

# Man as Trinity of Body, Spirit, and Soul a Physicalist Approach to the Mind-Body Problem within the Disciplinary Matrix of the Elementary Process Theory

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**Abstract:** Although there are several monistic and dualistic approaches to the mind-body problem on the basis of classical or quantum mechanics, thus far no consensus exists about a solution. Recently, the Elementary Process Theory (EPT) has been developed: this corresponds with a fundamentally new disciplinary matrix for the study of physical reality. The purpose of the present research was to investigate the mind-body problem within this newly developed disciplinary matrix. The main finding is that the idea of a duality of body and mind has to be rejected as an incomplete representation of reality: in the universe of the EPT, man has to be a trinity of body, spirit and soul, where ‘body’, ‘spirit’ and ‘soul’ are names for distinct physical things. The mind is then a mere idea that arises from (self-)experience, but without ontological connotation. In addition a mechanism for mental causation, which implies a principle of choice, is rigorously formulated. The main conclusion is that a fundamentally new physicalist approach to the mind-body problem, according to which man has a free will, has been formulated strictly within the language of the EPT. Further physical research is then required to describe how the interaction between body, spirit and soul is to be understood in terms of fundamental interactions. In addition, further philosophical-theological research has to establish whether the presently discussed trinity and the trinities of body, spirit and soul mentioned in the Bible and the Vedic texts are one and the same thing.

## 1. Introduction<sup>2</sup>

### 1.1. The physicalist point of view

Although the idea of a dualism was first proposed by Plato (427 – 347 B.C.), the mind-body problem has arisen from the now historical substance dualism of Descartes, according to which the mind is distinct from the body and is a nonmaterial substance: Descartes, namely, never succeeded in successfully answering the question how body and mind interact, and from this failure the mind-body problem arose – it is *the* central issue in the philosophy of mind.

A possible approach to the mind-body problem is to investigate it from a physicalist point of view: this comes down to describing at object level, *strictly using the vocabulary and assumptions of physics*, what the mind is and how, if at all, mental causation can occur. Since there is no consensus on what *the* language and assumptions of physics are, a dilemma analogous to Hempel’s dilemma (1969) arises: does one have to use the vocabulary and assumptions of a *well-defined* physics paradigm, or can a physicalist approach also be based on some *ideal future* physics paradigm? To resolve this dilemma, here the following position is taken:

a physicalist approach to the mind-body problem is an approach from the point of view of a well-defined disciplinary matrix for the study of physical reality

Note that a well-defined disciplinary matrix for the study of physical reality does not necessarily have to be *widely accepted*. According to this definition, there is thus no such thing as *the* physicalist point of view: there is *a* physicalist point of view for every such well-defined disciplinary matrix. An example of a non-physicalist approach is “emergentism”: the body, in particular the brain, is then assumed to be a complex system of classical particles, but to ex-

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plain the mind it is assumed in addition that complex systems can have properties that cannot be reduced to properties of the particles that make up the system. This additional assumption places it outside the framework of classical mechanics, so that emergentism cannot be called a physicalist approach.

### ***1.2. Classical and modern physicalist approaches***

Thus far, two disciplinary matrices for the study of physical reality have been used as a basis for a physicalist approach to the mind-body problem: the framework of classical mechanics and the framework of modern physics (quantum mechanics). Below, the variety of resulting approaches is illustrated by selected examples, but without the intention to give a complete overview or an in-depth review.

Despite the falsification of classical mechanics as a true physical theory, the corresponding physicalist point of view is still widely held today due to the “tremendous inertia from the philosophers of the past, philosophers of the classical world” – as Stapp put it, cf. (Kuhn 2010).

The most straightforward philosophy to fit the mind in the ontology of classical mechanics is the so-called “identity theory” that the mind simply *is* the brain, where the brain is a system of particles; this ontological monism was developed by Feigl (1958) and Smart (1959). Various other philosophies, simply put, reject the idea that the mind can be *reduced* to the brain (as in identity theory) as an oversimplification, but maintain that the mind can be *explained* by the brain as a complex system of classical particles; for an elaborate review see the literature, e.g. (Kim 2005). The common denominator is that the mind is not a substance of any sort in itself (McLaughlin 1999: 688) – a stance that is naturally rooted in the fact that there is no such thing as “mental substance” in the classical-mechanical universe.

Concerning mental causation, Van Inwagen has shown that the idea of free will is incompatible with a deterministic world view (1975). The various physicalist approaches to the mind-body problem solutions that are based on classical mechanics therefore all meet the general criticism that they discard free will as an illusion: “the important lesson we have learned from three decades of debate” is that these approaches “run aground on the rocks of mental causation” (Kim 2005: 158). Such approaches “have been generally accepted, [only] because they do not violate the closedness of World 1”, that is, because they do not violate the classical-mechanical view that the world of matter-energy is completely unaffected by any non-material agency such as the mind (Eccles 1986).

