

May Conscious Mind Give a “Scientific Definition” of Consciousness?

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Abstract

The mind when posing the question “what is consciousness?” (i.e. “The Hard Problem of Consciousness”, THPOC) will encounter an unsurmountable conflict of interest. The hope that by investigating the “neural correlates to consciousness” (NCCs) one might come to a “scientific (conceptual)” definition of consciousness is then paradoxical. In fact, the investigation of NCCs might unveil only “operational” (functional) properties of the mind. Nevertheless, the pieces of information deriving from these investigations seem to be striking. To this respect, there is a growing evidence of a dual-state activity in mind, corresponding to the activities of a conscious (explicit) mind (C) and an unconscious (implicit) mind (U), respectively; moreover, C and U do not share any conceptual connection with psychoanalytic Conscious and Unconscious. In detail, C is the domain where thoughts (as well as images and music) can be managed; instead, U exhibits a biophysical/biochemical activity. In order to communicate with each other, a transduction of one language into the other must reciprocally occur; it is notable that the investigation of NCCs leads to the conclusion that it is right that transduction process accounts for the unsurmountable question about THPOC. Moreover, it is demonstrated that the dual state activity in mind stands on a probabilistic-deterministic mechanism; this functional property of the mind is incompatible with the existence of free-will (FW) but not with C’s FW illusion. In summary in the current literature, there is a unique cognitive model that is compatible with all these evidences, i.e. “The Bignetti Model” (TBM).

Keywords

The Hard Problem of Consciousness, The Conflict of Interest, Conscious and Unconscious Mind, Free Will, The Bignetti Model

1. Introduction

The typical set of questions that are usually debated in neurosciences, are: “What

do we mean by consciousness? How does the mind relate to the brain? Can computers ever be conscious?” (Dennett, 2001). All of them bring back to the notion of human consciousness, an unresolved issue for which Chalmers (1995, 1996) coined the sentence: “the hard problem of consciousness” (THPOC). According to several authors, the question should be investigated by exploring “Neuronal Correlations to Consciousness” (NCCs) (Tononi & Koch, 2008; Crick & Koch, 1998; Edelman, 1989; Baars, 1988; Libet, 1982). To this regard, Chalmers (2000) proposed: “Once we know which systems are NCCs, we can investigate the mechanisms by which they work, and how they produce various characteristic functional effects. Just as isolating the DNA basis of the gene helped explain many of the functional phenomena of life, isolating NCC systems may help explain many functional phenomena associated with consciousness”. In spite of the striking progress in neurosciences, the basic questions on the nature, origin and functionality of human consciousness are still a mystery. It seems paradoxical but the question regarding THPOC that is posed by the conscious mind (C) to itself, is too big for it! Generally speaking, controller and controlled systems should not coexist unless in the absurd situation named “conflict of interest”. This might occur in several aspects of social life (law, economics, politics, insurances, health and care etc.) but not in biology. Otherwise, it would be illogical, like an eye that is trying to see itself.

Moreover, two are the perspectives by means of which C can manage thoughts (images or music): a subjective, emotionally-driven 1st-person perspective (1st-PP) or an objective, rationally-driven 3rd-person perspective (3rd-PP); in a sane mind, no other kind of perspectives may rise during a thinking process. Now, let’s assume that an individual is engaged in a “voluntary” action, in response to a stimulus. The subjective, emotionally-driven 1st-PP seems to elaborate primary ideas on the basis of the information that is directly drained from the hidden world of sensory-motor perceptions; while the objective, rationally-driven 3rd-PP seems to elaborate secondary ideas and manage comprehensible thoughts on the basis of the primary ones. Presumably, the 1st-PP must communicate with the unconscious mind U in order to receive stimuli and react properly to them; while the 3rd-PP must report the events related to the action and action outcomes. Necessarily, this report occurs with a tiny retard with respect to the action (a-posteriori); so, thoughts based on a 3rd-PP will never coincide with those based on a 1st-PP.

In summary, we have tentatively explained that the question on THPOC will never be solved. C is unable to give a scientific definition of consciousness; otherwise, C itself wouldn’t self-pose that basic question. In Psychology, generally speaking, it’s easy to find that “operational definitions” are erroneously substituted for “scientific definitions”. However, the definition of what can be explained, predicted or measured requires the use of “scientific” (or “absolute”) terms; it cannot be satisfied by “operational” (or “relative”) terms (Hibberd, 2003). If psychology would take this suggestion in real consideration the paradox of THPOC would vanish.

