Why physicists should pay attention to the mind

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In this post I'll explain why physicists should pay attention to the mind, but I should clarify that the word "should" is to be understood in the following way. In order to say what a person should do, one must first know what the goal is. Once one knows what the goal is, the question of what one should do is a strategic question, and not a moral one. Hence only rational thought, and not emotional or social pressure, should be used to decide whether something should be done.

Volition, in so far as it must be employed in the course of deciding what to do, should, once the goal has been settled, restrict its activity to the direction of attention, and should not be in the business of affirming statements. That is, any time somebody affirms a particular statement as true, and resolves to consider it to be true in the future through force of will, rather than by simply paying attention to the question of whether it is in fact true, he thereby distorts his own understanding. To clarify this point further, perception of the truth of a statement which can be readily deduced is an involuntary act, and the only deliberate thing which must be done if one wants to understand that it is true is pay attention to it. If we render statements true in our mind by mere voluntary affirmation, when the involuntary perception of their truth is lacking, then we delude ourselves.

It has to be left to the individual to determine in any given circumstance whether he is being honest with himself. Opinions and beliefs, which are never accompanied by a perception of their truth, for otherwise they would count as knowledge, and would not need to be opined or believed, are instances of self−delusion as described above, and must be eschewed.

In any case, it is assumed here that the goal is a clear understanding of why things in physics are the way they are, and what way they are. If the goal of an individual is to get tenure, or be hailed as the next Einstein, then they should only pay attention to the mind in so far as doing so helps them achieve that goal, which is a social goal.

Similarly, if the goal is to merely be a good working
physicist, and have a successful career without understanding
a thing, then there is no need to pay any attention to the mind.

Ralph Hartley writes:

>rof@xxxxxxxxxxx wrote:

>> There was a global prohibition on physicists talking or even thinking
>> about the mind

>Can you show me something positive that resulted from them doing so, or
>even any valid argument that they should?

First, I'll address the question of something positive that resulted,
and then give valid arguments that they should. However, I want
to emphasise that each person has procedures by which they come
to regard statements as facts, or as truths. A physicist who
accepts "the lessons of history", or merely the word of a famous
physicist who he respects, as sufficient evidence to support
a statement, is a poor physicist. In that regard, I assert
that the valid arguments which follow the historical and
authoritative arguments are the ones which deserve more
attention.

Second, I want to set the stage by caricaturing a "debate" in
philosophy, namely the debate between ontologists and epistemologists.
In physics, there is a corresponding debate between people
who call themselves realists and those who don't.

Ontologist: I'm examining the things that exist. Really really exist.
Like the world. That really really exists. It's really real.

Epistemologist: We need to pay attention to the way in which we
acquire knowledge, and to the status of that knowledge.

O: No we don't. We can know the *truth*. The truth about what's
real.

E: If we do pay attention to the way in which we acquire knowledge,
we find that reality is a flag that we set on certain mental
constructs of ours. We begin from our sensations, construct
representations that we call objects, and then regard them as real.

O: You're saying the world isn't real.

E: No I'm not. I'm not asserting that we are making a mistake
of any kind when we regard the objects around us as real; I'm
asserting that we do, in fact, regard them as real.

Ontologist 2: What's that epistemologist talking about?

O: He says the world isn't real.

E: No I don't. The objects that we perceive around us are indeed real. We regard them as real and we are right to do so.

O2: He's talking about perception. Is he crazy?

O: Yeah, he's crazy. He said the world isn't real. Let's get back to ontology.

O2: We're studying what's really really really real.

O: Yes, really really real. ...

Now, the reasons why I'm drawing attention to this debate are twofold:

1. The study of epistemology requires paying attention to the mind. By this I mean paying attention to the way the mind handles and processes data. I do not mean repetitively saying things like "The mind exists. It's real. Really really real. Like the physical world. That's really really real too. The physical world causes the mind. It must, because the physical world is really really really really real." To study epistemology, one must wean oneself off ontology, which can be regarded as an unhealthy obsession with the notion of reality.

2. The vast majority of physicists are ontologists. Anyone who calls himself a realist is an ontologist, and most physicists are realists. Physicists who are realists consider themselves opposed to those stupid people who think the world isn't real. They invite such people to jump out of the window if they really believe that the world isn't real, and thereby discover just how real the world is. The first thing epistemology has to teach ontologists is that the statement "The world is real" is not even wrong; it's vacuous.

