

Self, Time, and Reality in Quantum Stream of Consciousness

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ABSTRACT

The aim of this paper is to propose a model that can be compatible with philosophy of mind, psychology, neuroscience, and physics (with its regard to time and consciousness). It is mostly a structural-dynamical approach to consciousness by analogy with a causal approach in Relativity. Consciousness is studied in dynamics over time as a stream St that alternates instant mental acts and temporal quanta. Being a cause-like chain, St generates a trichotomy of personality P : self-alienability (SA), self-inadequacy (SI), and self-completeness (SC) between the past-present-future. Descartes' *cogito* is none other than a mental act of SA. The *cogito* can be obtained by consciousness with collapsing the brain's superposition over time through SA and SI mechanisms. The formalism is like a quantum-mechanical commutation in Heisenberg's description. latter can also provide us with the mechanisms of the altered states and neuro-mental disorder such as hallucination, hypnosis, schizophrenia and so. While St is open from above, its lower boundary reposes on its first mental act as the unconscious Jungian Self. The model endows the thermodynamic and causal arrow of time with anthropic one. The final conclusion suggests a reformulation of Wheeler's anthropic principle in a neuro-phenomenological manner.

Key Words: stream of consciousness, time, quantum stream, cause-like chain, brain superposition

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Introduction

From Descartes to date, there is no generalized and well elaborated theory of consciousness. The various and sometimes incompatible approaches are proposed in philosophy, logic, psychology, sociology, neuroscience, and physics in its respect to a question 'What is the observation?' The main discussion there between the proponents and opponents is reduced to the question whether consciousness influences quantum mechanics (and the universe on the whole) or not. The proponents follow the Copenhagen interpretation in applying to neuroscience and refer to brain processes (Tarlaci, 2010). The opponents argue

against quantum consciousness. In their opinion, quantum mechanics can operate its own laws with no observers. In general, the universe will follow its own way and destiny independently whether consciousness is there or not (Stenger, 1996). The rest is metaphysics.

In such a materialistic treatment it seems undoubted. The universe had been before consciousness and will be in the future. What is the real in the absence of consciousness? And how do things exist in themselves? It is a question to ontology rather than physics. If a thing consists of atoms, then only the atoms exist. If an atom consists of particles, then only the particles exist. Perhaps, we can come in this way to emptiness. Then, the reality will be the epiphenomena of nothing. It had been at stake for ancient as Western as Eastern philosophy. It remains undecided to date. Broadly speaking, ancient

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philosophers suggest us that the only reality that has value and sense for us is consciousness.

The Eubulides' heap paradox, for example, starts with the cognitive fact that a grain of sand is not a heap by definition, and then assumes by mathematical induction that adding a single grain of sand to something that is not a heap does not turn it into a heap. Thus, a heap is not possible at all. Then how can a heap exist cognitively? This paradox is typically attributed to semantic vagueness in many-valued logics. It imposes semantics on physics too, since any thing (physical body or phenomenon) is in some sense a 'heap'. So, Whitehead argues for it, 'The most general term 'thing' - or, equivalently, 'entity'- means nothing else than to be one of the 'many' which find their niches in each instance of concrescence' (1929; p.211). We think set-theoretically, and the reality consists of what is in predication of consciousness.

Besides logical-ontological aspect of mind, there is dynamical one. An ancient parable runs: Two monks were arguing about a flag. One said, "The flag is moving." The other objected, "The wind is moving." Just then Zeno happened to be passing by. He told them, "Not the wind, not the flag. Mind is moving." Each of us deals with consciousness. Nevertheless, we scarcely know it. Strictly speaking, all science begins with terminology. The terminology applied to consciousness is very confused, and scientists follow their own notions of what are consciousness, awareness, 'I', Self, ego, personality, and so on since there are no definitions approved and acknowledged by the majority of them. It indeed opens a wide field for creativeness and metaphysics. However, what is there for science?

Therefore, the first task is to elaborate the conceptual basis, methodology, logical and mathematical technique before studying consciousness as a complex and multifunctional dynamical system. This paper starts with the fundamental conceptions of philosophy of mind and psychology and proposes their mathematical definitions which can be logically based lemmas on to elaborate an analytical approach to consciousness. Any definition is surely established under the presumption of Ockham's razor in the sense that definitions inevitably restrict all connotations to the introduced meanings. However, if being operational and well-elaborated, they allow to find (in the given case) the structural relationships between the

psychological and the neural. The second aim of this study is to illuminate in a simple mathematical approximation how consciousness interacts with the physical reality. Three lemmas will be introduced. Each of them implicates a remarkable and well-known by our everyday life mechanism that arises in consciousness due to time passage.

Consciousness fluctuates incessantly. We know it, however, we coarse grain time or ignore it in theorizing. In reality, it is enough to say "now" in order to happen in the future and thereby close up that "now" with a new "now". Time looks a puzzle in physics (Anderson 2012), but it is the same for philosophy of mind, psychology, and neuroscience. Everything is subjected to time. But what is time? Consciousness explained allegedly by Dennett (1991), cannot be in principle explained without time (and vice versa, perhaps).

In order to be consciousness has to begin. "Being" requires 'becoming'. Consequently, there is the first mental act in its stream over time. What can be the first act? The mirror test shows that 65% of infants demonstrated recognition of their mirror images from 20 to 24 months of age (Amsterdam, 1972). Does it mean that consciousness stays in an unconscious state having not anything about itself? Is there some self-consciousness in infants before the mirror test? It seems undoubted. Generally speaking, being as a state with all its perceptions (positive and negative) is already some (ubiquitous) test for consciousness to self-identify perpetually – whether it wishes or not to know itself. Of course, consciousness comes in being out of the absolute darkness knowing nothing about itself or the World around. Self and the World must be put on the test. What has to be known before – Self or the World? This question seems absurd. Can Self know the World beyond Self?

Hence, the first phenomenon that can and must be known by a newborn consciousness is the consciousness itself, and only then the self-consciousness can discover the outer World to come to the dualism 'I-World' including Cartesian 'mind-matter' and the 'problem of other minds'. Consciousness comes to the act '*nosce te ipsum*' when Self is already in being. In this sense, Self is the core of this phenomenon including the most primitive form of consciousness that can be found in the nature beginning with the simplest organisms.



We can ask themselves ‘Is there some biochemical mechanism that can be like Self in unicellular organisms?’ The answer seems obvious in regard to a crucial distinction between living bodies and non-living things. It might be called the ‘Frankenstein problem’. A non-living thing and a living body can consist of the same chemical elements, so that the *crucial distinction* between them occurs only in their internal order. The aim of this paper is not to discuss the origin of life as well as the question whether there are or not any distinctions between consciousness and machine.

It is said to emphasize a key role of Self in living systems. Even a unicellular organism must contain some self-ruling mechanism in its order that can be evaluated as a primitive Self. Only then the evolution of life could develop that primitive Self over time into an unconscious complex network in the brain of conscious beings. Saying philosophically, all terms related to the living system imply a prefix ‘self’ in definitions. It is, for example, such notions as self-sufficiency, self-organization, self-preservation and the like. In applying to consciousness, it means, firstly, that Self as an evolutionary complex is rather immersed in the unconscious than emergent clearly, but instead can be lightly elicited or even perpetually available by self-referential mechanism over time.

At this stage, it may be only supposed that ‘consciousness = Self + machine’. And then the ‘Frankenstein problem’ can be reformulated to the question ‘Are we able, at least theoretically, to endow a machine with the unique Self?’ Just so, since we themselves would be no more than a machine having not Self. The very ‘will to life’ – whatever it may be neurologically – is to be vitally unsupported and, say, existentially nonsense in absence of Self.