2. A More Stringent “Operational” Definition of Consciousness: “The Domain of Thoughts”

In summary, there is no way that C may self-describe in scientific terms of absolute validity; that’s why, there are so many definitions of C, all relative to the ambit of the scientific discipline of the moment. Concerning Cognitive Sciences, there is a general agreement that “consciousness matches the state of having a subjective experience of a perception”. To this respect, some authors proposed that NCCs should be defined as “the minimum neural mechanisms sufficient for any one specific conscious percept” (Tononi & Koch, 2008; Koch et al., 2016). Different convergent experimental investigations of NCCs might provide this target. One of these possible complementary approaches is to discriminate which brain area changes activity and which does not, when a stimulus is experienced. Another one should monitor a differential activity in individual awareness when it is specifically diminishing, i.e. during sleep or coma etc.; a third attempt towards the definition of what is consciousness should develop a theoretical framework that might configure the emerging of consciousness from a physical system; this model should resist to evaluation tests and predictions made on the basis of unquestionable experimental data. Then, according to those authors, it’s of primary importance the attribution of a specific function to C: the rising of subjective perception. The question is what do we mean as perception? As an example, in visual perception, it is claimed that anatomical NNCs are localized primarily in sensorial areas of the posterior cortex, rather than to fronto-parietal cortex whose network is mainly devoted to task monitoring and reporting.

We disagree with this. Let’s assume that we have the image of a bottle in front of us; since we have already learnt and memorized what that image means, we can easily say (in about 200 milliseconds) the word: “bottle”! By analyzing this process, it is clear that, in specific sensory conditions, we can consciously perceive the final product of this process only under the name “bottle”! Certainly, a visual sensory input of this image has been correlated with a similar or an equivalent image we have experienced and memorized in long-term memory store (LTM); so, by means of the mechanism based on pattern comparison, we finally recognize the image perceived. However, the recognition is a functional, operational property of a hidden part of the mind (U). Moreover, until the word “bottle” is not pronounced by “inner speech” in our consciousness C, we cannot explicitly report the perception of this word; all the processes that precede the pronunciation of the word “bottle” by C, are exclusively unconscious. Moreover, C cannot understand how the biophysical-biochemical coding used by U, might be transduced into the explicit word “bottle” in C. In summary, the transduction of 1st-PP coding into the word-based language of 3rd-PP is a mysterious process, i.e. an unsurmountable limit beyond C’s capabilities.

Then, we are convinced that the area of investigation of NCCs could be newly defined on the basis of the evidence that C (in particular the 3rd-PP) may be the terrain where intelligible thoughts (schematically reduced to words, images and

music) are elaborated and communicated with others; then, C might be defined as “the field where the aware subject can manage intelligible thoughts”. If the thoughts are self-addressed, then we are assisting to self-conscious activity. Maybe the “intelligible” thinking activity is not the unique functional property of C, but certainly it is a fundamental requisite for a sane, fully awake individual, and even more important it is a requisite that unequivocally distinguishes C from U.

According to the theory of “The Continuous Mind” (Spivey, 2008), thoughts never stop circulating in the brain. Sensory inputs coming from the outside work like attractor basins that intercept thoughts and modify their energy contents and pathways. To this regard, we think a method for investigating NCCs might be to analyze the components and the constructs of thoughts under a “Kinetic vs Thermodynamic” profile; The results thus obtained, should explain how C might compose basic data that are already intelligible for C (like letters, words, sound etc.), in order to obtain a thought with a purposive significance. In other words, this investigation cannot explain how the basic data become intelligible (that pertains to the mystery of THPOC) but it can explain how C can manage them once they already belong to “the field where the aware subject can manage intelligible thoughts”.

3. Conscious Mind (C) and Unconscious Mind (U)

In 1869 the philosopher Eduard von Hartmann wrote the book: “Philosophie des Unbewussten” (philosophy of the unconscious) (Von Hartmann, 2014) by means of which it becomes possible to compare the view point on the unconscious mind mentioned by Veda (the oldest Hindu book) with that expressed by several contemporary philosophers among whom Schopenhauer stands out (Ellenberger, 1970). In the nineteenth century, the technology to investigate the mind-brain relationship has evolved a lot.