Another criticism is hereby that classical mechanics has already been falsified: how can a physicalist approach to the mind-body problem lead to a fundamental understanding of mental causation, when the physical laws that are assumed as representations of the workings of the physical world are *known* to be false? Apparently, mental causation uses laws of nature at a more fundamental level than classical mechanics, that is, laws of nature from which classical mechanics emerges at the macroscopic scale – it may be the case that it is hitherto unknown which laws of nature that are, but one thing is for sure: mental causation does not use the laws of classical mechanics. *All* physicalist approaches to the mind-body problem based on classical mechanics are therefore futile beforehand – that is, it may be true that identity theory and variations thereof such as eliminative materialism are sufficient to explain experimental data obtained from measuring brain activity, but these deterministic doctrines have nevertheless to be rejected as a definite solution of the mind-body problem. One might thus take the point of view that the denial of mental causation *is* the definite answer to the question of mental causation, but that point of view is then based on the false assumption that the laws of classical mechanics are universally true: the denial has, thus, been developed from a falsehood and has, thus, to be discarded.

The falsification of classical mechanics as fundamental laws of nature has in recent decades caused interest in a physicalist approach to the mind-body problem based on quantum mechanics (QM). Important for the question what the mind is from the quantum-mechanical point of view, is the framework of complementarity, which was developed by Bohr in the 1920's as a general framework for the interpretation of QM (Bohr 1928). The aspect of complementarity relevant for the mind-body problem is the so-called wave-particle dualism, an ostensible paradox which arises when one tries to apply the classical concepts of waves and particles to atomic phenomena and “[fails] to realize that such different descriptions refer not to the same object but to complementary phenomena which only together provide an unambiguous description of the nature of the objects which give rise to these phenomena” (Folse 1987: 183). While Bohr already in 1929 hinted at an application of this framework of complementarity to the subject-object problem in philosophy (Bohr 1929), it was not until decades later that Pauli suggested an application of complementarity to the mind-body problem: “It would be most satisfactory if *physis* and *psyche* could be conceived as complementary aspects of the same reality” (1952: 164).

Since then, several dual-aspect approaches to the mind-body problem have been developed within the paradigm of QM. An example is the dual-aspect monism proposed by Polkinghorne, which concerns duality of matter: “there is only one stuff in the world (not two – the material and the mental), but it can occur in two contrasting states (material and mental phases, a physicist would say) which explain our perception of the difference between mind and matter” (1994: 21). Another example is the dual-aspect theory introduced by Stapp, which involves a duality of events (only events are real in this theory): “in this [dualistic] model the thinking and the doing do not occur in tandem. The thought and the physical act that implements it are two faces of a single mind/brain event” (2009: 22). But also a Cartesian-like dualism has been formulated in the framework of QM: according to Eccles, the mind is a nonmaterial entity (1986). Eccles refers to Margenau, who stated the following: “The mind may be regarded as a field in the accepted physical sense of the term. But it is a nonmaterial field, its closest analogue is perhaps a probability field” (1984: 97).

Concerning mental causation, several solutions have been proposed within the paradigm of QM. Of these, the mechanism published by Stapp is the most elaborate one staying strictly within the quantum paradigm; it uses the feature of the framework of QM that there are two kinds of processes (continuous and discontinuous ones). In a nutshell, Stapp assumes that the brain evolves continuously in accordance with the Schrodinger equation until a specific probing action, that is, an act that implements a thought, takes place. The quantum state of the brain then immediately reduces in a discontinuous way to a state compatible with both the state attained at the previous probing action and an increment of knowledge that stems from the thought. This reduction can actualize a large-scale pattern of brain activity that can cause an intended bodily action to occur (Stapp 2009: 119-149). Another dual-aspect quantum approach that “explores Pauli’s idea that mind and matter are complementary aspects of the same reality” uses two concepts of time: reality has a nonmaterial, tensed domain, which is related to a mental world, and a tenseless domain, which is related to physical objects; both domains are connected to each other in a non-classical way by *entanglement* (Primas 2003). So this approach suggests a mechanism for mental causation that uses another feature of the framework of QM: entanglement.

Nagel criticized all dual-aspect approaches formulated within the paradigm of QM with the remark that “talk about a dual-aspect theory ... is only to say roughly where the truth might be located, not what it is” (Nagel 1986: 30). This criticism, however, seems to be too general to rule out *all* such approaches; it is, for example, not clear how this refutes Stapp’s approach. What the various quantum approaches do have in common is that they all still lack

experimental support, not in the last place because measurements of brain activity necessarily involve the whole of the brain as a macroscopic object.

### ***1.3. Motivation for a new approach***

It is currently not the case that any consensus exists about a physicalist solution of the mind-body problem. That is, there is currently absolutely no agreement whatsoever about what the mind is in physical terms, nor about what the physical principles at object level are by which an intentional thought can cause a bodily action.

