*European Journal of Science and Theology*, April 2022, Vol.18, No.2, 111-123

# THE FRAGMENTED SELF
# A MULTIDISCIPLINARY APPROACH

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(Received 8 October 2021, revised 24 January 2022)

## Abstract

The problem of unity or disunity of the self is discussed from the point of view of various disciplines. The first part of the study concerns the notion of self-fragmentation present in Human sciences (particularly in Psychology and Cognitive sciences) and its relationship to religious views. The focus is on the narrative self and its fragmentation through narrative practices. In the second part, I examine Jacques Derrida's work on deconstruction and its implications related to the fragmentation of the self. Deconstruction is presented in terms of formalism in Mathematics. The final part concerns the possible splitting of the conscious self of the observer in quantum mechanical (QM) experiments. Specifically, I consider the quantum mechanical interpretations of 'splitting brain' suggested by von Neumann and the 'many-minds' suggested by Albert and Loewer.

*Keywords:* unity, identity, deconstruction, many-minds, quantum mechanics

*The story goes that, before or after he died, he found himself before God and he said: "I, who have been so many men in vain, want to be one man: myself". The voice of God replied from a whirlwind: "Neither am I one self; I dreamed the world as you dreamed your work, my Shakespeare, and among the shapes of my dream are you, who, like me, are many persons - and none".*
(Jorge Luis Borges, 'Everything and Nothing')

## 1. Introduction

The concept of the self lies at the core of western philosophical thought. It is William James, however, who is credited with introducing the concept in the sense that we use today. He writes extensively on the notions of the self and self-identity [1]. For him, self-identity is a construct that emerges from the accumulation of experiences, responses and feedbacks one receives through interacting within the social environment. Debates about the self continue in Social sciences and Humanities to this day with its practical value as an

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explanatory concept, and its very existence, often questioned. The self can be thought of in two ways: as a subject (a knower) and as an object of what is known [1]. Self-identification begins with the feeling that one knows oneself. However, this gives rise to another well-known problem, ever since Kant spelled it out in 'The Critique of Pure Reason'. If we consider knowledge to be something common to our mutual phenomenological experiences, a problem arises when the self becomes an object of its own knowing. This 'short-circuit' effect renders self-identification a dynamic process. Resulting identities are not fixed, but very much sensitive and dependent on the context. The various self-identities are already present in James' writings: one's social self, spiritual self, mental self, material self, etc. [1]. Multiplicity of the selves appears also in Derrida's work on deconstruction, who offers yet another point of view on the self-fragmentation, based on theoretical considerations about the boundaries of our knowledge. Thus, the idea of self-fragmentation is not related to a single discipline - it should be viewed from a broader perspective. On the other hand, mainline theological accounts continue to defend the concept of the singular self [2]. Since this issue is obviously important for different disciplines, I decided to present it here using a multidisciplinary approach. I will consider the various ideas on the unity and the fragmentation of the self from the point of view of Psychology, Philosophy, Mathematics and Physics.

## 2. Many selves

"Who in the world am I? Ah, that's the great puzzle." (Lewis Carroll, *Alice in Wonderland*)

When we talk about the self, we usually think of it in the singular. It is our theoretical analysis of the concept of the self that reveals there is more to it. The concept is integral to Philosophy and Psychology, as it enables us to describe and critically discuss a number of different phenomena. However, the definitions of the self vary significantly [3]. Strawson, for example, numbers twenty-one different concepts of the self [4]. On the other hand, authors such as Olson [5] and Wilkes [6] view the self as an unnecessary notion that should be removed altogether. This is also the position of David Hume, who proposes that the identity we ascribe to the mind of man is only a fictitious one [7]. To transcend the problem of personal identity perceived as an illusion, Ricoeur suggested the concept of narrative identity. In 'Time and Narrative', he states: "without the recourse to narration, the problem of personal identity would, in fact, be condemned to an antinomy with no solution" [8]. The concept assumes that the identity of the narrative self is determined by various narrative configurations. The self then represents a fictional centre of narrative gravity [9]. The idea of narrative identity is also relevant to our concern with the fragmented self. In the well-known studies on the split-brain patients, Gazzaniga demonstrates that different inputs given only to the left or right hemisphere of the brain, may produce behavioural disunities, usually followed by the subject's reinterpretation stories, which provide a coherent picture necessary for the feeling of the unified