Sigmund Freud and others were deeply involved in this epistemological approach. He began his medical career in neurology; then, he moved to psychoanalysis to study the conscious and the unconscious states of the mind. The conscious state of the mind accomplishes the awareness of the surrounding world and self-awareness, i.e. all we can rationally think of; moreover, it partially includes our memory, at least the content of the short-term memory we can retrieve into the domain of awareness. Instead, the unconscious dimension of the mind is hidden to the conscious mind but cooperates with it by facilitating the rise of emotions, instincts, mental representations and thoughts or by elaborating basic paradigms for human behavior; therefore, it contains thoughts beyond awareness. Our behavior and experience are steadily influenced by the unconscious, even though we are unaware of these underlying influences. The unconscious is dynamic and is sealed off from the conscious mind by a force which he referred to as repression. With the famous book “the interpretation of dreams” (1899), the unconscious mind makes its new entry in psychoanalysis. In his early approach to Psychoanalysis Freud has questioned whether a sort of “Res Exten-

sa” underlies also the oneiric activity of humans; certainly, our conscious mind can always experience a reliable and steady representation of our own personal identity by recovering the necessary information from long-term memory stores. Instead, Freud claims the logic of the unconscious moving in a dream, is not as rational; though, any attempt to “the interpretation of dreams remains the royal road to understand the unconscious in the psychic life”.

In a further book “The Psychopathology of Everyday Life” (Freud, 1901), its presence as a subjective experience in daily life, is deeply investigated. Straight on the way of Psychoanalysis, Freud came to the theory of “repression”; the unconscious can collate those ideas that are removed from conscious (i.e. “repressed”) as a consequence of psychological trauma. Moreover, the ideas that are repressed, are hidden to self-awareness yet operative; only under certain circumstances, the repressed idea may be recovered in explicit form. In order to get them, Freud postulated the presence of “preconscious mind”, an intermediate level that can retrieve information from or pull them into consciousness, a sort of bridge favoring the dialogue between the two domains of the mind. As for the unconscious level, we are not aware of the connecting activity of the pre-conscious, at any given time. Descartes said “*cogito ergo sum*” to claim the coincidence between the thinking state of an individual and Self-awareness, but what about dreams? Can we assert ours “Self” while dreaming? Between dreams and wakefulness Freud (1904) found either an analogy and a dissimilarity, respectively: on the one hand, the subject of first-person thoughts always refers to the same ego either in dreams and in conscious mind; on the other hand, instead, the constructs of thoughts lays on different logic (for example, the non-contradiction law does not hold in oneiric logic). Interestingly, these evidences, taken together, might induce the “cogitating” individual to think his ego shares a multifaceted or contradictory personality. Late in his life, Freud has proposed the more articulated picture of mind by subdividing it into three components: 1) “Id” (i.e. a hidden part of the mind that would satisfy sexual and emotional drives; regression therapy might discover and describe them); 2) Super-Ego (Freud has introduced the ambivalent nature of drives based on Eros and Thanatos; Super-Ego should embody the dictatorial part of the mind that controls our final actions and try to repress drives on the basis of ethic instances) and, finally, 3) Ego (the conscious mind that finally translates thoughts either in actions or in other ideas, by trying to mediate between drives of Id and mandatory needs of Super-Ego).

It’s interesting to note that there isn’t any single proposal of the above scenario that was experimentally proved. Though, Freud’s arguments took root in the collective consciousness: his hypotheses contributed not only to open a large dispute on unconsciousness within the scientific community, but also to determine a large influence on culture and habits of the society. As a matter of fact, Freudian and post-Freudian society has realized that it cannot shed a clear light on the contorted twist and turns of the unconscious; so it’s almost impossible to rely on mind, especially when describing the innermost personality made of feelings, motives, desires, virtues and vices. Thus, the “cogitating” subject of Freudian and

post-Freudian era looks like less reliable than the Cartesian one. On the other hand, this psychoanalytic era coincides with a relativistic perspective of the real, a typical refrain of contemporary philosophy and culture that take particular inspiration from Nietzsche.

In 2001, while searching specific material for publishing a book on human consciousness and free-will (FW) illusion (Bignetti, 2001), I have asked an internationally renowned neurophysiologist what did he think about consciousness; the clear-cut answer has been that consciousness is something for philosophers/psychologists or so (as to intend that is an argument only for soft-sciences). Actually, that occurred about 20 years ago; the journals on cognitive sciences, were very few. By that time, science and technology were some light-years behind today's progress and, possibly, the inheritance of the Psychoanalytic duality "consciousness vs unconsciousness" still was drawing the scientific attention.