Consciousness perceives the reality exclusively through Self as a Protagoras’ measure of all things. The brain is only a receiver whose cortex is differentiated by functions. The first task for consciousness is to become a regular and successful interpreter of the information to make sense of what is Being or Parmenides’ thinkable existence (1892). Thus, consciousness interprets the neurological as the psychological by endowing neural syntax with cognitive semantics attributed to the reality. It may be already called Logos in which (by Heraclitus) consciousness and the World constitute Being by thinkable existence. Henceforth consciousness perceives only the



phenomenological (thinkable and speakable) reality.

Descartes argued his *cogito* as a self-evident tautology: “I think (of myself), therefore I am”. A thinkable doubt upon it from the thinking “I” is thus a ‘*reduction ad absurdum*’. Hence, this thinking ‘I’ exists. Now, by replacing the variables, we can obtain: ‘I think (of the world), therefore the world exists through my ‘I’. Descartes based his ‘ontological argument’ on the *cogito* and in following this ontological position argued ‘when we conceive of substance, we merely conceive an existent thing which requires nothing but itself in order to exist’ (cited by Whitehead, 1929). Thus, existence is a predicate of consciousness. A real thing can, of course, exist independently anywhere as a ‘thing-in-itself’, but only consciousness endows it with phenomenological being for itself.²

In conclusion to this part, it can be said that consciousness is only a bridge between Self and the outer World. And this bridge is in evolving over time as a neuro-quantum stream (Yurchenko, 2012).

1. Stream of consciousness and Personality

By combining Husserl’s phenomenology and behaviorism suppose that $x(t)$ is a mental act of a brain at a moment t . Let St be the set of the all mental acts of a consciousness over time.

Definition 1. *The steam St of a consciousness is a union of its mental acts.*³

$$St = \bigcup_{i=0}^{\infty} x_i \quad (1)$$

Thus, we start with the simplest and most uncontroversial definition of what is consciousness in order to avoid any vague presumption besides, maybe, the fact that consciousness evolves in time by means of mental acts elicited from the reality or elaborated in itself.

² Although a famous Kantian thesis that ‘being (or actuality) is not a real predicate’ was articulated against Cartesian position, it was made in another philosophical key than it is discussed by us now. Kant aimed his thesis at a ‘highest being’ that has all realities, whereas we argue for a phenomenological (or linguistic) position like ‘positivistic experimentalism’ in modern physics. So, in positivistic experimentalism, ‘any observation requires an observer’ (Rovelli 1996). On Kant’s critique of the ontological argument see e.g. Proops (2015).

³ On assumption of a linear St and the rational choice theory, the St must be like a recursive function and/or Markov chain in behaviorist modeling.

The former consists of the images of the things (physical bodies) and events between them. The latter embraces all abstractions such as perceptions (pain, cool, light, darkness), ideas (space, the right and left, top and bottom, time with the past and future), and logical conceptions (order, a whole and a part), and so on. In other words, a mental act is something that can be aware by consciousness as a separate and distinguishable state of a brain.

Following further a phenomenological thesis that the consciousness is always consciousness of something, the definition 1 means that St is realization of $x(t)$ at every moment t . Let t_0 be a birth-moment of a consciousness. Then $x(t_0) = x_0$ has to be the first mental act of St . Let $St = \{x_0, \dots, x_k\}$ at a moment t . Then $St = \{x_0, \dots, x_k\} \cup x_{k+1}$ at the next moment $t + dt$. Thus, St is discrete, transitive but irreflexive so that no mental act precedes itself by temporal and mental order $<$.

- (i) transitivity: $\forall x, y, z \in St(x < y \ \& \ y < z) \rightarrow x < z$;
- (ii) irreflexivity: $\forall x \in St(x \not< x)$.

Transitivity and irreflexivity at once exclude cyclicity of St when $x < y < z < \dots < x$. In sum, it means that St is a cause-like chain but not a strict causal set as it is in Relativity theory (see e.g. Sorkin, 1991; Henson, 2006) because of 'free will' of consciousness. Irreflexivity is a necessary condition of determinism, and St obeys this universal principle. In retrospection, a reflexive (reverse) mental act (cycle) on $x(t) = x_i$ at a moment t is possible, at least, as the next act $x_{i+1} = x(t + dt)$. If physical causality and free will could be replaced by instructions (algorithms) for St (and in the absence of Self) then St was like a 'Turing machine'.

Definition 2. The personality P is an initial segment of St integrated into long-term memory M :

$$P = -x(t_0) + \int_{t_0}^t x(t) \quad (2)$$

This equation has not a strict mathematical value. It is used to introduce visual clarity and emphasize qualitative details that contain some mathematical sense in this model. In the given case, the equation (2) implies temporal and

functional integrity of personality and draws a symbolic distinction between St as a simple union and P as a whole personality that is accumulated in consciousness excepting however the first mental act $x(t_0)$. In other words, St generates mental acts, whereas P summarizes them up to a structure $(St, <)$ ordered by a cause-like relation and the associative mechanisms in memory M . It also means that the first mental act remains in the unconscious and cannot be obtained since the reverse reference from it fails. What is the first act $x(t_0) = x_0$ of St ? Something exists, by Parmenides, if it is thinkable. Is it thinkable by whom? A newborn consciousness as a *tabula rasa* in the first thinkable act $x(t_0)$ cannot find anyone besides Self as a pure consciousness. And then, in the second act $x(t_0 + dt)$, the consciousness may discover itself as personality P through Self and acquire an initial memory. Therefore:

$$P = St - Self \quad (3)$$

In other words, the personality P (and memory) can start only with the second act of St that, in turn, begins with Self. No consciousness can be reminded of its first mental act in principle, since Self is just zero of memory M . Personality P changes over time by increasing St with integrating $x(t)$ in M , so that each individual today is another than he was yesterday. In fact, he becomes another at every moment t . It may explain why the different memories M_A and M_B generate the different personalities P_A and P_B , if even they are genetic clones living in the same environment. Even one individual is not equal to himself over time due to increasing his memory.

$$P - M = 0 \quad (4)$$

Thus, personality P changes continuously and vanishes without memory M , although St may be continued as a brain functionality. A partial break of memory M (not St) causes a mental disorder of P , neurodegenerative dementias such as Alzheimer's disease or Wernicke-Korsakoff syndrome (see e.g. Victor et al. 1989), whereas removal (ablation) of M , if it is possible, is a loss of a personality P but not a consciousness. Theoretically, at least, consciousness as St can go on by means of the simple reactions of a brain over time without fixing mental acts $x(t)$ in M . If Self proceeds to be in the absence of P , then what is the death of Self? It is a halt of St by a common clinical definition of brain death, when brain activity (including cerebrum and brainstem) finishes. Self comes in the first and out the last.



Definition 3. *The Self is the lower boundary of personality P.*

$$\text{Self} = \text{Inf}_{St} P \quad (5)$$

It does not imply that Self is a focal point of consciousness as Dennett argues: ‘A self ...is not any old mathematical point, but an abstraction defined by the myriads of attributions and interpretations...’ (1991). On the contrary, personality *P* can find itself by self-reference to its memory *M*, but if Self would want to find Self, it found nothing. The definition 3 introduces Self as the unconscious background on and in which personality evolves. Apparently, the *St* is open from above like the mathematical infinity, say, \mathbb{N} or \mathbb{R} , and can be dynamically infinite in the future, $St = \{x_0, \dots, x_k, \dots\}$. A halt (death) breaks up *St* (and *P*) in some mental act x_n , but it is not a logical limit in which *St* could not go on in principle. In the reverse dynamics, *P* is limited to Self.