self [10, 11]. Dennett argues that the callosotomy procedure, actually, reveals this talent to be present in all people [9]. On this view, we are all novelists and we produce stories, which are sometimes unified and sometimes not. Multiple selves can simply be stories that do not cohere around one fictional centre of narrative gravity **but, rather, cohere around many fictional points**. These stories can be true or false and our narrative self/selves might not be infallibly true. On the other hand, the contemporary phenomenologists question the narrative model as an exhaustive account of what it means to be a self [12]. Dan Zahavi, a leading proponent of this view, redevelops the thesis of a minimal experiential self as an integral part of phenomenological consciousness and, consequently, *"as a pre-linguistic presupposition for any narrative practices"* [12].

The stories we tell about ourselves are constrained by the stories of others. Thus, our narrative self is formed through this interplay. Also, the narrative self-creation includes acts of cognition and reflection, which assume the presence of self-consciousness and/or self-knowledge. According to Neissser, the term 'self' becomes psychologically interesting once the activities of cognition and reflection are involved [13]. He differentiates 'selves' depending on the kind of self-knowledge they are related to. The notions of the conceptual self, the temporally extended self and the private self, presume the use of language and correspond to the narrative self. I will now turn my attention to traditional psychology, particularly the work of C.G. Jung.

So far, we have considered the stability of narrative identity as dependent on our story-telling. There is constant interpretation and reinterpretation of stories, which provides a more or less stable identity over time (note that this does not presuppose these stories to be true). Jung also argues for the integration of the psyche, but from a somewhat different point of view. Influenced by medieval philosophy, he takes up the notion of *unus mundus* - "one unitary world" [14]. This notion carries the sense that the multiplicity of worlds we experience rests on an underlying unity. For Jung, that is also true for the world of the psyche. The connection between the psyche and the body suggests their underlying, unitary nature. His *unus mundus* is a world outside of time where everything is interconnected [14] and there are no differences between physical and psychological facts. Jung explains the structure and the dynamics of the psyche by introducing archetypes as components of the collective unconscious. Archetypes are formal and categorical potentialities actualized through individual experience. Their role is to determine the objective experience, while the subjective experience is determined by one's personal complexes [14]. They are groups of associations that have 'ego', a sort of a will of their own, hence they can act autonomously. In Tavistock lectures, Jung specifically states that "complexes are fragmentary personalities our unconsciousness is made of" [15]. These parts of the psyche, although separated, may be reunited into a whole and the teleological process through which this occurs was termed individuation. Eventually, the result of the individuation process is the Self, an archetypal image of the entire psyche, not just of the ego [14]. The above presented

approach differs from the one suggested by Freud. His dictum '*where id was there ego shall be*' assumes the analysis of the unconscious contents of the psyche and making them conscious [14]. Jung's work spurred on the formation of several schools of Psychology. The teachings of the school of archetypal psychology are closely related to the subject of this study and I will briefly present them here.

The school of archetypal or imaginal psychology, founded by James Hillman in the early 1970s, attempted to redefine certain aspects of Jungian theory of archetypes by removing some metaphysical assumptions [16]. Hillman adopted the term 'archetypal images' (complexes), but rejected the term archetype. For him, the image is all that exists and archetypal psychology is strictly phenomenological. Previously, Jung had argued that the balance between the ego and the Self can be attained through the regulatory system he called 'compensation'. The compensation of the ego by the unconscious and the individuation of the ego in relation to the Self - during the analytic process - lead to the integration of the psyche [16]. For Hillman, the purpose of analysis is the 'relativization' of the ego by the imagination. The ego becomes an image among other, equally important images, and the personality is not understood as unitary [16]. In fact, there is no personality, only personifications, which analysts regard as autonomous personalities. Hillman, basically, claims that the **multiple personality** is characteristic of a 'normal' human individual. The situation is different in the clinical cases of multiple personality disorder, where the personifications have been literalized rather than metaphorized/imagined [16]. It should be noted that the polycentric view of the self is not specifically characteristic to archetypal psychology. For example, it is also found in the works of object-related psychologists such as Melanie Klein, W.D.R. Fairbairn and D.W. Winicott [M. Fonda, 2000, https://www.researchgate.net/publication /231603156].