To summarize the current state of affairs, it suffices to quote Searle: “we are nowhere remotely near having a solution” (2007: 11). Even stronger, Norman wrote that one must face the conclusion that “entire epistemic system of [contemporary] science is based on a faulty set of premises” if mental causation is possible (2004). Or, as Kuhn put it: “explaining consciousness will require something radically new – either finding physical stuff beyond current boundaries or revealing the reality of *nonphysical* stuff” (2010).

Recently, a fundamentally new disciplinary matrix for the study of physical reality has been introduced (Cabbolet 2010; 2011). The motivation to use this as the basis for a new approach to the mind-body problem is that the world view of the Elementary Process Theory is fundamentally different both from the deterministic world view of classical mechanics and from the probabilistic world view of QM: it thus might be the case that the mind and mental causation fit more naturally in the new ontology than in the ontologies of classical and quantum mechanics.

## **2. A new approach to the mind-body problem**

### ***2.1. Man as a trinity of body, spirit and soul***

To start with, features of the EPT are (i) that the process of evolution can be indexed by discrete degrees of evolution, and (ii) that the smallest possible tangible objects (electrons, protons, etc.) exhibit stepwise motion by alternating between a particlelike state of rest and a wavelike state of motion: occurring motionless as a particlelike form of energy at the spatiotemporal position  $X$  at a given degree of evolution, they move in the state of a wavelike form of energy, which arises from the aforementioned particlelike state by a discrete state transition, to reoccur at the next degree of evolution at another spatiotemporal position  $Y$ , again as a motionless particlelike form of energy; see figure 1 for an illustration. The state of being of such small entities thus consists of a (particle) state of rest and a (wavelike) state of motion. Thus speaking, a human being has, at any degree of evolution  $x$ , a “body”  $B_x$  and a “spirit”  $S_x$ : the body  $B_x$  is a composite entity made up of (solely) of particlelike forms of energy; the spirit  $S_x$  is a composite entity, made up of precisely those wavelike forms of energy that arise from the particlelike forms of energy making up the body<sup>3</sup>. ‘Body’ and ‘spirit’ are thus names of *physical objects* that occur in the universe of the EPT, and therefore this separation of body and spirit is a material substance dualism: the spirit is distinct from the body, but it is not nonmaterial – in the universe of the EPT wavelike forms of energy exist that do not occur in the universes of classical or quantum theory<sup>4</sup>, and precisely that feature of the present ontology enables to formulate this substance dualism.

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<sup>3</sup> The terms  $B_x$  and  $S_x$  – and in fact the entire approach to the mind-body problem presented in §2 – can be rigorously formalized using the formalism of the EPT; such a rigorous formalization is omitted for the sake of readability of the present paper.

<sup>4</sup> These are nonlocal wavelike phase quanta in the vocabulary of the EPT.

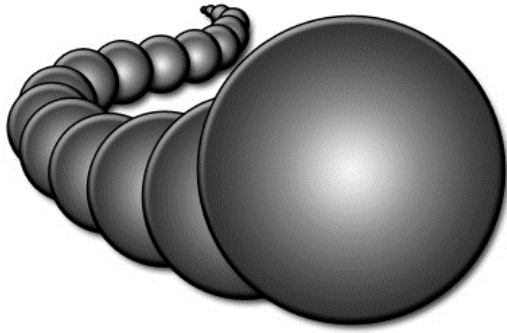


Figure 1. Illustration of the stepwise motion of an electron. The balls depict the subsequently attained particlelike states of rest; the intermediate wavelike states of motion are not shown, but in that state the electron is spread out over space.

However, since motion in a wavelike state is universal in the framework of the EPT, it also applies to tangible objects such as stones: it can thus also be said that a stone has a body and a spirit – the wavelike state in which a stone moves can be called the “spirit” of the stone. And looking at figure 1, it can even be said that an electron has a body and a spirit: the balls each depict a body at a certain degree of evolution, and the intermediate wavelike state is the spirit. Thus, if a human being is *at all* able to cause physical events that would not have occurred if human beings would be without a free will like stones, then on account of the causal closure principle it is not sufficient to say that a human being is a duality of body and spirit. To solve this, the starting point is that the spirit of a human being has, as a wavelike entity, at any degree of evolution a short, finite duration: at every point in time  $t$  of this time interval of existence, there is an internal state  $\Psi_t$ . This is not necessarily a constant: the internal state may vary over time during the time interval of existence of the wavelike entity. Now consider that the time interval of the existence of such wavelike entity contains the open interval  $\langle t_1, t_2 \rangle$ ; then the following relation is always valid for any two internal states  $\Psi_t$  and  $\Psi_{t+\Delta t}$  attained within this time interval:

$$\Psi_{t+\Delta t} = \Psi_t + \Delta\Psi \quad (1)$$

The change,  $\Delta\Psi$ , which is thus a *fluctuation* in the wavelike entity  $S_x$ , consists then of changes due to fundamental interactions (gravitation, electromagnetism) *plus* changes due to thinking: a human being thus *has to have*, besides a body and a spirit, an active principle, which accounts for awareness (consciousness) and intentional thoughts, and which is ontologically realized in fluctuations of the spirit. This active principle can be given many names; here it is called a “soul”. In the framework of the EPT, soul and spirit can thus be seen as an integrated whole – ontologically, they form together a stream of wavelike states – but they are not the same thing. And given the concept of stepwise motion of the EPT, this trinity gives rise to a counterintuitive concept of motion of a human being: it is not at all the body of a human that moves from  $A$  to  $B$ , it is the spirit and soul of a human that move from a body at a position  $A$  to a body at a position  $B$ .