Lemma 1. *The personality P never is a part of itself.*

$$\forall t P(t) \neq P(t \pm \Delta t)$$

Proof. It follows merely from irreflexivity of *St*. Therefore $P(t) < P(t + \Delta t)$ is a trivial situation of our everyday life, when we know ourselves in our past, but the temporal and causal loops, when $P(t) < P(t)$, are absolutely impossible for all moment *t*. Personality cannot be doubled into two identical personalities P_i so that one happens in the past (future) of the other, as if two various personalities P_i and P_{i+k} with two various memories (so that one contains the other) could come face to face with each other. In such a fantastic scenario, it needs a break of *St* that is none other as the death of consciousness as a whole. So, a scenario wherein *P* travels through time in order to meet itself in the past (by analogy with the twin paradox) is absolutely impossible in respect to a nature of consciousness (brain).

Then what can be a dual personality or dissociative identity disorder (DID) that seems very controversial to psychiatrists (see e.g. Gillig, 2009)? If we want to be exact in analysis, more complex terminology is necessary. Just therefore the stream of consciousness *St* had been introduced by us into this model together with personality *P* (and memory *M*). Traditionally, DID is defined as a structural dividedness of the personality (see e.g. Harper 2011). In fact, personality *P* does not exist by itself independently. *P* is always attached to its *St*

(Definition 2). Thus, there is a unique *St* wherein *P* is integrated over time.

Nevertheless, theoretically in least, *P* can be dual as two various parts of the *St* with two different memories M_A and M_B when one ignores some acts of their unique *St*. Therefore, there can be two personalities that are immersed in one and the same *St* at all moment time *t*, so that $M_A + M_B = M$. Then *St* has not a break, only two memories are broken and separated from each other in it. So, we cannot reject *St* for the sake of simplicity without an essential loss of completeness in scientific studying.

Lemma 2. *The personality P never is identical with St.*

Proof. It holds on Lemma 1 and the fact of continuous dynamics of *St* and *P* over time in the order that was established from Self. While *P* has acquired its act by introspection from *St*, *St* has also done a step forward into the outer World. Thus, the very first act of *St* is Self (definition 3), but Self cannot belong to *P*, since *P* as self-consciousness is in appearing yet. In order to self-refer, someone must have oneself in being beforehand. However, *St* cannot be stopped to wait for *P* while *P* self-refers. It is just the mortal halt. Thus, the order that has been established from the first mental act (Self), holds on all times and cannot be changed.

In other words, *P* is always open from above by time passage to the present, and *St* is its upper closure, as if *P* perpetually strives to come up with *St*. It requires for *St* to be in turn also open from above for the real events in the future to make them the mental acts for *P*.

Now the equation (3) can be specified:

$$St(t) = \text{Self} + P(t - dt) + x(t), \quad (6)$$

where *t* is a current moment of the present and $(t - dt)$ is its nearest past.

In conclusion to this part, (6) means that just the stream of consciousness *St* deals with the outer World that is full of real things and events and thereby creates a window through which personality *P* meets the physical reality as its own perceptions, images, ideas and so on, whereas Self underlies them both.

2. Consciousness and Time



On assumption that a mental act $x(t)$ is instant in a brain, the phenomenological (but not physical) time in St is:

$$St = 0 + dt + 0 + \dots + dt + 0 + dt + \dots \quad (7)$$

where zero symbolizes the instant mental acts and dt is a temporal quantum.

The given term “quantum” is not, of course, a mathematical differential dt or Plank’s unit of time, $t \sim 10^{-43}$ s in this context. To date, neurophysiology estimates a minimal interval between two immediate acts about 100 -750 ms (Buonomano *et al.*, 2009).

It is a phenomenological necessity for consciousness to choose by fixing events (states) from the holistic reality over time. Time (as well as space) is traditionally conceived in Relativity to be continuous under the Hausdorff separation axiom (HSA). However, taken as a continuum \mathbb{R} in a Cantor sense, such time is uncountable and therefore leads inevitably to a conclusion that causality cannot be observable completely, since it is impossible to enumerate all events within any minimal interval Δt in order to test them step by step. In other words, if an event a causes an event b by a well-established physical experience, $a < b$, then there exist two at least events c and d such that $a < c < d < b$ by HSA.⁴ The c and d are always immersed in an unattainable and unobservable causal background (UCB).⁵ Then what is the event which determinism reposes on? Is it only a phenomenological and conventional concept in an opinion of our consciousness or a real state of a system in the independent physical reality?

In fact, only discrete and countable time can provide us with the complete causal picture of the universe, when there are no hidden events between elements of any causal chain. However, it introduces non-locality into the chains. What is then the universe between two causally immediate discrete states?

Time brings an undecidable problem into the physical reality and divides physics into three generalized strategies:

⁴ In fact, it is the oldest problem of time that had been articulated by Zeno long ago in his famous paradoxes on the instant rest and motion. On the Weyl Tile argument about the discrete space impossibility in physics see e. g. Hagar (2014).

⁵ In such a reality, consciousness could observe a process wherein, say for simplicity, an egg turned into an omelet spontaneously with no intermediate events. USB can be directly correlated to particle physics.



Tempus ante Quantum;

Tempus post Quantum;

Tempus nihil est (Anderson, 2012).

If time is assumed to be in general, then it can be reduced to two fundamental aspects:

1. If time is continuous and separated, then UCB and the ‘Moment Problem’ (Ash *et al.*, 2003) arise in Relativity;
2. If time is discrete (quantum), then Continuous Spontaneous Collapse and the ‘Measurement Problem’ (Bassi *et al.*, 2013) emerge in Quantum mechanics.

In a more radical approach, this problem puts us to question whether the universe is timeless (Smolin, 2013) and consists of only events or only time is with no events. The former seems preferable for physics, since mathematical equations there describe just the events (states) in dynamics but not time itself. In fact, time is indescribable (except Lorentz transformations that define time by time and led to absolute temporal relativism). The main timeless argument is that the fundamental laws are mathematically invariant under time reversal.

On the other hand, how can consciousness exist in the absence of time? Timeless naturalism may be well enough for physics in ignoring consciousness, but it is extremely unsatisfactory for consciousness at variance with what we see and know about themselves. Moreover, it contradicts the arrow of time under obvious and testable asymmetry of the reality. The thermodynamic and cosmological arrow of time must be also added with anthropic one in respect to the evolution of consciousness over time.

What is the event? This question is to consciousness rather than to physics. The concept ‘event’ is before physics. It is an issue of philosophy of mind and ontology. Thus, although our assumption on the instant acts seems incorrect in respect to physical nature of the brain, it is based on a phenomenological but not physical speed. Neural networks may and must form a mental act as long as necessary. The very act of cognizance (realization) in brain is instant. Just the consciousness brings events in the reality as its own mental acts. No consciousness? No events (states). A vicious circle arises in *Tempus nihil est* strategy:

timeless naturalism – no consciousness – no events – no timeless naturalism.

Any observation requires an observer (Rovelli, 1996). In fact, any observer related to one or another inertial frame of reference in Relativity is also a certain neuro-phenomenological system (brain). In order to make an instant reference by measuring, this neuro-phenomenological system must be instant itself. However, this reference requires self-reference of consciousness (neuro-phenomenological system). But St is irreflexive in causal sense and cannot be stopped. No instant observer? No observation. No observation? No event.

Observation comes to be possible in the reality only due to the cause-like nature of St by (1). But it occupies two at least mental acts $x(t)$ and one quantum dt between them in dynamics of consciousness over time by (7). Consciousness can find itself as self-awareness in the present only by superposition between St and P (Lemma 2). It must be also taken into account that $P(x_{i-1}, x_i) \neq P(x_i, x_{i+1})$ in dynamics of P . Thus, superposition is embedded in consciousness. It is inevitable by two reason:

1. Consciousness brings events into being and thereby creates real (instant) states in the continuous and uncountable Cantor-Hausdorff's Universe;
2. Consciousness can make these events (states) only by self-reference (in superposition between St and P).