According to Hillman, religion (or Theology) plays a role in the development of Psychology [16]. The theories of Freud and Jung made sense to a western audience because they are compatible with monotheism and the individual relationship between a human being and God. This is why, I believe, the mainline theological accounts insist on and defend the concept of the singular self [2]. On the other hand, archetypal psychology is oriented towards polytheism, not in terms of worshiping various gods but in terms of understanding them as metaphors for the forces of the psyche. Although this debate continues, I consider modern man to be governed by mythologies more so than by the New Testament. We are modern pagans. As demonstrated by Kołakowski, the mythical way of thinking is everywhere, even if we believe that civilized life and scientific progress renders us immune to it [17]. The polytheistic psychology of Hillman seems accurate when describing the psyche of the present day individual. A self-integrated man of the future would, perhaps, require a different kind of psychology. Finally, Julian Jaynes' provocative work 'The origin of consciousness in the breakdown of the bicameral mind' proposed a strong thesis that a change in the "organization of our mind" occurred

sometime around 1000 B.C. [18]. This resulted in a new kind of consciousness. Prior to that, Jaynes contends, the mentality of the ancient man was, in large part, moulded by audio hallucinations attributed to voices of gods. He relates these voices to the right hemisphere, involved in understanding, but not in speech (I am speaking here of a typical right-handed person). In this bicameral mind, the function of gods was to plan the action in novel situations and to provide directions for man's verbal and analytical left hemisphere [18]. Jaynes examines a variety of ancient texts in order to support his theory. Roughly, bicameral mentality emerged about 12 000 years B.C. and began to break down at about one millennium B.C. [18, p. 453]. The upshot of the thesis is that cultural pressure induced the change in the mode of consciousness. A cultural shift also induced a cognitive explosion and the appearance of a new kind of memory, the so-called reminiscent memory, in contrast to habit retention (or semantic memory) [18, p. 457]. The invention, or construction, of the self - through various narratives - also came about as a consequence of the breakdown of the bicameral mind. The changes in consciousness, based on learning and culture, required a new form of mind organization. The self now acted as an agent who can instruct us on when, how and what to do or not do [18, p. 458]. Although controversial, the ideas Jaynes puts forth are sound and based on research. The self, as a product of our stories, is variable and fragile. The fragmentation of the self into its various forms may be traced to the vestiges of the bicameral mind.

## 3. Deconstruction of the self

"I can doubt the existence of everything except for my own doubt." (José Ortega y Gasset, *Some lessons in metaphysics (XIV)*)

Jacques Derrida's deconstruction questions conceptual distinctions present in Western philosophy, particularly those related to speech and writing as well as form and meaning [19]. A leading poststructuralist, Derrida rejects Saussure's linguistic structuralism. He also questions the phonocentrism present in traditional Metaphysics, while giving priority to writing. Three notions: text, centre and *différance* appear as basic to the deconstruction. I will consider them here from the viewpoint of Mathematics, using the approach suggested by Vladimir Tasić in his book 'Mathematics and the roots of Postmodern Thought' [20]. Tasić translates Derrida's concepts into the language of Mathematics - this approach allows for a clear and concise presentation of the deconstruction of the self.

I will first discuss structuralism from the point of view of formalism in Mathematics. Like logicism and intuitionism, formalism was a program introduced at the beginning of the 20$^{th}$ century to secure a firm foundation of Mathematics. Formalism puts the emphasis on the relations between objects within the structure, regardless on the nature of these objects *per se* [21]. Instead of points, squares, lines etc., we can use any objects, as long as we precisely define their formal relation to the other elements within the structure. Similarly,