## 2.2. The mind in the framework of the EPT

Up till now, the talk has been limited to physical entities and fluctuations thereof: body, spirit and soul exist *ontologically* in the universe of the EPT. Now what happens in the physical world are physical processes, but what a subject experiences are mental processes: in this picture, the concept “mind” requires a dual-aspect approach in addition to the material substance dualism that describes the trinity of body, spirit and soul. The key is self-awareness: the idea of a mind arises because the physical object is self-aware. To relate mental processes to physical processes described by the EPT, it is interesting to cite Kim’s variant of McLaughlin’s widely accepted correlation thesis: “for every type of sensation state,  $S$ , there is a type of physical state  $P$  such that it is nomologically necessary that for any organism,  $x$ ,  $x$  is in  $S$  if and only if  $x$  is in  $P$ ” (Kim 2005: 127; McLaughlin 2001: 319). Similarly, the physical stream

of wave states, formed by the spirit and soul, and a correlated stream of mental states together form a psychophysical process<sup>5</sup>: the mental processes are *nothing but* the parallel ongoing images of the correlated physical processes, formed by self-awareness – there is nothing more to it<sup>3</sup>. To put that in other words: the stream of mental states is nothing but the “subjective form” of the stream of internal states  $\Psi_t$  that occur in the wavelike entity formed by spirit and soul: the stream of mental states *is* the self-aware subject. The correlation works both ways, that is, holds for both perception (from the physical to the mental domain) and intention (from the mental to the physical domain). The idea of a “mind” is then created from the stream of mental states, and has thus absolutely no ontological connotation in the framework of the EPT: it is not a substance of any kind – spirit and soul are together are a real entity (a stream of wavelike states), the mind merely arises as an idea from the subjective form of that real entity. The mind is thus not a thing in itself in the noumenal universe.

### 2.3. Mental causation

Let at the  $x^{\text{th}}$  degree of evolution the body of a human being be denoted by  $B_x$  and the spirit by  $S_x$ . Physically, the spirit is the (composite) form of energy that transports the energy of the body  $B_x$  to the body  $B_{x+1}$  at the next degree of evolution; this can be expressed by the following general formula<sup>6</sup>:

$$S_x : B_x \rightarrow B_{x+1} \quad (2)$$

This has to be read as: the spirit at the  $x^{\text{th}}$  degree of evolution,  $S_x$ , effects a transition from the body at the  $x^{\text{th}}$  degree of evolution,  $B_x$ , to the body at the  $(x+1)^{\text{th}}$  degree of evolution,  $B_{x+1}$ . Now let the body  $B_x$  be made up of  $N$  ultimate constituents; the state of  $B_x$  then depends on the  $N$  spatiotemporal positions  $X_1, \dots, X_N$  where these  $N$  particlelike constituents are located:

$$B_x = B_x(X_1, \dots, X_N) \quad (3)$$

At this  $x^{\text{th}}$  degree of evolution, it is determined *that* there will be a body of the human being at the next degree of evolution,  $x+1$ , but it is not yet determined in *which* state the body will be: a fourth distinctive feature of the universe of the EPT is that it is *nondeterministic* – the EPT contains an elementary principle of choice. Applied to the mind-body problem, that means that at the  $x^{\text{th}}$  degree of evolution there is a set  $P_{x+1}$  of possible next states of the human being’s body, which can be indexed by some set  $F$ , and the next body,  $B_{x+1}$ , will be one of those:

$$P_{x+1} = \{ B_{x+1}^i \mid i \in F \} \quad (4)$$

$$B_{x+1} \in P_{x+1} \quad (5)$$

The spirit,  $S_x$ , depends as a physical wavelike entity on its energy distribution: *due to thinking* this energy distribution can change, cf. (1). The general expression for this wavelike entity  $S_x$  is then the following:

$$S_x = S_x^0 + \Delta S_x \quad (6)$$

Here  $S_x^0$  denotes the wavelike entity that would occur without thinking (for example, if the human being would be dead) and  $\Delta S_x$  denotes a change due to thinking: stones and other entities without a soul can thus *not* generate such a change  $\Delta S_x$ . Different intentional thoughts then correspond with different changes. Thus, suppose that an intentional thought #1 corresponds with a change  $\Delta S_x^1$ , then

$$S_x = S_x^1 = S_x^0 + \Delta S_x^1 \quad (7)$$

<sup>5</sup> That is, it is not the case that the psychophysical process is some illusive thing in itself, which gives rise to the mental process and the correlated physical process.