In returning to the Cartesian ontological argument, we can take it as a plausible postulate.

Neuro-phenomenological postulate (NP).
*Existence is an exclusive predicate of consciousness.*⁶

In following the Eubulides' paradox, a heap is impossible. Nevertheless, a glance is enough for consciousness to cognize a heap in a set of things, as if the brain collapses information to one point. In this scenario, observer (consciousness) does not make a physical measurement of a heap by his glance at it (since it is only information emitted by a heap to everything alike), but consciousness (neuro-phenomenological system) interacts by this instant reference with itself over time. An act of cognizing as mental grasping of a whole image and thereby introducing a phenomenon (event

or/and instant state) in being is similar to wave-function collapse in quantum mechanics. It is an instant phenomenological (non-local) fall of probability or 'objective reduction' by Penrose (1989).

Consciousness makes time discrete by events of necessity for itself but time is not to be by fact separable (countable and totally dense) by quanta as it is in (7). It is time constrained phenomenologically. Wheeler notes, 'Nothing so much distinguishes physics as conceived today from mathematics as the difference between the continuum character of the one and the discrete character of the other. Nothing does so much to extinguish this gap as the elementary quantum phenomenon "brought to a close," as Bohr puts it by "an irreversible act of amplification," such as the click of a photodetector or the blackening of a grain of photographic emulsion (1989; p.315). But before all experimenter's actions, his consciousness makes this 'click' to detect the reality in which it may exist solely. No device and technique can abolish this reality. The very consciousness must be forbidden.

As personality P integrates acts x_i but not 'quanta' dt , it makes time thinkable but elusive. Although, 'the ability to determine the interval and duration of sensory events is fundamental to most forms of sensory processing, including speech and music perception' (Buonomano et al. 2009), in introspecting on time, P can find none other than a new mental act but not a quantum itself. Its short-term memory M_{sh} holds only the order of the events (mental acts) in a small interval Δt but not time between them.

$$M_{sh} = \dots + x_{i-1} + x_i + x_{i+1} + \dots \quad (8)$$

Time vanishes yet in M_{sh} , though a current order of events by appearance is saved to be there – at least for a short interval Δt . But then this order becomes also blurred and replaced by associative mechanisms of long-term memory M . Individuals cannot remember their own actions in strict succession after Δt . Traditionally, $M_{sh} = 7 \pm 2$, and $\Delta t \sim 18$ s (see e.g. Miller, 1956). Instead, the associative mechanisms allow P to obtain the correlative communication in its memory M immediately, when, say, a smell evokes the mental acts (things or events) from the removed personal past. It is called 'reminiscence'. It must be emphasized that a reminiscence as well as an introspection returns P to P in its past as an imaginary reality but not to the real past.

⁶ Poincare noted, if there is no consciousness in the universe, then what is the being of the universe? What mind can observe its existence? It is more than rhetoric.



The associative mechanisms must be many more than a compact repository of information saved to be lightly elicited. The ‘compactification’ of information in brain needs logistics as such, and therefore memory may be a unique source of what we call ‘logic’. While short-term memory M_{sh} keeps a current order of events as they contingently go over time, the long-term memory M selects and separates mental acts by some properties, for example, associating the most stable ordered chains of events in the observable reality and conscious experiences as causal blocks.

Thus, P acquires the ability to foresee events by comparing initial real conditions with patterns of causal blocks in memory M . It seems reasonable to suppose that human natural ability for logic is extracted by the brain from the physical reality subjected to causality but not logic. Mental logic approximates physical causality. In other words, logic influences mental acts in neural network by analogy with the way in which causality influences physical events in the reality.

Now we can elicit time as an abstraction by eliminating mental acts (zeros) out of St in (7).

$$t = \dots + dt + dt + dt + \dots = \int dt \quad (9)$$

Thus, (9) can be already considered as the mathematical infinity generated by a ‘pure mind’ of consciousness. This homogenous construct consists of some (infinitesimal) abstract quantities (points) without singularities (zeros) and embodies the classical properties and notions that are traditionally put into foundation of mathematics. Further, the ‘pure mind’ could impose the Cantor continuum on it and so on to elaborate independently all mathematical forms from itself solely (brain). In other words, by assuming some fantastic scenario, might consciousness be congenitally able to create mathematical universe having no real universe in experience and be then surprised to see that the former could be correlative to the latter?

The phenomenological time possesses the same properties as physical time. First, it is the arrow of time. As regards irreflexivity, any reflexive act is possible only as self-reference. Being at x_i as the present, P may return to x_{i-n} in the past only through the future at x_{i+1} due to time progress. It is not a temporal loop but only a cause-like unclosed loop whose minimum contains three mental acts. A reminiscence is a similar loop at any reasonable interval Δt .

Dynamics of St and P both generate three psychophysiological mechanism: (i) self-alienability, (ii) self-inadequacy, and (iii) self-completeness of P . The self-alienation arises inside P -chain in the direction to the past as a reminiscence or introspection, the self-inadequacy occurs at the next step between P and St due to openness of P to St at the present, whereas openness of St to the future provides self-completeness of consciousness.

3. Self-Alienability Mechanism

Firstly, when an individual speaks ‘ T ’, he makes a reverse (inner) reference from P to P . This psychological and linguistic fact of the reference in dynamics implies another individual. Since personality P changes continuously, the P can refer to itself only as to another P in the past, since $P(t) \neq P(t - \Delta t)$ (Lemma 1).

When an individual call himself ‘ T ’, it is another by sense and logic. There is no difference whether he tells about himself or another person. Self-reference always uses self-alienability (SA) mechanism. ‘It is me’ is factually ‘It is he’ by SA-mechanism. It is typically studied in reflexive psychology and sociology with regard to moral self-estimation of individuals (Bourdieu and Wacquant, 1992). Indeed, morality would be impossible in the absence of human ability to make self-estimation and, consequently, self-alienation. A testament ‘Love your neighbor as you love yourself’ and Kantian maxims claim self-alienability of P to estimate itself as another person. It is possible only due to continuous increasing of P . Morality and responsibility are impossible for lack of SA.

SA is widely discussed in philosophy of mind by many philosophers (Bennett *et al.*, 2009; Priest, 1991; Searle, 1997) with regard to elusive frontier between consciousness as such and self-consciousness as ‘ubiquitous inner awareness’ (McClelland, 2015). What is the former and what is the later? What distinction is between them? The definitions given above allow to elaborate terminology and make the distinction obvious through SA-mechanism. In this study thus consciousness is none other than a neuro-stream St , whereas self-consciousness can embrace all personality P excepting Self. Just therefore Self, being in the unconscious, lies beyond SA-mechanism. Self cannot be consciously alienated and estimated even for a moment. Therefore, selfish residuum is always.



It seems undoubted that ‘in the name-user scenario, each speaker uses their own name self-consciously to self-refer’ (Hamilton, 2015). But strictly speaking, the true ‘I’ is unspeakable since a self-reference is always SA that needs a time interval, but personality P changes continuously. Time cannot be stopped. Even a halt of St cannot do it. It is only the end of a person’s time. In this sense, a liar’s paradox is impossible in a sensitive temporal logic. When an individual says “I lie”, just at this moment the liar becomes another person in the past (Lemma 1). Now his statement may be true for the renewed individual. Psychologically, being in self-reference SA is a reminiscence of consciousness, i.e. an unclosed loop in the cause-like chain of St . In referring to or only implying itself, personality P does not return to the past but realizes new mental act by reinserting its past into its future through its present.