Now that the stage is set, we appeal to history and to authority. Appeals to authority in physics should always begin with Einstein:

' "The physical world is real." That is supposed to be the fundamental hypothesis. What does "hypothesis" mean here? For me, a hypothesis is a statement, whose truth must be assumed for the moment, but whose meaning must be raised above all ambiguity. The above statement appears to me, however, to be, in itself, meaningless, as if one said: "The physical world is cock−a−doodle−doo."' Einstein, [1]

'Science without epistemology is −− insofar as it is thinkable at all −− primitive and muddled.' Einstein, [2]

'"How does it happen that a properly endowed natural scientist comes to concern himself with epistemology? Is there no more valuable work in his specialty?" I hear many of my colleagues saying, and I sense it from many more, that they feel this way. I cannot share this sentiment. When I think about the ablest students whom I have encountered in my teaching, that is, those who distinguish themselves by their independence of judgment and not merely their quick−wittedness, I can affirm that they had a vigorous interest in epistemology. They happily began discussions about the goals and methods of science, and they showed unequivocally, through their tenacity in defending their views, that the subject seemed important to them. Indeed, one should not be surprised at this.' Einstein, [3]

The latter quote was in a memorial note for Ernst Mach. Einstein considered Mach's ideas the prelude to the theory of relativity. Mach wrote things like this:

'Colours, sounds, temperatures, pressures, spaces, times, and so forth, are connected with one another in manifold ways; and with them are associated dispositions of mind, feelings, and volitions. Out of this fabric, that which is relatively more fixed and permanent stands prominently forth, engraves itself on the memory, and expresses itself in language. Relatively greater permanency is exhibited, first, by certain complexes of colours, sounds, pressures, and so forth, functionally connected in time and space, which therefore receive special names, and are called bodies.' Mach [4]

According to a random web page: In Beitrage zur Analyse der Empfindungen (1886; Contributions to the Analysis of the Sensations, 1897), Mach advanced the concept that all knowledge is derived from sensations thus, phenomena under scientific investigation can be understood only in terms of experiences, or "sensations," present in the observation of the phenomena. This view leads to the position that no statement in natural science is admissible unless it is empirically verifiable. Mach's exceptionally rigorous criteria of verifiability led him to reject such metaphysical concepts as absolute time and space, and prepared the way for the Einstein relativity theory. [5]

So, I claim that Einstein's development of relativity was a positive development that depended upon his willingness to investigate epistemology. Einstein paid attention to the mind:

'I believe that the first step in the setting of a "real external world" is the formation of the concept of bodily objects and of bodily objects of various kinds. Out of the multitude of our sense experiences we take, mentally and arbitrarily, certain repeatedly occurring

complexes of sense impression (partly in conjunction with sense impressions which are interpreted as signs for sense experiences of others), and we attribute to them a meaning−the meaning of the bodily object. Considered logically this concept is not identical with the totality of sense impressions referred to, but it is an arbitrary creation of the human (or animal) mind. On the other hand, the concept owes its meaning and its justification exclusively to the totality of the sense impressions which we associate with it.' (Einstein)

This was quoted recently by Brian, but it bears repeating.

Other positive developments include the contributions to the development of quantum theory and to the standard interpretation of quantum theory by Niels Bohr, who said:

'From our present standpoint, physics is to be regarded not so much as the study of something a priori given, but rather as the development of methods for ordering and surveying human experience.' Bohr, [6].

"The fact that in atomic physics, where we are concerned with regularities of unsurpassed exactness, objective description can be achieved only by including in the account of the phenomena explicit reference to the experimental conditions, emphasizes in a novel manner the inseparability of knowledge and our possibilities of inquiry. We are here concerned with a general epistemological lesson illuminating our position in many other fields of human interest." Bohr, [7]

Recall that the Copenhagen interpretation of quantum mechanics supposes that the wavefunction represents knowledge, rather than representing the "really really really real." Almost all subsequent interpretations of quantum mechanics treat the wavefunction as something that's really really real. That is, they are ontological interpretations, as opposed to the Copenhagen interpretation, which was epistemological. This is not to say that the Copenhagen interpretation is the correct one, but it was certainly a positive development in the history of physics, and it was the interpretation of the founders of quantum mechanics. I assert that the widespread rejection of the "wavefunction represents knowledge" position by modern physicists, and the subsequent arising of the "measurement problem", stems from the fact that modern physicists refuse to think about epistemology, because it has something to do with the mind. They are playing the role of the ontologist in the debate I caricatured above.