<sup>6</sup> Formula (2) can be seen as a notation for a mathematical formula  $\langle S_x, B_x, B_{x+1} \rangle \in R$  for some set  $R$ .

Thus,  $S_x^1$  denotes the spirit  $S_x$  in the particular case the intentional thought #1 takes place. And suppose that another intentional thought #2 would correspond with a change  $\Delta S_x^2 \neq \Delta S_x^1$ , then in that case

$$S_x = S_x^2 = S_x^0 + \Delta S_x^2 \quad (8)$$

Using the general expression (2), this yields

$$S_x^0 : B_x \rightarrow B_{x+1}^0 \quad (9)$$

$$S_x^1 : B_x \rightarrow B_{x+1}^1 \quad (10)$$

$$S_x^2 : B_x \rightarrow B_{x+1}^2 \quad (11)$$

where  $B_{x+1}^0$ ,  $B_{x+1}^1$  and  $B_{x+1}^2$  are all elements of the set  $P_{x+1}$  in (4). Naturally, as is the case with the state  $B_x$  in (3), each such state  $B_{x+1}^i$  depends on the  $N$  spatiotemporal positions of the  $N$  individual particlelike constituents that make up the state  $B_{x+1}^i$  in question. Applied to expressions (9)-(11), this yields

$$B_{x+1}^i = B_{x+1}^i(Y_1^i, \dots, Y_N^i) \quad (12)$$

for  $i = 0, 1$ , and  $2$ . The crux is then that for any different  $i, j \in \{0, 1, 2\}$

$$\{Y_1^i, \dots, Y_N^i\} \neq \{Y_1^j, \dots, Y_N^j\} \quad (13)$$

so that also

$$B_{x+1}^i \neq B_{x+1}^j \quad (14)$$

Now suppose that the body of the human being at the  $(x+1)^{\text{th}}$  degree of evolution,  $B_{x+1}$ , has become  $B_{x+1}^1$ . The point is then that the change of state from  $B_x$  to  $B_{x+1}^1$  *could not have been effected* without the intentional thought #1: without intentional thought or with another one, another state  $B_{x+1}^i \in P_{x+1}$  for which  $B_{x+1}^i \neq B_{x+1}^1$  would have been attained<sup>7</sup>. In effect, the element  $B_{x+1}^1$  has thus been chosen from the set of possibilities  $P_{x+1}$ ; see figure 2 for an illustration. In general, this can be expressed by the formula

$$B_{x+1} = f_{\Delta S_x}(P_{x+1}) \quad (15)$$

where  $f_{\Delta S_x}$  is a choice function determined by the fluctuation  $\Delta S_x$ . Substituting (6) and (15) in (2) then yields

$$S_x^0 + \Delta S_x : B_x \rightarrow f_{\Delta S_x}(P_{x+1}) \quad (16)$$

Expression (16) supports the view that the spirit ( $S_x^0 + \Delta S_x$ ), as a form of energy, transports the energy from the body at the  $x^{\text{th}}$  degree of evolution ( $B_x$ ) to the body at the next degree of evolution ( $f_{\Delta S_x}(P_{x+1})$ ), but that the actual state of the latter is chosen by the soul, which is carried by the spirit as a fluctuation  $\Delta S_x$  thereof. The general expression (16) is thus an *irreducible* agent causation. That is,  $S_x$ ,  $B_x$ , and  $B_{x+1}$  can be written as a superposition of billions of ultimate constituents, but the choices made in the individual processes are *imposed* by the choice made by mental processes at the macroscopic level. By this mechanism, mental causation takes place in the universe of the EPT; see figure 3 for an illustration. The sense of choice of a human being is thus not *imagined* but *real* – a human being has the *real* ability to make choices, and thus a free will!

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<sup>7</sup> The causal exclusion principle – “no single event can have more than one sufficient cause occurring at any given time, unless it is a genuine case of causal overdetermination”, cf. (Kim 2005: 42) – holds in the framework of the EPT.