Therefore, the statement “I lie” is only a reminiscence of what is already out. For a brain, it is always resurrection of a liar. Thus, SA-mechanism endows consciousness with both remarkable abilities to be responsible and to lie alike. Consciousness can be moral and give false evidence only due to SA. From the second mental act, consciousness lives in perpetual self-alienation. In this dynamics, using SA-mechanism, self-consciousness as P is always behind consciousness as St by one at least quantum dt . In mathematics, the recursive functions (or Markov chains) define the future by the present. It seems reasonable and inevitable in a deterministic paradigm. Just so a machine (computer) works. But consciousness uses a more sophisticated process in the reverse order. The future in St defines the present of P .

SA-mechanism can be also considered in respect to the Cartesian thesis. The *cogito* is a shortest loop in St as a reminiscence of the nearest past by reinserting a mental act $x(t - dt)$ into $x(t + dt)$ through $x(t)$. It would be more exactly to say ‘I think (self-alienation), therefore he was.’ Now ‘he’ is turning into ‘I’ while a quantum dt goes over. When the quantum has been gone, ‘he’ has turned into ‘I’, but this ‘I’ is already in evolving through a new quantum that begins at once. Thus, ‘he’ in the present is possible only due to ‘I’ in the future. What we call ‘I’ is a dynamical phenomenon based on SA-mechanism and dilated among three mental acts at least.

In the Heisenberg’s approach, the difference between quantum and classical mechanics is expressed by replacing classical functions with

operators which commutations satisfy Poisson brackets $[q_i, p_i] = i\hbar$. Thus, if in following the Heisenberg’s equations of motion, the mental acts x_i can be converted to the operators X_i of the ‘pure’ state a brain, then SA-mechanism can be widely treated as a commutator of reminiscence by the *cogito*. While a pair (X_{i-1}, X_i) lies in the natural order of St , its inversion spontaneously induces a triple $((X_i, X_{i-1}), X_{i+1})$ as a cause-like loop. Thus, the commutator throws out an ‘action quantum’ of consciousness (brain) in dynamics over time.

$$[X_{i-1}, X_i] = x_{i+1}$$

We can have both passive and active phases of consciousness. Thus, if the operators X_i are taken to be not merely the ‘pure’ states of St but in an active phase as applied to the reality (at least, under observation), then St is non-commutative with a Lie-like algebra in the sense that the ‘order of things’ as in real as in mental is to be of great importance. Moreover, just this neuro-phenomenological model – though borrowed from Heisenberg’s formulation – may be put in front of the quantum-mechanically device by NP, namely that observer’s consciousness (Heisenberg’s for a moment) precedes factually any conscious experience and consistent theory. On the same reason, quantum description of the reality may be called more ‘real’ than classical.

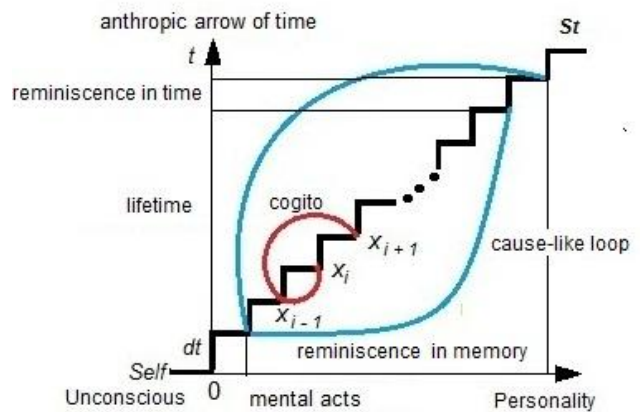


Figure 1. Stream of consciousness and SA-mechanism.

The personality P can be approximately presented as a polygonal chain or uniformly broken line (Figure 1), that consists of the light-like (instant) mental acts x_i and quanta dt that, in turn, are not reflected in P (and memory M). Thus, the reciprocal projections of dt and x_i on each other are empty. In other words, the time axis does not contain mental acts, and personality P (and M) contains only the acts but not time. It also



sustains the asymmetry of time in respect to the thermodynamic and cosmological arrow of time. Moreover, while the thermodynamic and cosmological asymmetry of time reposes on our common experience and astronomical observations of Hubble's red shift in the universe, the anthropic arrow of time makes our phenomenological being irreversible. Theoretically, the movement backward in time must, at least, erase mental acts from memory M . Thus, the reverse movement is impossible absolutely. The obliteration of quanta dt from St claims consistent erasure of acts x_i from M . It is annihilation of P in its integrity by (2) and (4).⁷

4. Self-Inadequacy Mechanism

The self-inadequacy (SI) mechanism is caused by dynamics of St into the future. SI is less studied or even unmarked in philosophical literature, since it is close to psychology rather than philosophy. As St must be discrete to provide P with distinguishability (though, maybe, without strong certainty) of its mental acts and at the same time St cannot be discontinuous insofar as it is a collapse of consciousness and death by a clinical definition, so an interval dt bridges a gap between two immediate acts x_i and x_{i+1} . When St already contains x_{i+1} as a real present of consciousness, P has only a past act x_i in its memory. It means that personality P can grasp the present only when St will step into the future. It is just the SI-mechanism which some remarkable properties of consciousness are based on.

There is always a moment of inadequacy of P in St . It is the present. Thus, in dynamics of being, St precedes P by one act over phenomenological time. Therefore, P is not self-adequate at every present moment. Just the SI-phenomenon allows to explain the mechanism of hypnotic suggestion and hallucination. How can it be yet possible to impress on consciousness the unreal mental acts if personality P controls its stream St ? The dynamics of consciousness alternates stable and instable states of mind over time. The personality P is absolutely stable when has grasped a mental act in its short-term memory M_{sh} , but the present itself lacks in P . It is a ground for suggesting the false and unreal mental acts.

The P loses stability when jumps into the future and may be misdirected to a hallucination by suggestion or due to mental disorder such as schizophrenia characterized, in particular, by false beliefs, auditory hallucinations, and loss of what is real (on gene-environment interactions in schizophrenia see e. g. Ayhan *et al.*, 2016). A hallucination, being perceived at mental act by St , will be naturally grasped by memory M and, thus, acquire a status of a real event in the past. It is already a part of an individual phenomenological reality. A hallucination becomes imbedded in P . Individuals – whether they are sane or insane – incline to believe their memory M on which their personality P is grounded and integrated continuously. In fact, the unique criterion of what is real is individual memory M . In this sense, personality P is equivalent to its phenomenological reality.

Then the physical reality as a whole is no more than an objective part of the 'collective phenomenological reality', the *super-cogito*. Some people, for example, have faith in angels. What is necessary to make the angels real for the rest? The angels must come into being or they must become a mass hallucination to be involved in all individual phenomenological realities. Thus, the physical reality can be estimated as the 'total phenomenological hallucination' that is obligatory for all consciousness. Can we prove the independency of this reality in the absence of consciousness? This question is a logical nonsense as it had been noted by Poincare. No consciousness? No question. No question? No answer. A famous sentence of Wheeler (1989) 'It from bit' can be rephrased as 'It from consciousness'.

If an individual has had the hallucinations or beliefs, only he may be able or disable to separate them from things and events that are confirmed to be real by the rest individuals or, at least, the majority of them. The said returns us to Protagoras' thesis to reformulate it in conformity with HP-postulate: 'Consciousness is the only measure of being of all things by SI-mechanism'. The reality is what the majority think real. Can the universe be in being only due to our common consent on it? We will discuss it in Conclusion.

SI-mechanism endows consciousness with many remarkable abilities. What are the belles-lettres, cinema, theatre, computer games, and the like for consciousness? It is an immersion into the imaginarily virtual worlds. In the same way, a schizophrenic's brain generates an altered reality

⁷ On the other hand, it can be also interpreted in psychophysiological sense as dementia. Then a fantastic scenario on the reverse movement in time is like devastation, degeneration, and/or traumatic destruction of neural networks in brain since erasing memory M by time reversal in St only returns P into Self.



that appears more attractive for his consciousness than the common reality generated by the 'collective consciousness'. It can be supposed that just the solipsistic Self through SI-mechanism instigates consciousness to a schizophrenic riot. Possibly, Self finds consolation in an altered reality with false beliefs as well as personality is sometimes absorbed in reading or computer games. The only difference between a virtual world and an altered reality consists in an ability or inability to robust self-control (by means of SA-mechanism), since memory M (and P) keeps the real and unreal mental acts (events) alike.