As a final example, I'll cite Hamilton:

"Endeavoring to attend to thoughts rather than to things, we form the nearest approach to the idea of time when we think of one order

as the mental basis of another, and consider the latter arrangement, which in this view resembles the course of events, as reducible to a mental dependence on the former arrangement which corresponds to the course of time." Hamilton, [8]

These were part of the musings which lead Hamilton to write his article, "Algebra as the Science of Pure Time", which, for the first time, gave a comprehensible meaning to the notions of negative and imaginary quantities, and which lead to the development of quaternions.

Summarizing the something positive which resulted from physicists thinking about the mind: Relativity, quantum theory, quaternions, and a firm footing for negative and imaginary numbers. There are, doubtless, many other examples that I've left out, like Oersted's prediction that chemistry would one day be reducible to physics and so on.

Anyway, the dedicated ontologist can always respond by saying that Hamilton was a fool and a drunk, Bohr was an obscurantist, and Einstein succeeded despite his engaging in such nonsense, rather than because of it.

I cannot defeat these arguments, and am not inclined to try. As I mentioned above, a physicist who accepts arguments from history or authority as sufficient to establish a truth is a poor physicist, and rational arguments (meaning those which appeal to the person's reason, rather than to their emotions or willingness to acquiesce or respect) are much more important. I am certainly not a historian, and even if everything I have claimed about history is false, it doesn't matter.

Just before I leave the subject of arguments from history and address the question of valid arguments regarding why physicists should pay attention to the mind, I will draw attention to an argument from history with which every physicist who has received a good indoctrination should be familiar. It's the story of Copernicus, who, as we all know, knocked man from his pedestal at the centre of the universe. The Earth goes around the sun, and not the other way around, as people had previously thought.

Well, the "lesson of history" is this: That nothing human, such as the mind, is ever of any significance in the investigation of physics. I contend that anybody who believes that the historical events of several hundred years ago are sending him messages, establishing the truths of certain statements like the above, is hallucinating.

This does not mean that I claim that we all have to

pay attention to "our human side", with love and poetry and other such fluff. I claim merely that no fact has been established by Copernicus' insights other than that the Earth goes around the sun. Yes, people were perhaps foolish to suppose that the universe was constituted such as to afford them some position which a human would interpret as an honourable one, but perhaps this should be interpreted as a warning not to let a sense of self−importance lead us to assert the truth of a statement ("I'm a theoretical physicist and I'm great, therefore I have nothing to learn from epistemology"), rather than as a proof of anything in particular.

So much for the lessons of history.

Now I proceed, at last, to the arguments about why physicists should pay attention to the mind. There are arguments a priori and a posteriori, which in this case means without taking into account the accumulated body of knowledge about physics, and taking it into account, respectively.

First, let me note that, since I am contending against the powerful forces of a meme, I am at a disadvantage compared to one who simply wishes to explain that a certain course of action is advisable. Most of the theoretical physicists of the world have been subtly manipulated by a communicable mental disease to such an extent that they refuse to acknowledge that the mind even exists (hence, "The physical world is all there is").

When they are confronted with wise arguments which establish beyond doubt that the mind does exist, they will respond by defending their meme − change the subject, act dismissively, try a one−line defense which relieves them of the burden of investigating the consequences of this new fact. Hence, we expect them to say "I don't have to think about it because the mind is the same thing as the brain/corresponds to it/is an aspect of it/isn't worth thinking about for some random reason." Recall from the elementary theory of viral memes that sustained logical analysis of the subject matter with which the meme deals is dangerous to the meme, since it threatens its survival. Hence memetic religion will tell you that you need faith, which is an ability to ignore and, through force of will rather than understanding, defeat logical investigations which reveal its absurdness. Also, those who attack our viral memes are irritating to us, and seem worthy of ridicule, since without an ability to inspire these reactions in us, the memes wouldn't spread.