Afterwards, new, sophisticated techniques have become available in Neurosciences so that it was easier to explore mind at different levels of complexity, from molecular dynamics to psychic behavior. Now, in our post-psychoanalytic era, the current literature has assigned to "Conscious mind" (C) and "Unconscious mind" (U) different functions. A list of technical terms are attributed to C and U on the basis of their different functions, can be found in Baars & Gage's book (2012). For instance, short-term memory is located in C while the long-term memory is in U; on this basis, it's easy to foresee which roles the two domains, C and U, respectively, may play in cognition. The most significant definition of C and U corresponds to "explicit" and "implicit", respectively; the two attributes correspond to two separate states of the minds that, mainly differentiate for "Reportability" (R). As an example, C can say words either silently to itself or aloud to others; how may this R occur? It is known that, at young people takes a long time to understand and silently repeat mother-language words. The inner-speech is the essential tool underlying this process, an innate mechanism of the language brain areas that was deeply studied by Vygotsky (1934, 1978); however, the semantics of the words can be understood only by means of the interaction with the surrounding world, i.e. by making correlations with others' facial and bodily mimics or by associating them to images or objects. Actually, when we formulate our thoughts, the brain manifests an activity of electric waves, hidden to our awareness but easily monitored by means of EEG and this is apparently the form that this information assumes in U.

The question further complicates when C wants to communicate these thoughts by utterance. Along the pathway, the information is transduced into different energy forms (electric potentials, neurochemical reactions, mechanical stretching of muscles, air vibration etc.), each one compatible with the specific physical-chemical structure that is crossed. So, the information reaches the air likewise in a relay race where a baton is passed from one rider to another. Obviously, the message that C decides to send, is made of words; C has no idea of the neuronal correlates of words made of spike trains. Neither, C can realize how this form of energy is then converted in many other energy forms during the

process; however, C may control whether the information has been preserved and delivered correctly, at the end of the path, by means of feed-back sensory inputs. The interesting thing is that this information returns as a train of spikes and then is transduced into words again to re-enter C. So that, we can perceive the words only at the beginning and at the end of this loop; in between, it's like to be in a black box (for images and music is almost the same general mechanism).

3.1. Qualia

We are concerned that the process described above is much more complicated than that; in fact, the discovery of inner speech and speech processing has risen lots of questions not yet fully solved (Vicente & Manrique, 2011). One of them has been whether both left and right hemispheres are involved in speech comprehension and articulation; to this regard, a “dual stream model” has been proposed (Hickok & Poeppel, 2007) in which a ventral stream is largely bilaterally wired for comprehension of speech signals while a dorsal stream which is strictly in the left hemisphere, is involved in conditioning frontal lobe in speech articulation. Research on this front is particularly active; then, we are aware to have depicted above a schematic story about the information circuitry. Though, an irrefutable conclusion can be drawn: that C cannot explain how the information, made for instance of words, is transduced into a train of spikes and vice-versa. C is absolutely limited in R because it lacks the knowledge of how C and U intimately exchange information; yet, if we simply asked people that have assessed the same event (a word, a colored spot or a music note, etc.), how they have perceived them, the answer given in most cases seems to have a basic similarity.

To this regard, a famous issue is the use of the term “Qualia” to identify phenomenal qualities of mental experiences that include how can sensations, emotions, thoughts, etc. be intimately perceived. The subjective qualitative sensations that arise associated to a mental experience, have been investigated by atomists long ago (B.C.). In modern history, Locke (1690) has elegantly faced the issue by proposing that the direct experience of primary ideas (sensations) is engraved on our mind like on a “tabula rasa”. This is necessary to build up personal identity (Ego); then, ex-post “association” of primary ideas by means of the brain instruments of logics (i.e. by estimating their analogy, interdependence and relative reality) can result in more complex, secondary ideas of scientific valence (Gordon-Roth, 2019). Secondary idea survival, however, can stand only on the persistence of primary ideas; thus, the 1st-PP and the 3rd-PP are indefinitely linked.