structuralists view language as a formal structure, where words obtain their meaning through relation with other words. Yet, language cannot provide universal meaning to words. If a word is defined by the totality of the objects (words) to which it belongs, the definition is circular or *impredicative* [20, p. 63]. In mathematical logic and computability theory, impredicativity or self-reference is an important concept in proving of the limitations of many systems. It is particularly problematic to use impredicative, i.e. self-referencing definitions in generative structures (language, Arithmetic, etc.) - those that can generate new elements according to certain rules. Each time we introduce a new element, we should repeat the signification process. Nothing within the structure guarantees that the identity of the element is not going to change after a certain number of iterations. Another problem with consistent formal systems (if they include basic Arithmetic) is that there will always be sentences written in the system's language, which can neither be proven nor disproven. This is a formulation of Gödel's 1st theorem of the incompleteness of a formal axiomatic system. I will now offer an example of the theorem using natural language: "*Vladimir Djoković cannot consistently judge this statement to be true*" (the original sentence features the name of David Deutsch [22]). This sentence is obviously true for anybody who reads it except for me. I will contradict myself no matter how I understand it. This shows that language has its limitations. Language also contains paradoxes; expressions based on apparently true assumptions that lead to a contradiction. Natural language paradoxes are typically self-referential such as the Curry, Berry, knower, liar, etc. paradoxes [23]. How do we resolve these problems that result from the limitations of language? Take, for example, the liar paradox, which can be formulated as: 'This sentence is false'. The quoted sentence is true only if it is not true, i.e. it is paradoxical. Although it appears trivial, the problem with such propositions concerns a much larger issue in Logic and Philosophy - the understanding of truth [B. Dowden, *Liar paradox*, in *Internet Encyclopedia of Philosophy*, 2022, https://www.iep.utm.edu/par-liar/#SH1b]. Dowden's article is an overview of possible ways out of the liar paradox and I am not going to discuss them here. What is important to note is that they all assume the presence of an additional higher principle, not provided in the original structure (a hierarchy of meta-languages suggested by Tarski [https://www.iep.utm.edu/par-liar/#SH1b], performative theory of truth suggested by P.F. Strawson, etc.). Thus, a higher principle is necessary in order to avoid self-reference paradoxes in a formal language.

Having reviewed the basic properties of formal structures, I now return to Derrida. He introduced his 'text-in-general' as the universal, formal and generative structure. It is, basically, the structure of all structures and it contains everything we know. In order to justify our knowledge, we must be able to write it down and, as Derrida famously asserts, there is nothing outside of the text. On the other hand, since text expands constantly by the addition of new writings, new scientific findings, new books, etc., can we claim that its units have stable identity? As mentioned above, such units are impredicatively, i.e. self-

referentially defined, and the text needs a higher principle to secure their stable meaning. Derrida calls this principle of regulation, 'the centre' [20, p. 143]. His critique of structuralism is directly connected to the analysis of this notion. If we try to determine where the 'centre' lies, we can say that it is either inside or outside the 'text'. If the 'centre' is outside the text, then we have no knowledge about it. In contrast, if the 'centre' is inside the text, then it is an self-referentially defined unit of the 'text in general', and we cannot claim that it has stable identity. Therefore, this general formal structure, the 'text', does not have a 'centre' and nothing assures the identity of its units. Derrida applies similar reasoning to demonstrate the deconstruction of self-identity [20, p. 144-145]. When I think about myself, the reflections gained in the act of cognition are somewhere in the 'text'. Therefore, I have to go through the text to acquire knowledge about myself. To do that, I must distinguish my 'I' from the rest of the units of the text. This is, however, an impredicative definition, because 'I' belongs to the totality of the units. Since the 'text' does not have a 'centre' then there is nothing to ensure stable self-identity i.e. **the self will be deconstructed**. This however, does not exclude the possibility of defining the self as something that is not a product of reflection, like 'immediate self-consciousness' of Fichte [24] or Schelling's 'absolute identity' [25]. Zahavi's 'minimal experiential self' mentioned in the first section might also belong to this category.