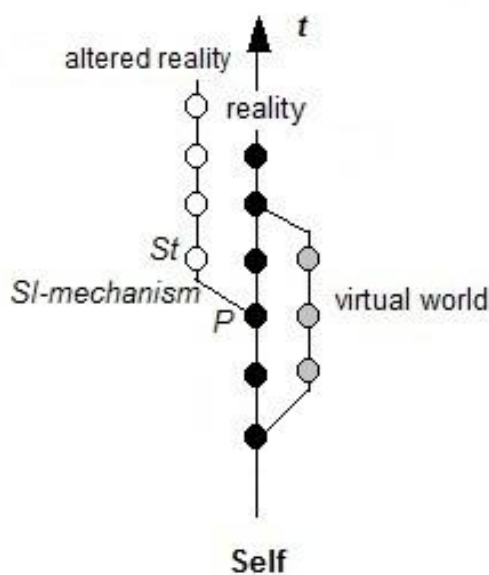


Figure 2. Personality between a virtual world and an altered reality.

Possibly, the free will comes to be in brain due to the SI-mechanism. It leads inevitably to a conclusion that the free will, mind as such, and also suggestibility (including schizophrenia) are bundled on non-identity between St and P (Lemma 2).

In our simple approximation, the stream of consciousness is a chain St that is open from above. Its closure lies in the future. The closure moves perpetually in dynamics of St over time. While P acts inside St , just the St deals with the outer World and thus turns the physical reality into mental acts for P (and M). It is the most mystical process for studying. If the reality is quantum and non-local in its nature, then just the consciousness must turn it into deterministic and local, since in conformity with the Copenhagen interpretation of quantum mechanics, just the

observer collapses a wave function and thereby makes the reality classical.

There is a crucial difference between space and time for consciousness. Consciousness sees the space but cannot see time and acquires a fundamental idea of the real future having the past attached to its personality P (and M). Time is invisible but can be indirectly observable through evolving of M . In other words, a mind can find the time only inside itself. Consciousness realizes its past, whereas its future remains essentially unknown. It is a fundamental fact of our unconscious perceptions of and conscious reflections on the reality in each brain. The only physical reality accessible to consciousness is the reality in its memory. In other words, we have and observe no universe besides the universe in our past.

A current present is a key point wherein the universe changes cardinally. In a simple mathematical fact, this point is a (rational) singularity of both past and future light cones in a Minkowski spacetime. A problem, as it is said above, consists in distinction between a quantum dt at a moment t and event $x(t)$ as zero at $t + 0$. Every present will become an ordinary moment t in the past like all other moments, but the current present in itself as 'now' has a special status. Smolin argues for it in his temporal naturalism by saying 'all these other moments will have or have had that same special status with respect to observers at those times' (2013).

What is the present? In a mathematical sense, it is the boundary between the (closed) past and the (closed) future. How long is this boundary? If the present has some duration, it can be divided again and again. In other words, what is the boundary of all those boundaries? Wheeler, for example, says 'The boundary of a boundary is zero. This central principle of algebraic topology, identity, triviality, tautology, though it is, is also the unifying theme of Maxwell electrodynamics, Einstein geometrodynamics and almost every version of modern field theory' (1989; p.315).

A moment t itself that we observe immediately as 'now' is either a whole slice of the quantum reality or zero. Relativity says that the present is light-like in a Minkowski spacetime with a metric degenerated (null). In other words, by foliation of the space-time, the 'now' is a hypersurface as a *singular* (by Hausdorff separability) boundary between the open past and the open future. It is said in some controversial sense that

the past light cone and the future light cone are inseparable by anything but separated by 'nothing' as a thinkable phenomenon that, consequently, is in being by NP-postulate.

$$past \cap future = \emptyset, \quad (10)$$

as if their 'right' and 'left' closures respectively are one and the same moment t , but t has its own boundary whose Lebesgue measure is empty.

Just therefore the phenomenological time (7) must be an alteration of quanta and zeros as instant events collapsed by consciousness. Thus, the quantum nondeterministic reality (that is believed to be in the future) turns spontaneously – by passing through a current singular present – into non-quantum deterministic reality on which all classical and symmetric under time reversal equations were made (as only the past we know and study). However, the relativistic past is not a mirror image of the quantum future. For quantum mechanics itself, this mirror is the anti-universe (antimatter) by CPT-theorem. Thermodynamics also argues against formal T-inversion between the past and future, since thermodynamic processes are irreversible. It seems an undecidable problem to physics if consciousness is put into neglecting.

As the fundamental laws are indifferent to time reversal, the proponents of timeless naturalism suggest 'the evident time-asymmetry of nature is then held to be an accident, due to an improbable choice of initial conditions' (Bombelli *et al.*, 1987). This 'accident' of an 'improbable choice' is just the consciousness (brain) itself. Mathematics is no more than a unique product of mind. If mathematical equations allow physicists to call time 'illusion', it is *reductio ad absurdum*, since then those equations are illusory also.

Timeless naturalism inferred from mathematical presentations is a logical error (Cortes *et al.*, 2014; Smolin, 2013). Moreover, it is ontological panpsychism. Since the mentioned 'initial conditions' of time-asymmetry imply Big Bang cosmology, then consciousness must be conceived before the Big Bang singularity in the state where time vanishes by the same mathematical equations (of General Relativity).⁸ Is

it conceived by whom? By consciousness itself? It is a nonsense which Einstein argued against.

In response to this challenge, let us consider it in regard to a Turing machine. In a simplest definition, the Turing machine mechanically operates on a tape. On this tape are symbols, which the machine can read and write, one at a time, with the help of a tape head. Operation is fully determined by a set of instructions. Thus, the tape imitates the physical reality that was divided into the cells, as if each cell could be a temporal state of the independent outer World. The machine can erase or write a symbol, move the head left or right, *and then* assume the same again or a new state as prescribed by instructions. Stop the process before 'and then'. It imitates the present of the machine. Now the machine has realized the last act and is ready to go on into its future in order to change or preserve it. Despite the tape on which some future has been written down, the real future does not exist. It is only in becoming through a quantum dt .

Let us assume that consciousness does not move along the temporal axis (tape) into the future, but the axis moves through consciousness from the future. This scenario is logically justified, mathematically correct, and factually Lorentz-invariant in relativistic interpretation of the inertial frames of reference. It also conforms to philosophical 'presentism' that treats the present as the only state of consciousness (Tallant, 2014). Can time be evaluated in this sense as active? Indeed, while we stay in the 'presentism' rest, the future impends on us inescapably whether we want to participate in it or not. Then, consciousness does not slide towards the arrow of time at all, but, on the contrary, the arrow of time passes through him (its brain). Moreover, as it is said above, consciousness cannot see the future as if it stands in back-position to it. Yet, it is a back-superposition by SA and SI mechanisms.

In other words, consciousness (as a relativistic observer) is located at a present moment t between the past and future light cones in a Minkowski spacetime and moves backwards to the future so that his brain's (as a neuro-phenomenological frame of reference) action coincides with this 'active' arrow of time.

⁸ It seems to be naïve that some psychologists, believing timeless naturalism and in line with Penrose's idea of non-random objective reductions of the wave function (1994), attempt to develop a so-called 'retro-causation' in consciousness by experiences on retro-active processes and pre-real unconscious knowledge (Bem, 2011). Strictly speaking, such assumptions, being ontologically unfolded, lead to 'timeless panpsychism'.