We therefore adopt a pugnacious attitude to those who challenge our memes. Here I am challenging a meme which says "Do not think about the mind. Ridicule those who do." The theoretical

physicists who were once interested in the mind have lost their interest, or at least any public display of it, for fear of ridicule. Accordingly, one who approaches the infected to tell them that they are diseased will be issued with an unfair challenge − Prove beyond doubt that investigating the mind will bring immediate benefits, or cease your tiresome troublemaking.

So, my first a priori argument is this:

Deliberate ignorance of any subject is always a bad thing (from the point of view of achieving any goal which requires knowledge). The ban on thinking about the mind was unjustified in the first place; I should not need to justify removing it. Asking me to justify removing the ban is unreasonable because any ban on thinking about a subject can only lead to a poorer understanding of things in general. If somebody proposes that I should forever remain ignorant of a certain subject matter, I would refuse and should not have to immediately demonstrate that that subject matter is valuable to me. The peculiar characteristic of knowledge is that you don't know how valuable it is until you have it.

My second a priori argument is this:

The mind has structure. There are sensations, perceptions, conceptions, volitions and emotions. These stand in readily describable relationships. Perceptions result from processing of the information provided by sensation; from the representations provided by perception I can form concepts (as in the concept of a body). Volition and emotion are of less direct interest to a physicist, but nonetheless stand in specific relations to the rest of the mind.

Only introspection is necessary to see that there is a lot of structure there. Perception has perhaps the most structure, rivalled only by memory. Intuition, which mathematicians and physicists make considerable use of, is a mental faculty. To assert that we shouldn't think about it is to imply that it is good to remain ignorant of how intuition works and helps us understand physics and mathematics. The structure of intuition and the structure of the mind generally determine what takes place when we regard a proof as valid. More generally, the mind is what we use to think about physics. Mathematics, in so far as one can prove theorems in one's head without moving any muscles, is a form of introspection. Things which have structure can be described, understood, theorized about.

The third argument is:

The material objects with which physics deals are not simply detected by the mind. The things which the

mind simply receives are sensations. Objects, which Mach called bodies, must be constructed. Our perceptual apparatus adds features to the world, such as depth, which were not merely detected by us.

The feeling that we get, when looking at an object, that it is far away, is not merely a recognition by us that the spots on our two retinas have a specific relationship. It is the awareness of depth, which differs from the awareness of a relation of two spots. In this sense, the depth of which we are aware was not detected by us, but it was actually generated by the perceptual apparatus in response to something which was nothing at all like depth.

In that sense, the world around us, which is a perceived world, is actually generated by our perceptual faculty, rather than passively observed.

The fourth argument is:

Experience is fundamental. No matter what way a particle or group of particles move, it will never satisfactorily explain why there is an associated experience. It may explain behaviour, but all that can be done is to explain why the material stuff moves the way that it does. Merely understanding the motion of the matter does not explain why phenomenal experience occurs. The hope that, somehow, sometime, somebody will find a particle moving along a certain type of curve, or an electric field oscillating in a special way, and that that discovery will explain phenomenal experience, is a severe self−delusion.

Once the "the mind does not exist" meme has been eliminated, the next step is to realise that the mind is not a physical object. Mere correspondence with a physical object is not sufficient to make it not worth thinking about. The claim of physics, that it explains absolutely everything, must be reexamined if there is something which it cannot explain, and physicists who attempt to dismiss this unexplained phenomenon by saying that it "corresponds to", or is an "aspect of" a physical thing, can only arouse suspicion by trying to distract attention away from such a glaring exception to the original claim that absolutely everything was explained.

That is, if somebody tells me all about physics and then claims to have explained absolutely everything, and I ask

"What about the mind?", if they respond with "Oh, that corresponds to the brain, a physical object," then I would want to know what else they've decided to leave out. What else "corresponds to" physical objects? Why can't the existence of this mind be deduced from physics?

But one of the central points of epistemology is precisely this: that the objects that we call bodies, or physical objects, are mental constructions which were generated to represent certain recurring or persistent patterns of sensations, as Mach and Einstein explained more clearly above. We may very well characterise the behaviour of such objects, but that can never be a satisfactory explanation of why there were sensations in the first place.