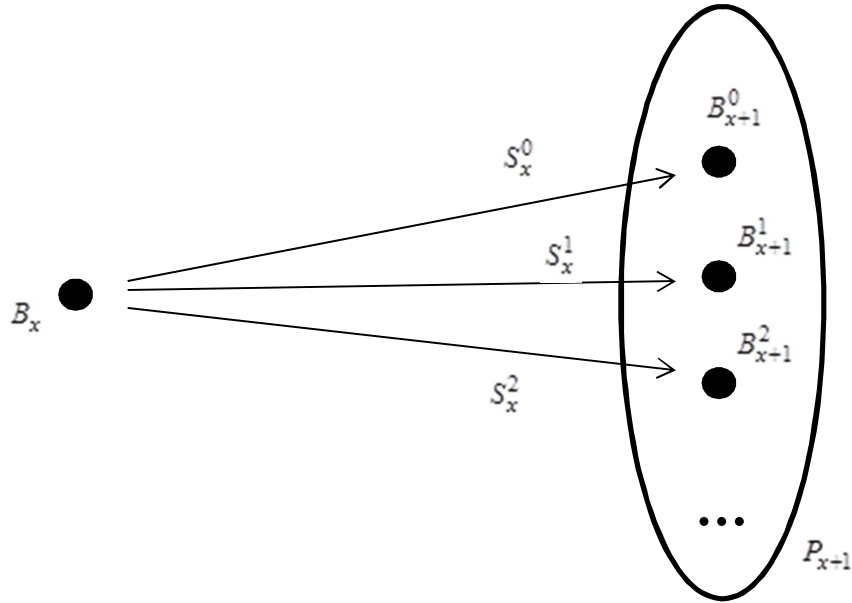


Figure 2. Illustration of the choices made by intentional thoughts. The dot to the left depicts the body  $B_x$  of the observer at the  $x^{\text{th}}$  degree of evolution. The oval to the right is a Venn diagram, depicting the set  $P_{x+1}$  of possible next states of the body; the elements  $B_{x+1}^0$ ,  $B_{x+1}^1$  and  $B_{x+1}^2$  are shown and the three dots at the bottom indicate that there are more elements. The upper arrow indicates that the body  $B_x$  is succeeded by the body  $B_{x+1}^0$  if the intermediate wave state is the spirit  $S_x^0$ , which is the object that would arise from  $B_x$  if there were no thoughts. The middle arrow indicates the body  $B_x$  is succeeded by the body  $B_{x+1}^1$  if the intermediate wave state is the spirit  $S_x^1$ , which is the object that would arise from  $B_x$  instead of  $S_x^0$  if the observer had intentional thought #1. The lower arrow indicates the body  $B_x$  is succeeded by the body  $B_{x+1}^2$  if the intermediate wave state is the spirit  $S_x^2$ , which is the object that would arise from  $B_x$  instead of  $S_x^0$  if the observer had intentional thought #2.

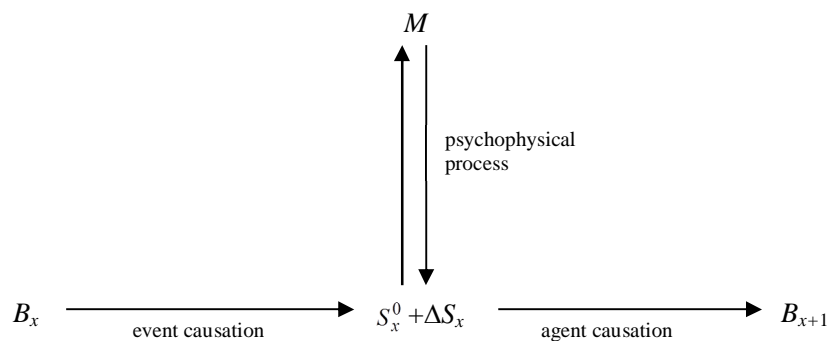


Figure 3: schematic illustration of mental causation in the framework of the EPT. The left arrow indicates that discrete state transitions (events) cause the transition of the body at the  $x^{\text{th}}$  degree of evolution,  $B_x$ , to the spirit plus soul at the  $x^{\text{th}}$  degree of evolution,  $S_x^0 + \Delta S_x$ . The latter is a stream of wave states: the vertical double arrow indicates that this is correlated to a stream of mental states ( $M$  in the figure) in one psychophysical process; the right arrow indicates that the body at the  $(x+1)^{\text{th}}$  degree of evolution,  $B_{x+1}$ , emerges from the spirit plus soul at the  $x^{\text{th}}$  degree of evolution by an irreducible agent causation.



### 3. Discussion

#### 3.1. *The present view versus impossibility arguments*

In 1949, Ryle criticized the idea that the mind is distinct from the body. His argument against dualism, to which he referred with the term “the dogma of the ghost in the machine”, is that it is entirely false – he called it a “category mistake” – to assume that mental processes can be seen as something isolated from physical processes; (Ryle 1949: 13-20); according to Stapp, “Ryle’s 1949 arguments are still influential today” (2009: 21). However, while Ryle’s writing may be a valid counterargument against *Cartesian* dualism, it does not apply against the *material* substance dualism of the present view. Ryle’s “destructive purpose” is, namely, to demonstrate the falseness of “the representation of a person as a ghost mysteriously ensconced in a machine” (1949: 19): the subject of Ryle’s attack is the *immaterial* ghost (i.e. Descartes’ mind), but in the present view spirit and soul are *material* entities. Thus, Ryle’s “ghost” is absolutely not the same as “spirit” or “soul” in the present view. And neither does Ryle’s argument apply against the dual-aspect approach of the mind in the present view: it is, namely, not at all the case that a mental process can be seen as something occurring in itself, without any associated physical process. The present view does, thus, not make Ryle’s category mistake. Concluding, Ryle’s impossibility argument does not apply to the present view of man as a trinity.