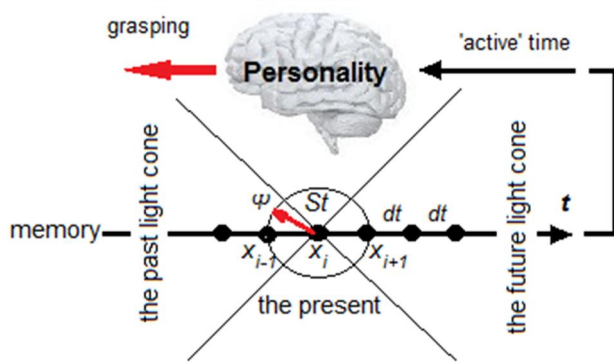


Figure 3. Wave-function collapse in brain back-superposition.

Just so, at every moment t , consciousness stays in a singular present between the past and the future. It is some mental act x_i such that x_i belongs to St but not to P (Lemma 2). The P looks at the past by means of SA-mechanism, where a wave function ψ has been already collapsed by its (observer's) grasping. Just therefore P is also inadequate in the present by SI-mechanism. In particular, if consciousness in back-superposition between x_{i-1} and x_i collapses an unreal event x_{i+1} from the unknown future (hallucination, suggestion, and so on), it falls to memory M by transferring through 'active' time passage, and hence personality P appears in an altered state.

Despite a deterministic trajectory of a body in classical physics and Relativity, the uncertainty principle, superposition, and wave-function ψ collapse arise in quantum mechanics. This contrast is traditionally related by mathematical presentation of both theories and by measurements to an artificial divide between the micro-world and the macro-world. But the true divide can lie not at micro-macro levels but in the very time between the past and the future.

So, the future is also essentially non-predetermined in St . However, we do not see a problem in the fact that the universe is probabilistic to us in the future although it is well-established for the past (since that is the only one what we have and know actually). The consciousness (brain), going incessantly forward over time, is induced to predict the future in order to be survivable, reasonable and even rational, as it is in rational choice theory. Otherwise, the future must be like a leap into nothing and nowhere. In other words, just the consciousness grasps the future and thereby turns the

undetermined quantum future into the non-quantum deterministic past.

Just therefore, this past is always subjected to causality and logic also. Only then consciousness can invert it into the future to come up to its own expectations there. This inversion is indeed justified by the order of things (preserved as causal blocks in its memory M) in a short term. However, the predictions fail in long-term perspective unfolded into the 'dark future'. This 'dark future' can lightly lead consciousness astray, mystify it and bring to altered states.

5. Self-Completeness Mechanism

The said above inevitably leads us to self-completeness (SC) mechanism. Consciousness is self-sufficient and complete in itself. Suppose that there is a 'blind' consciousness as a 'machine-in-itself' isolated from the reality by analogy with a so-called thought experiment 'brain in a jar'. This brain obtains communications with the reality through the wires which provide it with electrical impulses. Assume that this connector was broken as if the reality would be vanished. Must the consciousness be stopped, since information lacks? No. Why not? Lack of information is also an information for the consciousness.

Consciousness is able to see emptiness (darkness) and hear silence. In other words, consciousness obtains information always and in all ways. Nothing is in being for it. Nothing is a thinkable phenomenon. The true 'nothing' (absolute emptiness, non-existence) for consciousness is possible only as a halt of St , i.e. its brain's death by a clinical definition. While Self is alive, consciousness always elicits some information. It is just the SC-mechanism.

Lemma 3. *In the absence of information for St , P has information alike.*

Proof. It holds on Lemmas 1, 2, and a common fact that St can be stopped only by an ultimate halt. While St is in progress, P always has one act $x(t + dt)$ before itself in order to pass to SA-mechanism by self-reference and not be in a causal loop, when $P(t) < P(t)$. Thus, whether personality perceives information from the outer World or not, P makes the next mental act alike and thereby brings a new event in its own reality.

The lemma 3 implies one more general conclusion, namely that both active and passive



phases of P are entangled over time. Indeed, it follows from our common understanding what we call 'mental act'. The act may be either 'pure' (passive) as an introspection that, generally speaking, does not interact with the outer World, or 'mixed' (active) as a physical action applied to the outer World.

Corollary. Active and passive phases are entangled in P .

In other words, whether consciousness is in meditation, in observation, or in action, the brain does not a principal distinction between the outer World and its interior reality. Self presences in all activities of a brain as a key mechanism of St . For quantum mechanics it may, in particular, mean that an observer appears already in interaction with the outer World in the sense that consciousness plays a crucial role in becoming the reality.

In dynamics of consciousness, SC-mechanism stands in a remarkable correlation to SA and SI mechanisms with regard to passing through trichotomy of the past-present-future. While self-alienability occurs due to the reverse reference (*cogito*) to $x(t - dt)$ in the past, self-inadequacy appears in the present moment t when $x(t)$ is in St but not in P yet, and then self-completeness will hold upon an emergent act from the future to be perceived as $x(t + dt)$. Thus, SC-mechanism is generally caused by consistent time progress. Since the triple 'past-present-future' is irreflexive and time progress is consistent, so the trichotomy $SA < SI < SC$ is also irreflexive as well as St and P on the whole (Lemmas 1 and 2).

First, it seems undoubted that just SC-mechanism plays a fundamental role in all passive neurophysiological phases of consciousness from meditation and sleep to coma and vegetative state. In a general definition, those states characterize P isolated from the outer World. The situation is like a 'blind brain experiment' wherein the communication between St and the physical reality vanishes. As it is said in Introduction, the reality begins for consciousness with Self as the infimum of being. Only then P acquires a sufficient 'knowledge of life' in order to separate internal reactions of its body and external perceptions from the outer World. Thus, just SC-mechanism endows consciousness with an ability to sleep when the outer World lacks but St proceeds to generate dreams within M with the help of SA and SI-mechanisms. It endows P with autonomy and

allows to see emptiness in the active neurophysiological states also.

Despite Western philosophy, SC-mechanism was especially illuminated and studied in Eastern philosophy long ago with regard to meditation and the key concept in Buddhism and Taoism on 'absolute emptiness' of consciousness and 'pure being'. SC-mechanism is considered there as a fundamental obstacle in the path to attain 'absolute emptiness' or 'nirvana'. So, we can find in Buddhist literature: 'When all lesser things and ideas are transcended and forgotten ... there remains only a perfect state of imagelessness where Tathagata and Tathata are merged into perfect Oneness' (cited by Goddard, 1966). Thus, in rational applying to the St -model, the mystical 'Oneness' underlies as P as its lower boundary. It must be before the first mental acts in St . In other words, it must be beneath Self wherein neural syntax and phenomenological semantics are the same. As yet nothing has been done by a newborn consciousness at that moment, NP-postulate is out.

Furthermore, this 'Oneness' is treated by Eastern philosophy in panpsychism tradition despite Western dualism. Tao Te Ching, for example, calls it 'Nameless that Heaven and Earth sprang' (Waley, 1958) or 'Unnamed, it is a source of heaven and earth' (Johnson, 2014). Although there is a wealth of connotation of what is 'Oneness', in a simple and more rational interpretation, it is like the true 'I' that is unspeakable by P in *cogito*. Thus, what we want to call 'I' cannot be named 'I'. It is only self-reference to P in the past. This 'I' is not in predication of consciousness. It spreads throughout P but only between acts and therefore cannot be collapsed. 'Oneness' or 'I' is timeless. To attain 'I', P (not St) is required to be halted. Thus, nirvana and coma become the same.

