaps becomes conscious as a thought slightly later. Remember that we are – mercifully - not conscious of the whole of the platonic world all the time, so our involvement in it need not be wholly conscious; there is room for a physically reflected time lag. Various studies as well as everyday experience have shown that there is no simple relation between consciousness and time (compare the apparent elapse of time at a party and during an exam., or in a dream where it may even appear inverted compared with a physical stimulus).

Let us look at this in more detail. It is stated that the physical world is causally closed, see for example Velmans (2000) who argues strongly against reductionism and eliminativism but in the end postulates *ontological monism* combined with *epistemological dualism* i.e. the physical and conscious worlds are really one, but our knowledge of them is perforce dualistic. Yet no proof is given that the physical world is causally closed, and we might question that strongly in the face of the great complexity of the brain combined with the fact that experiments are interpreted within a purely physical paradigm that could easily hide any “gaps”. What kind of gap is intended when it is said that there are none? The following diagram might illustrate what is meant:

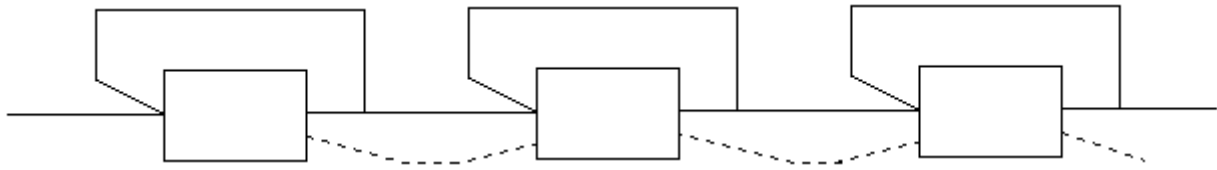


where the dotted part represents a non-physical intervention, and the boxes represent physical sub-systems with physical signals being transmitted by the solid lines. If this is meant it is very crude indeed. A more subtle approach could be represented by



which shows a simple feedback situation together with a non-physical intervention that modifies the properties of the sub-system. This could easily be missed experimentally as the total response could always

be regarded as purely physically determined because there is no apparent physical gap. If we apply this idea to the above problem of consciousness always lagging behind the physical antecedents, we might imagine a series of sub-systems each of which has a response time of 200ms:



Thus an initial input may be purely unconscious, and then 200ms later consciousness of that is acquired *which then modifies the response of the next subsystem in the series*. Consciousness then “oversees” the total physical sequence in the brain by modifying or inhibiting the final outcome. The lag is never more than 200ms as consciousness takes control after the first input, and the total lag is zero as the final output accords with the final modification of state. This is the simplest conceivable such state of affairs for the sake of clarity, and more complex feedback loops, both solid and dotted, are possible, indeed likely. Yet if the dotted lines are ignored we apparently have a causally closed system, with variable response characteristics that are *assumed* to be only physically produced.

Thus taking this bull by the horns, we see the parallelism we have discussed in a complementary light. The assumption that *because consciousness always follows the “true” physical causes therefore it is impotent* is far too simplistic, and in control terms it assumes an “open loop” relationship between the physical and the mental which is clearly false even on the simplest grounds.

Of course we must establish what aspects of the sub-systems are controllable in this way. Consciousness has to be aware of the physical states and capable of modifying them. Perhaps the most likely is the temperature, or else the electrical state, of the sub-systems. Subtle infusions of heat or electrical conductivity could easily be imagined in principle. It is doubtful that anyone has really established the total heat content of the brain and shown that it is absolutely conserved (how could that be accomplished to the level of accuracy required?), or that the electrical properties are totally without apparent drift or other influences usually dismissed as “noise”. We don’t look for missing or broken dendrites, but shifts in excitation or inhibition thresholds. The ability of positive feedback loops to amplify quite small interventions of this kind is well known to control engineers, and the number of feedback loops in the brain is very large. Another aspect that has acquired great importance is the chemical environment which can decisively affect response, and subtle changes in concentration gradient are significant.

We see that the consciousness time-lag is not nearly as decisive as it at first seems. We have also established logical parity between the physicalist and mentalist assumptions, with good reasons for favouring the latter. In particular the arguments about logical thinking, and the need to be conscious to make a decision, seem persuasive. To maintain the physicalist view thus becomes a faith rather than a scientific necessity. To investigate whether the one or the other ultimately proves superior is of course good science, but extravagant claims in favour of physicalism are unwarranted; even more so are claims that the mentalist assumption is somehow inferior or unscientific. The “problem of consciousness” for science is the unwillingness to entertain another aspect of reality besides the physical. All considerations of this subject, including this article, require us to think, as do hypotheses about brain processes related to thinking. Thinking comes first for the knower, and any attempt to demote its primacy is thus self-contradictory. In reply to Medawar’s style of criticism, everything in the human realm turns on consciousness for the mentalist assumption, and to say nothing turns on it is to assume the physicalist assumption uncritically.

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?, Sir Peter Medawar, ?

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