In 1991, Dennet gave the following physical counterargument against dualism: “a fundamental principle of physics is that any change in the trajectory of a particle is an acceleration requiring the expenditure of energy ... this principle of conservation of energy ... is apparently violated by dualism”; he regarded this as the “inescapable flaw of dualism” (Dennet 1991: 35). From the wording of Dennet’s argument, however, it is clear that it is based entirely on the paradigm of classical mechanics, where particles move on continuous trajectories under the influence of forces: on account of Newton’s laws, any change in such a continuous trajectory requires an acceleration, and thus a net force and thus energy. The present view, however, is formulated in the framework of the EPT: motion here is stepwise, so there is no such thing as a continuous trajectory, and Newton’s laws are not universally valid. In other words, Dennet’s “fundamental principle” is not at all fundamental in this framework: in the universe of the EPT, *other* laws of conservation of energy have been formulated for the individual processes that take place at supersmall scale, cf. (Cabbolet 2010). Now Dennet’s argument against dualism would still have merit for the present case, if the mechanism for mental causation introduced in §2.3 would violate these laws of conservation of energy that have been formulated for the EPT. The point is, however, that this is *not* the case. The physical realization of an intentional thought, as laid down in equation (6), does not even have to imply a change in the energy content of the wave entity: the change  $\Delta S_x$  can be a mere change in energy distribution. Concluding, Dennet’s impossibility argument does not apply to the material substance dualism of the present view.

#### 3.2. *Relation with classical views of Descartes and Spinoza*

In the Cartesian dualism, the mind is distinct from the body and is a nonmaterial substance. This dualistic aspect is found back: in the present view, mind and body are also distinct. However, if the “Cartesian mind” is compared with the “mind” in the present view, then an agreement between the two views is that the mind in both cases is nonmaterial, but a difference is that in the present case it is not viewed as a substance, i.e. something that exists in itself: in the present philosophy, it is merely the case that the idea of a mind arises from a stream of mental states – and these are just the subjective form of the correlated stream of wavelike states in the noumenal universe. If, on the other hand, the “Cartesian mind” is compared with the “spirit” or the “soul” (or a combination thereof) in the present view, then the

agreement is that in both cases it is a substance; the difference is then that in the Cartesian dualism the mind is *nonmaterial*, while spirit and soul are *physical* entities in the present philosophy. But interpreted one way or the other, the present philosophy does provide an answer to the question how body and mind interact – a question to which Descartes never gave a satisfactory answer.

In the dual aspect monism of Spinoza, mind and body are two concomitant aspects of a single entity: the human being. While it remains true in the present philosophy that mind and body are two aspects of a human being, there are two major differences with the view of Spinoza. The first is that from the present point of view a dual-aspect approach is insufficient to describe human beings: body and mind are not the whole story. The second major difference is about the relation between mind and body: in the present philosophy one may speak of a psychophysical parallelism as far as it concerns mental processes and the correlated physical processes, but the ‘physical’ part of the adjective ‘psychophysical’ then refers to spirit and soul, and not to the body. And there is also the issue of free will: in Spinoza’s pantheistic worldview, free will is an illusion; in the present philosophy, human beings definitely have a free will – formula (16) expresses the free will of human beings in the universe of the EPT.

### **3.3. Relation with modern views**

In the quantum-mechanical view on the mind-body problem of Stapp, it is assumed that mental events and physical events (probing actions) are complementary aspects of a single mind/brain-event, but the point is that “the causal origin of the ... probing actions is not specified, even statistically, by the presently known laws of physics” (Stapp 2009: 271). In other words, in Stapp’s mechanism for mental causation it is assumed *that* probing actions take place, but the paradigm of QM offers no answer to the question *why* these probing actions take place. Furthermore, in order to actualize the large-scale pattern of brain activity necessary for an intended action, not just *a* probing action is required: no, a very *specific* probing action is required. With respect to that, Stapp writes the following: “according to the Copenhagen philosophy, there are no presently known laws that govern the choices made by the agent about how the observed system is to be probed. This choice is, in this very specific sense, a free choice. It is not ruled out that some deeper theory will eventually provide a causal explanation of this choice” (2009: 217). In other words, the explanation of free will is that a human being chooses a specific probing action by “choosing” an intentional thought – these are namely connected in a mind/brain event – but the paradigm of QM offers no answer to the question *why* a thought corresponds with a certain probing action: it is merely assumed *that* this is the case. While the present view on the mind-body problem is *ontologically* of course very different from Stapp’s view, the comparison of the mechanisms for mental causation yield a remarkable agreement: both yield a mechanism, strictly formulated within a well-defined disciplinary matrix, for how intentional thoughts can cause the material brain to develop a large-scale pattern of neural activity, necessary to cause a certain bodily action. A difference between the two mechanisms is that Stapp’s view is much coarser: the present mechanism identifies *all* the precise steps at the most fundamental level according to which an intentional thought leads to a certain brain activity – there are no open question such as the above ones concerning Stapp’s approach. It needs to be said, however, that it is true that Stapp’s mechanism is coarser, but it is as refined as it gets in the paradigm of QM: the aforementioned open questions are *inherent to the quantum paradigm*. In addition, the difference may not be directly measurable: it is doubtful that experimental observations of brain activity will ever be able to distinguish between the two mechanism, largely because such measurements take place on macroscopic scale. A better route towards distinguishing between the two mechanisms seems to be the falsification of the underlying physics: the EPT is incompatible