The point here is not to denigrate physics by showing that there is something that it can't explain, but rather to say that, if one wishes to understand what physics is and its relation to what is going on in general, one should not refuse to think about the mind, and justify this by saying that physics explains it all. The reason one shouldn't do this is because physics doesn't explain the mind; rather, the mind is the organ with which we do physics, and an investigation of what the mind is doing will reveal what physics is. This is what Niels Bohr was trying to do when he said that physics was the development of methods for ordering and surveying human experience.

Now for some a posteriori arguments:

My first argument was originally given by Einstein:

"It has often been said, and certainly not without justification, that the man of science is a poor philosopher. Why then should it not be the right thing for the physicist to let the philosopher do the philosophizing? Such might indeed be the right thing at a time when the physicist believes he has at his disposal a rigid system of fundamental concepts and fundamental laws which are so well established that waves of doubt can not reach them; but it can not be right at a time when the very foundations of physics itself have become problematic as they are now. At a time like the present, when experience forces us to seek a newer and more solid foundation, the physicist cannot simply surrender to the philosopher the critical contemplation of the theoretical foundations; for, he himself knows best, and feels more surely where the shoe pinches. In looking for a new foundation, he must try to make clear in his own mind just how far the concepts which he uses are justified, and are necessities." Einstein, [9]

No matter how few physicists are willing to admit it, there is a problem with quantum theory, and the problem is that we don't know why the formalism of quantum mechanics works. All of the interpretations of quantum mechanics were made up

after the formalism was established, and nobody can start
from an interpretation and deduce that the formalism that
is used is the right one to use.

Not only that, but, for any system with a measuring apparatus, we
can consider the measuring apparatus to be part of the system by
enlarging the Hilbert space, and then supposing that we use another
measuring apparatus to measure the first one. Repeat this process −
where does it lead? The thing which is called "the system" and
which is represented by a Hilbert space can continue to grow and
take in more and more of the mediate instruments which we use to
make detections until it goes into our eyes and then into the brain,
as Wigner pointed out. Merely thinking about quantum mechanics leads
us to thinking about the mind. I say if that's what we need to think
about then let's think about it.

On the subject of wavefunction collapse, Aaron Bergman recently
said:
>Decoherence really does solve this issue up until you start to ask
>questions about the human brain. At that point, I advocating throwing up
>one's arms and being happy that we seem to get the right answer.

With due respect to Aaron, I advocate not surrendering, not
being humble, and walking unafraid into the field of philosophy
if that is what is necessary to make progress.

As Einstein says, we shouldn't leave philosophy to the philosophers,
especially if there's work to be done in theoretical physics. The
present method in theoretical physics is to not ask questions −
use quantum mechanics and don't ask why it works; don't ask
why particles move along geodesics; don't think about the mind.

Although I realise that by this stage I've used too many Einstein
quotes, let me give one more:
"The intuitive mind is a sacred gift and the rational mind is a
faithful servant. We have created a society that honors the servant
and has forgotten the gift."

By the intuitive mind, I understand one which can think about
philosophy, and by the rational mind, I understand one which
can think about mathematics. Even if this wasn't what
Einstein originally meant, it is abundantly clear to even the
lay−person that theoretical physics is currently over−populated
by people who think that pure mathematics is the only way
to investigate fundamental physics. These people are successful
because they easily intimidate the ignorant, by telling them
that nobody can deny that they are geniuses unless the denier
knows more than they do about elliptic quantization of hemiharmonic
McMartin−Souviov forms. Now, we do need to have a good understanding
of mathematics, but what appears to have happened in theoretical
physics is that some people with mathematical skills but

little broader understanding have bullied everybody else
into worshipping mathematical knowledge.

The question we need to ask now is: "What is it that we are applying mathematics to?" Once we answer that, we will know what mathematics to use. If we don't answer that question, we fumble around in the dark, picking up one mathematical object after another, checking to see if it matches what we are looking for, without knowing what the next one we pick up will be, or even what fashion will lead us to consider it.

