



Opinion

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Neuropsychiatry Revisited: Consciousness and Memory

Diana Paleacu Kertesz**Neurology Service and Memory Clinic, Abarbanel Mental Health Center, Israel and Department of Neurology, Sackler School of Medicine, Tel Aviv University***Corresponding author:** Diana Paleacu Kertesz, Neurology Service and Memory Clinic, Abarbanel Mental Health Center, 15 Keren Kayemet, Bat Yam 59110, Israel.**Received Date:** November 01, 2022**Published Date:** November 14, 2022**Abstracts**

We discuss consciousness as an evolving concept starting with Freud's failed trial to dig into its neurobiological aspect. Consciousness has been defined and redefined in psychology and neurology according to different theories and points of view that are succinctly summarized. A new theory regarding consciousness is being now proposed by Budson et al (2022) linking it to memory, specifically to the episodic memory system (EMS), claiming that consciousness evolved as part of the EMS. This new theory is also supported by the two brain system theory stipulated by Kahneman and Tversky. In fact, we believe that the evolution of theories dealing with the concept of consciousness represents one of the basic aspects of the re-emerging discipline of neuropsychiatry.

Keywords: Consciousness; Episodic memory system; Neuropsychiatry**Opinion**

We shall soon celebrate 114 years from the birth of psychoanalysis, which strayed the study of the soul from the biological realm. This hurdle issued from Freud's failed efforts to build a bridge between neurology and psychology as a direct consequence of the failed operation by Wilhelm Fliess on one of Freud's patients diagnosed with hysteria. Both Fliess and Freud were preoccupied with sexuality and wanted to develop new theories linked to biological substrates. Freud, a neurologist and Fliess an ENT specialist, met in 1887 in Berlin at a time when hysteria was still perceived as the result of "the wandering womb through the body". This very old theory was circulated by Timaeus the Sophist, who argued in one of Plato's socratic dialogues that the uterus is "sad and unfortunate" when it does not join with a male or bear child... Where was the #me too movement then? At the same time Freud was returning from Paris after a three-

month fellowship in Charcot's clinic at the Salpêtrière. Charcot (the father of neurology) was conducting scientific research and treating hysteria by hypnosis at the time. And this was a catalytic experience for Freud, which turned him toward a new method of treatment. As they say, the rest is history. Interestingly enough, and quite unbelievable is the fact that this catastrophic experience (an operation that was utterly unnecessary, with dire consequences), did not deter the patient from continuing her analysis with Freud and later on, became an analyst herself. But this subject is beyond the scope of our dissertation [1,2]. The new emerging discipline was conceived and incubated in Freud's home in 1902, where a number of Viennese physicians, who were interested in his work, would meet every Wednesday afternoon and discuss issues relating to psychology and neuropathology. The birth took place in 1908. This above mentioned group was called the Wednesday Psychological

Society (Psychologische Mittwochs-Gesellschaft) and it marked the beginnings of the worldwide psychoanalytic movement [3]. The Id, Ego and Superego were created [4] and we still try to discover them in the midbrain, limbic region or the frontal lobes of the brain... they are parts of our personality and dictate our behavior. But how do the Id, Ego and Superego integrate in the concepts of consciousness and subconscious mind related to the biological brain? Are there places or regions in the brain that represent them? Or are they concepts conceived intuitively by Freud with no link to biology whatsoever? So maybe, for more than a 100 years, we treat the diseases of the psyche, based upon empirical concepts, where these concepts have no relation to the real biological changes that the sick brain undergoes when it is diagnosed with a psychiatric disease? It doesn't matter how preposterous this question is; the idea is that in the XXIst century we are looking for biological substrates of psychological phenomena and disease with better instruments (SPECT, PET, functional MRI) than during Freud's or Charcot's era.

When Freud spoke of the conscious brain what did he refer to? Consciousness is contrasted to self-consciousness, that includes: self-detection, self-monitoring, self-recognition, theory of mind and self-knowledge [5]. It is known that children become consciously aware between 12 and 15 months (+/-3 months), meaning that they have the ability to have the minimal form of higher-order thought necessary to access consciousness [6]. So we ask which part of the brain changes during this period. Gazzaniga relates conscious appreciation or feeling involved into a modality of sensation or action, to intact neural pathways communicating this information to the left hemisphere [7,8].

Neurology practice defines consciousness as one's awareness of himself and the world around, being aware and alert. This awareness is subjective and unique to each one of us and is mediated through the reticulate ascending activating system (RAAS). Some researches focus on the relationship between attention and consciousness, where the interplay between stimulus strengths and attention determine the taxonomy of conscious and non-conscious states [9].

A new theory regarding consciousness is being now proposed by Budson, Richman and Kensinger (2022) [10]. They claim that consciousness developed as part of a memory system used by our unconscious brain to help us flexibly and creatively imagine the future and plan accordingly. The innovative part of this theory is that we perceive, decide and act unconsciously and about half a second later we realize it consciously and remember doing it. Therefore, the authors conclude that consciousness is part of the Episodic Memory System (EMS). EMS was described by Tulving [11] as a set of processes allowing us to mentally time-travel backwards and re-experience a past moment. In order to do that, we must intake information through our sensory organs, keep it through our working memory (located prefrontally) and then create a mental representation of a moment in time (encoding done by the hippocampus). If we want to access that representation later, we must store it in a durable form (consolidation). If we want to later reflect on that specific moment in time, we must engage retrieval processes to do so. All these separate experiences

(types of memory) are bound together by consciousness and thus remembering is a conscious experience. Consciousness is the facilitator for these memories that can be replayed and finally kept in storage (in different parts of the brain, depending of the type of memory).

The authors add that "consciousness developed with the evolution of episodic memory simply—and powerfully—to enable the phenomena of remembering" and our ability to imagine things in consciousness is constrained by and related to our EMS [12] as another piece of evidence supporting the idea that consciousness evolved as part of episodic memory. All the systems including the sensory one, the working, episodic, and semantic memory that work as separate systems, in the healthy brain function together as a single entity [13,14]. Attention is necessary, but not sufficient, for stimuli to enter working memory. Therefore, stimuli, that are unattended to, will neither be consciously perceived, nor remembered using working memory and EMS. This is an essential mechanism that protects us from overstimulation. But what happens in blind people or those who suffer from hearing loss? We know that these ailments in old age raise the risk for dementia. And in the young, change blindness [15,16] inattentive blindness [17], and the attention blink [18] even highly incongruent stimuli, like in the famous experiment of "the monkey business illusion" [19] can be invisible to conscious perception.

Finally, the authors claim that their theory is fully consistent with the distinction made by Kahneman and Tversky [20], and later on by Carruthers [21] between conscious System 2 (slow, effortful, logical, calculating), and unconscious System 1 (fast, automatic, stereotypic). The theory simply adds that conscious System 2 was made possible by the original purpose of consciousness—to be the contents of episodic memory.

Conclusion

I conclude by saying that Freud was an intuitive genius who named certain processes by different names than those we use in current taxonomy. And thus, we revisit old concepts seeing and understanding them in a new biological light. This is the true sense of neuropsychiatry in the XXIst century.

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Conflict of Interest

No conflict of interest.

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