with QM, so the scientific method can decide which of these two theories has to be discarded. That, then, also decides between the mechanisms for mental causation.

Another difference with Stapp's theory is that intentional thought *precedes* neural activity in the present view. At the same time, this is an agreement of the present view with an aspect of Eccles' theory. However, regarding another aspect the present point of view is fundamentally different from Eccles' view, because the mind has no ontological connotation in the universe of the EPT, while on the other hand body and soul are not nonmaterial. Furthermore, the central aspect of Primas' theory, that there are two concepts of time, is found back in the EPT, in the sense that in the present framework the notion of discrete degrees of evolution exists besides the notion of time as a linear continuum: the observable processes of evolution can be indexed by degrees of evolution, while internal states of wavelike forms of energy can be indexed by moments in time; since body and soul are made up of such wavelike entities, this may account for the perception of time that every human being has.

It would be wrong, however, to equate wavelike forms of energy that occur in the EPT with the "mental phase of matter" that occurs in Polkinghorne's view: the universe of the EPT is made up of five different kinds of indivisible constituents, but these are not just "aspects" or "states" of one underlying "stuff". That is, in the framework of the EPT, Polkinghorne's statement that "there is only one stuff in the world" remains true in the sense that every individual constituent of the universe of the EPT is a form of energy, but the fundamental difference is that each such constituent is a thing in itself in the physical world – the *forms of energy* are the building blocks of the physical universe, not the *energy in itself*.

### 3.4. Conclusions

Ever since the mind-body problem arose from Descartes' dualism in the 17<sup>th</sup> century, virtually every philosopher who investigated it from a physicalist point of view has searched either in the direction of explaining a *duality* of body and mind, or in the direction of reducing body and mind in a *monism*: the first conclusion is that the present approach is the first physicalist approach that views man as a *trinity* of body, spirit and soul in the period after Descartes. As a consequence, any duality or identity of body and mind, such as assumed in the various approaches based on classical or quantum mechanics, has to be rejected as an incomplete representation of reality from the present point of view.

A second conclusion is that a mechanism for mental causation has been formulated at object level, a mechanism which fits seamlessly in the ontology given by the EPT: this demonstrates that man has a free will, if the physical universe is indeed governed by the EPT. It is emphasized, however, that this mechanism is only about the *principle* of mental causation: further work in this direction is needed to derive testable predictions from this approach. But the question remains whether standard laboratory methods for brain research are at all able to distinguish between the present mechanism for mental causation, Henry Stapp's mechanism, which has been formulated strictly within the quantum paradigm, and identity theory, which is formulated strictly within the classical paradigm. Surely these views can be falsified by falsifying the underlying physics – on that ground, identity theory can already be discarded – but even if just one such paradigm would survive, it still remains a difficulty to positively verify the specific postulates that constitute the solution to the mind-body problem in a laboratory experiment.

A third conclusion is that it is not yet mathematically exact understood how body, spirit and soul interact in terms of *fundamental interactions*. At present, it is described how these phenomena—recall that body, spirit, and soul are names for phenomena—interact *process-wise*: the EPT corresponds with the idea that the universe is best viewed in terms of processes, not interactions. So what is required is a mathematical model of the EPT that accounts for the fundamental interactions: from there, the interaction between body, spirit and soul can be

mathematically modelled in terms of interactions. Such a mathematical model of the EPT does currently not exist: this is an aim for future research in this direction.

All in all, the present approach differs fundamentally, both qua ontology and qua mechanism for mental causation, from the various monistic and dualistic approaches to the mind-body problem on the basis of classical and quantum mechanics. The Bible, on the other hand, suggests also that man is a trinity of “spirit, soul and body” (1 Thessalonians 5:23), whereby soul and spirit are definitely not the same thing (Hebrews 4:12). In addition, also the Vedic text indicate that the soul is to be distinguished from body and spirit (Srimad-Bhagavatam 12.5.8); according to Bhaktivedanta Swami, the Vedic texts entail that the soul is something else than the body and spirit, but all three are material entities (1988: 2). In the present view body, spirit, and soul are names for material phenomena: further philosophical-theological research is then necessary to establish whether or not the present trinity is in agreement with the teachings of the Bible and/or the Vedic texts.

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