What makes fundamental physics interesting is its philosophical character. Black holes, the weirdness of quantum mechanics and relativity − that is what makes us do theoretical physics. Now we are being told that there is nothing more of philosophical interest in physics, and that from here on it's all mathematics that takes ten years to learn. We are told this by those who want us to respect them for their mathematical prowess, even though they have nothing deep to tell us, except that the particular type of pure mathematics that they study is very deep. These same people will tell us that you shouldn't think about philosophy or the mind, that all progress comes from calculating without thinking. Ignore the philosophy and think about the mathematics is their advice. And whatever you do, don't think about the mind.

Even apart from the fact that quantum mechanics is almost telling us to think about the mind, there is the problem of reconciling quantum theory with gravity. This problem seems to be very difficult to solve using the present method of theoretical physics, which is to take the formalisms given to us by earlier generations of physicists (who did think about philosophy) and try to fit them together without asking why each of them works. From what we know, it seems possible that an understanding of how gravity and quantum mechanics fit together might shed some light on the beginning of the universe; at least it will tell us more than we currently know. This is an issue of philosophical significance. It is naive to think that the unresolved philosophical issues of, for example, the role of the observer (meaning the mind) can be ignored while pure mathematics tells us how the universe came into existence, especially when quantum mechanics, in which the role of the observer is central, is half of the problem.

My second a posteriori argument is:

Straight lines. Newton's first law says that things move
in straight lines, unless there's a reason for them not
to, and we call that reason a force. Something similar
but more complicated survives in general relativity.
But how do I know when a line is straight?

Most non−vision people would guess that a projection of a straight line onto the retina would be straight, and that would allow the inference that a line is straight. Or, they might guess, if the image on the retina isn't straight, it should at least be one of a class of special curves on the retina, where those special curves are the projections of straight 3D lines.

Well, this isn't quite right. When a person puts on powerful glasses for the first time, the world appears curved, if more clear. A falling object, undisturbed by wind or anything else, appears to move along a curved trajectory. Similarly, a car moving along a road which was known to be straight will appear to move along a curved trajectory, and, if one watches the same stretch of road for a long time, several cars will trace out the same curved trajectory. After several days, however, the world doesn't seem curved to the person any more; the cars seem to be moving along straight lines. Ask somebody with strong glasses about this if you haven't had the experience yourself. (George Stratton, in 1896, noticed that if you wear glasses that make the world appear upside−down, after a few days you see the world the right way up.)

What happened? The glasses didn't change, and nor did the projections of the cars' trajectories onto the retina, but the perception corresponding to the same series of sensations changed from a curved trajectory to a straight one. Of course, you always knew that the trajectory was straight "in reality", but your perceptual apparatus took time to adapt to the new situation, and it had nothing at all to check its data against.

That is, how did your perceptive faculty know that you weren't looking at a genuinely curved world, with cars moving along curved trajectories? It couldn't have. One must conclude that if you were really looking at a curved world with things moving along curved trajectories, your perceptual apparatus would "adapt", and make the trajectories, which you see traced out again and again by various objects, look straight. If you find this shocking, then you understand. If you find it confusing, you don't.

Of course, there are constraints. Two trajectories which intersect each other at more than one point can't both be made to appear straight, and there are lots of other constraints as well. Hyperbolic geometry is not the same as Euclidean geometry. Still, though, whether a line looks straight to you or not depends not only on the characteristics of the projection onto your retina, but also upon the statistics of what you have seen before. It is not entirely

inconceivable that Newton's first law is at least partially a consequence of something that our perceptual faculty does − take the most frequently occurring trajectories and present them as straight lines.

Recall that the space which we see around us is put together by our faculty of perception (or, if you've never realised it before, notice it now). That space has not only a topology, but also a geometry, and, when your perceptual apparatus assigns the geometry to it, it must correct for defects in your vision and haptic (touch) senses, and so it must be adaptable, and it must adapt based only on the statistics of sensations (for there is no other source of information available), so perceiving a line which you see or touch to be straight or curved is not merely an act of detection, but an act of comparison to what you have seen before.