Today, the existence of “Qualia” is scientifically controversial, since there isn't a measurable method to account for; however, Qualia may help to account with all the contents of the conscious state, in the absence of specific, rational arguments (Dennett, 1988). For instance, the colors red and green are perceived like “red” and “green”, respectively, by people's C; moreover, in a traffic light, a red spot means “stop”, while a green one means “go”; everybody has learnt how to

manage these two colors (so there shouldn't be any confusion in the city traffic); however, nobody can say if his "red" and his "green" are perceived with the same quality as anyone else. They are experienced privately, subjectively and directly; then, [Crick and Cock \(2003\)](#) suggest to deeply investigate the (visual) NCCs in the hope we can explain qualia in causal terms, i.e. to make the problem of Qualia clearer. However, they seem to belong to U domain rather than to C, i.e. hidden to awareness, far from a "scientific (conceptual) definition" of C.

Moreover, some experiments have demonstrated that U may play a fundamental role in action-decision making, even more efficiently than C ([Gonzales et al., 2008](#); [Dijksterhuis, 2004](#)). We have obtained similar results in typical press/no-press psychophysical tests ([Aimi et al., 2018](#)); according to our data, when the tests were repeated many times, the "press" (decision-making) action became automatic so the reaction times became so fast that they seemed to be under U control and not under C; as a matter of fact, the paradigm of a voluntary action that is repeated many times, is stamped on the working memory so that the implicit mind (U) can intervene in guiding the automatic behavior instead of the explicit one (C).

Other scientists have conducted similar experiments demonstrating that the creation of goals in action-decision making is not anymore a prerogative of C ([Wilson, 2003](#); [Bargh, 1999](#)). Up to them, a sort of "adaptive" U was clearly much more important in human behavior than it was considered in the past.

The experiments led to conclude that our brain activity is made of a dual system (U and C) that must efficiently cooperate in order to manage cognitive processes and behavior and for giving us a conscious version (see R above) of them.

3.2. Free-Will

Since Locke and other ancient philosophers of the positivistic school, the belief in free will (FW) has been denied by many people. At recent, it was demonstrated by means of EEG experiments that a conscious action is preceded by the arousal of an early potential in brain ([Libet, 1983, 2005](#)); these data seemed to corroborate both the idea that FW cannot exist and that U and C can efficiently cooperate in cognition.

A popular definition of FW reported by Stanford Encyclopedia, recites: "*FW is an art for a particular sort of capacity for the rational agent to choose a course of action from among various alternatives*" ([O'Connor, 2013](#)). So, the question is whether "to choose" implies a conditioned or conditional act; the theoretical and practical implications of this answer on human cognition are overwhelming. Therefore, the possibility that individual believe in FW might play a fundamental role in cognition, has been deeply investigated by the author and coworkers ([Bignetti, 1994, 2001, 2003, 2004, 2010; 2013; 2014, 2015, 2017, 2019](#); [Bignetti et al., 2016](#); [Aimi et al., 2018](#)).

At first, data demonstrated that brain is a probabilistic-deterministic machine ([Koch, 1999](#); [Bignetti, 2003](#)); as an example, see: "Galton Board" in which the

falling down balls randomly bounce either left or right, with the same probability. Though the final distribution of the balls at the bottom is apparently uncertain if the prediction is based on single events, actually, all the balls distribute according to a binomial function. In the brain, there are many neuronal elements (like the V-Sensitive- Na^+ -Channel, the synaptic buttons in inhibitory as well in excitatory synapses or neurons in visual cortex etc.) that singly behave in a stochastic mode; though, signal perceptions or even the action-decision mechanism, in the so-called “voluntary actions”, are actually calculated on a large mass of components thus giving a deterministic response (Koch, 1999). In order that a deterministic response might be predictable and coherent with the cause-effect law in neuronal behavior, several models of neuronal computations have been formulated; one of the most intriguing is the “Integrate and fire” model; roughly speaking, neuronal dynamics can be conceived as an “integration” process, i.e. a summation process, that can rise neuronal membranes above some critical voltage thus triggering action potentials (Gerstner, Kistler, Naud, & Paninski, 2014). Then, a conscious action is always “conditioned” by a mental, deterministic calculus. Other scientists e.g. Schultz (2015), have considered the cause-effect relationship under a softer point of view thus concluding that FW is “conditional”. We refuse this proposal considering it as a *jeu de mots* typical of soft-sciences. To this regard, let’s assume that a rational individual may find out more than one possible pathway in response to a stimulus; then, the reaction that is considered the worthiest, must be undertaken: no matter to contradict this basic rule! Now, let’s pose the question otherwise, i.e. let’s assume that the individual wants to contradict this rule; his intention is to choose the worst behavior instead of the best one, just to demonstrate that FW does exist. By this choice, the individual simply wants to demonstrate that he is able to contradict the rule; so, “to contradict the rule” (that would be absurd for us) is actually the new rule to which he is conditioned.