Another way to reinforce self-identity is to make metaphysical assumptions about the 'centre'. Derrida is aware of this possibility. He gives priority to writing over speech because the former does not assume the presence of the 'speaker'. His attack on Metaphysics goes *via* a critique of logocentrism, which assumes being as a presence and the existence of univocal meanings. In 'Of Grammatology', he states: "Metaphysics has constituted an exemplary system of defence against the threat of writing" [19, p. 101]. Derrida does not claim that the meaning of the units changes every time we add a new sentence to the text. However, without a central principle, there is no possibility for systematic control of the meaning of units. Therefore, we should abandon the idea that we can get to absolute identity. This does not imply all structuralism should be rejected. The process of semantic transformations that occurs within the 'text' (which Derrida termed '*différance'*) is not astructural [20, p. 149] and this allows for the functioning of structural science. We can acquire fragmented knowledge about ourselves, but we cannot complete the puzzle, which was attempted in traditional Metaphysics.

## 4. Many minds

"Papa, what is the Anti-World? There's not just one Anti-World. There are several universes, and they're all interlocking. There are numbers and numbers of them. These worlds interlink and interlock, without touching one another, for they all co-exist in the same space." (Eugène Inoesco, *A stroll in the air*)

The following section is about Quantum mechanics (QM) and some of its interpretations. A conscious observer plays an important role in quantum mechanical theory. At the same time, the observer is part of the so-called measurement problem, which the contending interpretations try to address. By modifying the mathematical formalism of QM, these interpretations also alter our understanding of the observer's consciousness and the nature of her involvement in the measurement process. I wish to focus on the QM formulations that might imply the fragmentation of the conscious self. But first, let me start with the orthodox, Copenhagen, formulation of Quantum mechanics.

In quantum theory, possible states of a system are represented by mathematical objects called wave functions. One of the main features of the theory is that any linear combination of wave functions also represents a possible state of that system. This step is necessary to account for interference effects, although it allows for a physical system to be in a superposition of mutually incompatible classical physical states (which is highly counterintuitive). In the standard Von Neumann-Dirac formulation, QM has two dynamical laws. The first is linear - it says that the system linearly evolves until it is observed. For non-relativistic QM, the linear evolution is described by Schrödinger's time-dependent equation. The second law describes the so-called collapse dynamics, a random discontinuous transition of the system (superposition of states) into a single state (with a definite measurement outcome), in the moment when the observation is made. This is referred to as the collapse of the wave function. For example, assume that a quantum object (q) has two incompatible properties, which I will call 'blue' and 'red' (I will try to avoid using technical terms whenever possible). By neglecting, for simplicity, the possible influences of the environment, the initial state of the system can be written as a superposition of two states as:

$$|S\rangle_q = c_1 |blue\rangle_q + c_2 |red\rangle_q \quad (1)$$

where $c_1$ and $c_2$ are complex numbers (relative magnitudes of 'blue' and ' red' in the system), while $|blue\rangle_q$ and $|red\rangle_q$ are orthogonal basis functions that represent particular incompatible states. Suppose that observer (O) wants to check the colour of the object q. The state that describes the moment at which O is ready to look for the colour $|Ready\rangle_O \cdot |S\rangle_q$, will - according to collapse dynamics - randomly evolve into state $|blue\rangle_O \cdot |blue\rangle_q$ (the colour is blue), with probability ($|c_1|^2$) or into state $|red\rangle_O \cdot |red\rangle_q$, with probability ($|c_2|^2$). What would have happened if there had been no collapse? The system would have evolved into a state (written, using initial basis functions):

$$|B\rangle = c_1 |blue\rangle_O \cdot |blue\rangle_q + c_2 |red\rangle_O \cdot |red\rangle_q \quad (2)$$

where O does not have a definite measurement record. Note that the state described by relation (2) exists in our consciousness but not in 'the outside world' (I am still speaking of the orthodox QM). Standard QM treats the measuring device as macroscopic and the collapse occurs when the observer examines the device. This extends the observer's knowledge about the system by aligning it with the observed outcome of the measurement, in a way similar to classical Physics. But in this way, QM was converted from a theory about the

physical world into a theory about human knowledge. The standard theory is subjective and epistemological [26]. Now I turn to different QM interpretations and how they deal with this problem. The measurement device is composed of atomic particles and, in terms of the interaction, there is no reason to treat them differently from the particles in the system under investigation. This disrupts the dynamical unity of the physical world [26]. To solve this problem, various approaches have been suggested - they either try to add something to the Physics part of the theory (non-local hidden variables of David Bohm [27]) or to modify the collapse dynamics (spontaneous localization theory of Ghirardi-Rimini-Weber [28]). Some theories completely reject collapse dynamics as in Everett's relative-state formulation of Quantum mechanics [29], which is important for the present study.