Now, many physicists might consider this implausible, because of the desire to look down on fields outside of physics as though they were less worthy of investigation. The fact that a trajectory can appear curved or straight depending on whether one has adapted to one's new glasses yet is not a matter for dispute, but the connection to Newton's first law is. I assert that hand−waving dismissals or mere expressions of distaste are not valid arguments against the idea that at least some of the things which we currently consider laws of nature are in fact consequences of the way our perceptive faculties adapt to the information presented to them. Dogmatics statements (meaning statements made without proof) that it is not true are not good enough either. Only valid arguments will do, and if valid arguments are found to dismiss an idea, then fine, let it be dismissed, but a ban on thinking or talking about it is quite simply stupid.

I will leave the arguments in favour of thinking about the mind there, but will add two other points.

The first is that, although epistemology is not physics, we still do not want to be wrong, and we will be wrong if we assert that the statements that we like are true, without checking to see if we can satisfy ourselves that they are true. Furthermore, in philosophy, we do not have the luxury of experimental results to guide us, unlike in physics, and so the standards to which arguments should be held should be higher than they are in physics. This is most certainly not the case in academic philosophy at present, and so the philosophy of physics (which, in case anybody has missed the point, is epistemology, and not ontology) cannot be left to the philosophers, precisely because of the notion of rigour (and also because

the vast majority of philosophers are ontologists).
So, the realisation that the mind is important is
not a license to speculate about "what really exists",
and nor is it a license to relax the standards of
rigour that physicists are supposed to have.

The second addresses the question of how one begins in practice to learn about the mind and its relation to physics. If you want a gentle introduction, read "Visual Perception: How We Create What We See", by Don Hoffman. If you want historical background, read Aristotle's "Metaphysics". Those were only my recommendations; you may find something that suits you better elsewhere. It is not merely a recommendation of mine that you read Kant's "Critique of Pure Reason"; Hamilton, Einstein, Goedel and everybody clever since Kant recommend it. This is the last major book to have been written on the subject of epistemology (and is generally recognised as one of the most important books in the history of philosophy, if not the most important), and almost no progress has been made on the subject since then, mostly because almost nobody has read the Critique more than once, while it needs to be read at least five times before it begins to make sense.

As my final prod to get you think about the mind, let me appeal to the most vulgar part of you − the part which inclines you, in your search for self−respect, to prove that you are one of the elite, with a quote from Kant himself:
"Should any reader find this ... obscure, let him consider that not every one is bound to study Metaphysics, that many minds will succeed very well, in the exact and even in the deep sciences, more closely allied to intuition, while they cannot succeed in investigations dealing exclusively with abstract concepts. In such cases men should apply their talents to other subjects." Kant, [10]

Finally, epistemology is part of philosophy and not physics, so follow−ups should go to alt.philosophy.debate, and not sci.physics.research.

R.

1 Letter from Einstein to Schlick, Sep. 25, 1918
2 Schilpp, Paul Arthur, ed. (1949). Albert Einstein: Philosopher−Scientist. The Library of Living Philosophers, vol. 7. Evanston, IL: The Library of Living Philosophers.
3 Einstein, 'Ernst Mach.' Physikalische Zeitschrift 17 (1916): 101, 102
4 Ernst Mach, The Analysis of Sensations and the Relation of the Physical to the Psychical
5 http://www.phy.bg.ac.yu/web−projects/giants/mach.html
6 Bohr, 'The Unity of Human Knowledge',Bohr 1960, page 9
7 Bohr, 'The Unity of Human Knowledge',Bohr 1960, page 12
8 Misc papers, April 21, 1832

9 "Physics and Reality." Jean Piccard, trans. Journal of the Franklin Institute 221: 348−382.
10 Immanuel Kant, "Prolegomena to any future metaphyics"

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- ***Follow−Ups***:
  - ***Re: Why physicists should pay attention to the mind***
    - *From:* bjflanagan
  - ***Re: Why physicists should pay attention to the mind***
    - *From:* Ralph Hartley
  - ***Re: Why physicists should pay attention to the mind***
    - *From:* Ben Rudiak−Gould

- Prev by Date: ***Re: Is State Vector Reduction a 'Process'?***
- Next by Date: ***Re: dose tree−level results in effective potential incorporate loop effects?***
- Previous by thread: ***dose tree−level results in effective potential incorporate loop effects?***
- Next by thread: ***Re: Why physicists should pay attention to the mind***
- Index(es):
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