This metaphysical aspect of consciousness nevertheless provides us with many rational abilities. So, for example, an ontological postulate on existence the black holes in the universe can and is intuitively obtained from NP-postulate by Lemma 3, since those objects have an event horizon with no emitted information. They are unobservable by their definition. In our model, there must be thus an empty act $x(t)$ of St at some moment t such that P has nothing for itself. In another way, each observer (personality) must be halted (dead) or at least collapsed to sleep or coma after a glance at a black hole. Although the black holes are indirectly observed through their



gravitational influence on other visible bodies, their primary ontological status holds on SC-mechanism. The said can be equally correlated to a vacuum in the lowest energetic state. The vacuum cannot in principle be beyond being for consciousness as absolute Parmenides' non-existence.

In particular, just SC-mechanism allows us to conceive and elaborate the mathematical abstractions such as zero 0, empty set \emptyset , identity element f^0 as a null operation and so on. More generally, consciousness is able to think 'nothing' and remain alive due to SC-mechanism. In Eastern though, it also prevents meditation and blocks conscious ability to attain nirvana.

Searle, for example, insists that 'consciousness is nothing beyond experience' (1982). Is it so? A crucial difference between consciousness and machine consists in the fact that the former is self-complete. A machine has not Self. For a Turing machine, if information in the cells on a tape lacks, the machine is beyond phenomenological being, although as a material thing it, surely, remains as well as a halt (death) of consciousness does not caused a brain's disappearance. In other words, the machine cannot work without a tape. It is not so for consciousness. Lack of information (experience by Searle) does not cause the loss of consciousness. *P* remains in acting. Possibly, just the Self saves consciousness by providing *P* with an ability to think 'non-being' and remains in itself.

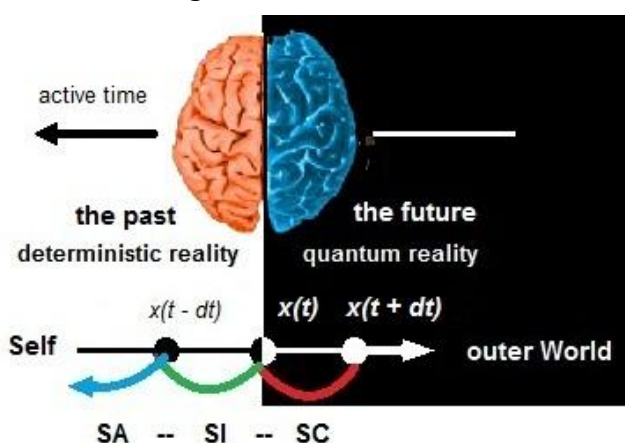


Figure 4. Mind-trichotomy between the deterministic past and the quantum future.

Conclusion

Is the nature subjected to our logical laws? It is the most puzzle for panlogism. Meanwhile, quantum physics rejects it by uncertainty, non-locality, and probability instead logic. More exactly, quantum physics argues for superposition instead of real

states (events) in the universe. Hence, according to the Copenhagen interpretation, these states are made by an observer (consciousness) through wave-function collapse (objective reduction by Penrose). But if there are no real states (events) in the universe, then time quanta must be absent there also. No one? No the other. In other words, time – if it is assumed to be in quantum mechanics – cannot be divided into the triple 'past-present-future'. It must be one eternal present or the present eternity. Moreover, in the absence of real states, any deterministic trajectory in Relativity and classical mechanics is impossible. A body moves along all possible paths at once by the Feynman's integrals despite a Hamiltonian 'principle of the least (stationary) action'.

Is it a problem of physics? Yes. Can philosophy of mind and neuroscience answer? Yes. Time and consciousness are necessary each other. If time would be not, consciousness was unable to separate one image from another image, one idea from another idea. Then what is thinking? No time? No mental acts. No consciousness.

So, a Schrödinger's cat is dead and alive at the same time, since there are no real state and, consequently, temporal intervals between dual positions lack in the universe. The cat is in all states at once. But consciousness is able to grasp one mental act as a real event and thereby make time discrete and orderable (countable) by means of quanta dt . Consciousness introduce the stable states and thereon the deterministic and logical order into its phenomenological reality (on a 'synchronicity phenomenon' and psyche, e.g. Martin *et al.*, 2010). In our model, *P* passes through SI-mechanism at the moment t when St collapses the quantum reality. In this sense, just the St makes the reality deterministic and relativistic. It seemed a nonsense and great mystery to Einstein who had not recognized quantum mechanics at all. In his physicalism, the universe cannot be dependent on consciousness.

While classical physics had been established and evolved under this presumption of the independent reality, quantum physics came to the question how much consciousness and the reality are inalienable. Bohm especially impressed these phenomenological and non-local (i.e. instant) bonds in his 'implicate order' (1980). It was impelled by experience and observations in both micro and macro scales, in quantum mechanics and relativistic cosmology. There are a number of approaches to the Anthropic principle beginning with Whitrow who argued that 3-dimensionality



of the universe is not an arbitrary or unrelated but necessary prerequisite for the existence of observers (Barrow, 1997). The others pointed to parameters like age, size, density, and other properties of the universe conditioned under biological factors. The main idea of such definitions can be reduced to some tautology like Descartes cogito such as ‘The world is thinkable, hence, it is made under consciousness’. Or the world would be unthinkable.

Wheeler believed that his *Participatory Anthropic Principle* (PAP) is valid to quantum mechanics through his idea that information is the fundamental reality. His PAP runs: ‘Observers are necessary to bring the universe into being’ (1977). Bohm also attached the quantum reality to consciousness in his non-local holism (1995).

Our thought experiment on a ‘blind’ brain entails yet another conclusion. Consciousness is able to create not only real states (events) in the universe but also the phenomenological facts in the absence of the reality. How can consciousness perceive time passage and conceive the very idea of time if “*Tempus nihil est*” (Anderson, 2012)? Evidently, it is possible only due to SC and SA mechanisms. Beyond communication with the outer World, *P* saves itself owing to SC by bridging an information break in *St* and then uses SA to return to memory *M* and thereby become a ‘consciousness-in-self’. A sequence of the mental acts can also supply personality with the idea of the order. Thus, consciousness can come to the idea of time and other purely logical notions in itself without observable physical causality.

In Descartes’ thought, the *cogito* is a mental act by which consciousness acquires itself in being. Meanwhile, the *cogito* is obtained by consciousness through collapsing a brain superposition over time. It returns us to a thought

that has been articulated in the Introduction of this article. Namely, being the first act of *St*, Self by the *cogito* discovers consciousness as the World and the World as consciousness. This ‘psycho-universe’ is bundled upon SA-SI-SC trichotomy.

Nevertheless, an excessive psychologism in quantum mechanics leads to Many-Worlds Interpretation of the wave function proposed by Everett (1957), wherein consciousness chooses its own universe from all the possible by collapsing one. It remains in ontological obscurity what is one universe and what is one consciousness (observer) related to it. The criterion of what is the ‘objective’ (not subjective) must be questioned also. The very reality what we know and live over happens at stake there.

Instead, NP-postulate, by taking into account of the fact that the brain itself is a part of this objective (physical) reality, argues for the unique universe that is in being by participating of each consciousness in predication. However, some and even many unreal phenomena can be in an individual predication like subjective images, false beliefs, and hallucinations imbedded in personal memories M_i (and P_i). As in following the very principle of experimentalism, any real phenomenon must be accessible to each observer, then the universe as the common physical objective reality (\mathcal{R}) exists within the intersection of all P_i as the ‘total brain convention’ or ‘universal super-cogito’.

$$\mathcal{R} \subset \bigcap_{i=1}^{\infty} P_i \tag{11}$$

In conclusion, by adding Wheeler’s definition to NP-postulate, the Anthropic Principle can be reformulated in a more delicate manner:

NP + PAP. *The universe is what consciousness needs to be.*



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