At second, experimental data demonstrated that people are firmly convinced of the role played by FW in action-decision mechanism in a so-called “voluntary” action; the illusion of possessing FW is created by the subjective 1st-PP. Conversely, when judging others’ actions the conviction on FW existence is not so solid (Nichols, 2011; Shepherd, 2012). In this case, C may take enough time to reason about the possible causes of others’ action, and may take advantage of a rational way of thinking carried out by an objective 3rd-PP, thus avoiding the false beliefs typically of the emotional 1st-PP. Then, the question is “Why FW illusion should be so strongly rooted in people’s mind during the performance of the so-called ‘voluntary’ actions”? The answer is given in “The Bignetti Model” (TBM) (see **Appendix**) (Bignetti, 2001, 2014, 2019; Aimi et al., 2018). Basically, the underlying evidence is that, believing in FW, an individual feels the Sense of Responsibility of the action; then, depending on the action outcomes, he self-attributes a reward or a punishment. This sequence of events is the typical paradigm of animal conditioning that fosters cognition.

In summary, we may conclude that action-decision making is a process that

belongs to U's domain; therefore, it is a deterministic process that excludes the presence of FW. While, the illusion of possessing FW is a subjective way of thinking about voluntary actions that necessarily belongs to C's domain. Since both perspectives coexist as indicative of a dual state of the mind, then, they must be considered by any realistic human cognitive model.

4. Concluding Remarks

The question “what is consciousness?” seems to be unsolvable (“The Hard Problem of Consciousness”); the reason why depends on an unsurmountable conflict of interest. In order to define consciousness “scientifically/conceptually” (and not only “operationally”), the subjective 1st-PP-dependent activity of U should be thoroughly analyzed and then reported by the objective 3rd-PP of C; however, the report carried out by C would occur with a tiny delay with respect to U's activity (i.e. *a-posteriori*) thus impeding C to truly identify with U.

Then, the investigation of NCCs may define operational/functional aspects of consciousness but not a scientific conceptualization of it. To this regard, NCCs can usefully elucidate that U and C cooperate in the mechanism implicated in cognition and behavior. Moreover, NCCs investigation highlighted that neuronal computing stands on a probabilistic-deterministic mechanism. Few models of neuronal dynamics have been proposed so far, among which the “Integrate and fire” model seems mostly accepted. In summary, according to the deterministic neuronal computation mechanism, 3rd-PP excludes the existence of FW in action-decision mechanism but it admits that 1st-PP may believe in it; i.e. it admits that 1st-PP may delude itself of FW existence.

The question now rising is whether there is a model of human cognition that might give the right consideration to the experimental evidences obtained by NCCs investigation. Actually, in the current literature, there is only one model, i.e. “The Bignetti Model”, that is compatible with all the different issues discussed above and attributes to FW illusion a fundamental role in cognitive processes.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix

The Bignetti Model (TBM)

ACTION

1) The so-called “voluntary” action is decided and performed by the agent’s U in response to a stimulus. To this aim, the reaction paradigm that might have the best probability of success is retrieved by U among those that are encoded in long-term memory store.

2) After a slight delay, the agent becomes aware of the ongoing action through feedback signals (somatosensory, etc.) that are conveyed to the brain as a consequence of its performance. Thus, the agent’s C always lags behind unconscious activity.

COGNITION

3) Owing to this delay, the C cannot know the unconscious work that precedes awareness; thus, the C erroneously believes it has freely decided the action. Though objectively false (i.e. according the 3rd-PP), this belief is subjectively perceived as true (FW illusion according the 1st-PP). It is so persistent and deep-rooted in the mind that the C is unwilling to abandon it.

4) The FW illusion satisfies a psychological need to secure the arousal of the Sense of Agency (SoA) and of Responsibility (SoR) of the action. Both SoA and SoR inevitably lead C to self-attribute reward or blame depending on action performance and outcome.

5) Both reward and blame are motivational incentives that foster learning and memory in the C; the updating of knowledge will provide new information and the skill required for further action (restart from point (1)).