In Everett's formulation of QM there is a state vector (function) for the whole universe that obeys a linear dynamics and never collapses. Obviously, the observers are now treated as physical systems and the experimental results (statistical predictions) should appear as their subjective experiences. However, without collapse, the observer will experience the state that looks like an equation (2) and not the definite result. The **many-worlds** is an interpretation of Everett's formulation that tries to address this problem. It assumes the state vector splits naturally into orthogonal vectors every time a QM measurement is preformed, which correspond to the splitting of the universe into a multitude of unobservable, but real worlds [29, p. 146]. In each of these worlds the measurements would give a definite record. In the example presented above, the state vector would split into 'blue' and 'red' worlds, where each copy of the observer sees a definite property of the object, the colour blue or red, respectively. The proponents of the many-worlds interpretation are aware this is counter-intuitive and difficult to imagine. However, Bryce DeWitt, who popularized Everett's formulation, claims this multiword concept indeed assumes the idea of $10^{100}$ slightly imperfect copies of oneself, endlessly split further with each measurement [29, p. 161]. David Deutsch thinks the same [22, p. 279]: "If, aside from variants of me in other universes, there are also multiple identical copies of me, which one am I? I am, of course, all of them. Each of them just asked the question, 'which one am I?'" Deutsch's position is rather strong since he presumes the physical theory tells us something about the ontology. Orthodox QM is a different type of theory (epistemological theory), and wave function does not have any particular physical meaning. Wave function is usually interpreted as the probability amplitude. If a physical theory indeed describes reality, then different quantum formulations would imply different ontologies. In his comment on Lockwood, Deutsch claims that the QM theories which offer a certain worldview can all be related to the many-worlds interpretation [30]. For him, many-worlds interpretation is 'the theory' and it describes the reality; hence the **splitting of the subject, along with the splitting of the universe into many worlds, is very much real.**

There are, however, other ways to look for a coherent theory that would allow for both subjective experience and the objectively existing physical reality. I have already mentioned that a conscious observer is an integral part of all QM interpretations, except, perhaps, in David Bohm's interpretation [27]. For this reason, QM can be regarded as a theory of mind-matter interactions, as it offers a possibility for studying the connections between the mind and the brain [26]. The role of the mind in QM can be active and passive. The active role is related to the question an experimenter wants to ask, which usually includes preparation of the quantum state and finding a preferable basis of state functions (vectors). The passive role of the mind assumes receiving responses from Nature. This later process required a redefinition of orthodox theory, which is exactly what one of the founders of QM, John von Neumann, provided [26]. He formulated a theory that describes the interaction between the evolving objective state of the physical universe and a sequence of mental events. The theory connects these mental events (subjective knowings) associated with individual physical systems and the physical states of those systems. That is assured by the mathematical structure of the theory. The whole process assumes the state of the brain evolves in accordance with the Schrödinger equation and splits into an ensemble of components (branches), each of them behaving as classically described brains [26]. Within the theory, the quantum event is treated as consisting of a physical event and a mental event. After interaction with the physical event, the initial state of the brain prior to the event splits into components that are compatible with the information carried by the associated mental event. For further details and a possible extension of von Neumann's theory to quantum field theory, I direct the reader to the referred Stapp's paper [26]. To summarize, von Neumann's approach suggests that the evolution of the state of the brain is affected by a physical event, and that the initial brain state splits into **ensemble of branches (classically described brains), which can act independently**.

Finally, I will present the many-minds interpretation of QM, akin to the one suggested by von Neumann, but, historically, derived much later and through a different line of investigation. Many-minds is one of the interpretations of the Everett's relative state formulation introduced by Albert and Loewer [31, 32]. The theory is further developed and critically discussed by Lockwood [33, 34], Donald [35; M.J. Donald, 1997, https://arxiv.org/abs/quant-ph/9703008v2] and Barrett [36]. Albert and Loewer start from the fact that, in Everett's formulation, the collapse of the wave function appears at the subjective level. They distinguish between the physical states of the observer and his mental states. Physical states might be in superposition and they evolve according to linear dynamics. In contrast, the evolution of mental states is stochastic and discontinuous. Albert and Lower attempt to follow the doctrine of the supervenience of mental states on physical, which was used in the neural computation models of the brain [37]. In order to enable mental states to supervene on physical states, they attribute to each observer a continuous infinity of minds. The theory itself has the form of a hidden-variable theory, where mental states of the observers are added as variables to the standard

quantum-mechanical state [34]. This step was introduced because in the single-mind interpretation the quantum state of the system might not always determine what observer believes; the same quantum state is compatible with different mental states [36]. The postulated non-physical minds have definite non-superposed beliefs and each of them evolves according to rule that would guide evolution of the single mind. In the above example, each of the observer's minds becomes randomly associated with the result $|blue\rangle_q$, with probability ($|c_1|^2$), or with the result $|red\rangle_q$, with probability ($|c_2|^2$). The concept of hidden variables and non-locality in QM will be omitted from discussion since they are beyond the scope of the present study. I will focus on the consequences of the many-minds theory. In principle, the many-minds has certain advantages over the many-worlds interpretation of QM, enabling statistical predictions of future events. If we run the experiment a number of times, the ratio $|c_1|^2/|c_2|^2$ (which gives the probability of an outcome of a QM experiment) will show the ratio of the distributions of the observer's minds that are associated to the definite records 'blue' or 'red'. In the many-worlds interpretation the observer will experience only one measurement record - exclusively 'blue' or exclusively 'red'. The other problem with the many-worlds interpretation is that the splitting of the worlds depends on the initial basis of vectors. Equation (1) obviously describes a state of the system, and it could be used as one of the basis vectors. This, however, would lead to the split-world with no definite measurement record. The preferable basis, which will produce definite measurement records, must be derived by analysing the physical system and its interaction with the environment. In the many-minds interpretation the basis may be chosen independently from Physics. In either case, the observation in the quantum mechanical measurement will somehow affect the observer by creating her copies in the split worlds or by associating different results to her continuum of minds.

## 5. Concluding remarks

The question of the unity or disunity of the self is an age-old problem, important for Philosophy, Theology and Human sciences in general. I have tried to discuss it by using a multidisciplinary approach and the theoretical analyses suggest various possible conditions necessary for the fragmentation of the self to occur. However, due to a lack of common terminology, it was difficult to attain a coherent picture. For example, multiplicity of the selves (personalities) in Psychology and Cognitive sciences could be related to the multiplicity of minds in Quantum mechanics, taking into account that Lockwood distinguishes the individual Mind (as a multimind) from the minds that have particular experiences. There are also obvious similarities between 'the ensemble of classically described brains' of von Neumann and 'minds' in the many-minds interpretation. I believe that the subject of self-unity and self-fragmentation calls for a dialogue across diverse disciplines and a reassessment of the basic terms: the self, the mind, consciousness, identity, etc. The present study is an attempt to

bridge such gaps. I do not claim that I have addressed any of these issues exhaustively. I deliberately avoided discussing split-brain and multiple personality disorder cases and chose to focus on how the acts of cognition, reflection and narration influence the appearance of multiplicity of selves in a 'normal' individual. The pre-reflective self, the consciousness of oneself as an immediate subject of experience is, so to speak, immune to splitting. It is our conceptual thinking that initiates fragmentation. My approach was, thus, theoretical; a different perspective is offered by William James who considers the effects of the environment on the emergence of the multiplicity of selves [1]. The external forces shape our sense of the self and we do experience a multiplicity of self-states. It is through the act of narration that we struggle to establish a dynamic equilibrium, a sense of 'I' that is more or less stable across time. On the other hand, according to Derrida, the self is de-centred and unable to find a definitive meaning of its own narrative. All these accounts should be considered when discussing the notion of the self, in an attempt to answer the primordial question: 'Who am I?'.

## Acknowledgement

The author acknowledges, with gratitude, the assistance and helpful comments received from Ilija Labalo. The study was funded in part by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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