



Review article

Neural synchronization as a hypothetical explanation of the psychoanalytic unconscious

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ARTICLE INFO

Article history:

Received 8 August 2015

Revised 23 December 2015

Accepted 23 December 2015

Available online 30 December 2015

Keywords:

Unconscious

Conscious

Psychoanalysis

Neural mechanisms

Synchronicity

Brain oscillations

ABSTRACT

Cognitive scientists have tried to explain the neural mechanisms of unconscious mental states such as coma, epileptic seizures, and anesthesia-induced unconsciousness. However these types of unconscious states are different from the psychoanalytic unconscious. In this review, we aim to present our hypothesis about the neural correlates underlying psychoanalytic unconscious. To fulfill this aim, we firstly review the previous explanations about the neural correlates of conscious and unconscious mental states, such as brain oscillations, synchronicity of neural networks, and cognitive binding. By doing so, we hope to lay a neuroscientific ground for our hypothesis about neural correlates of psychoanalytic unconscious; parallel but unsynchronized neural networks between different layers of consciousness and unconsciousness. Next, we propose a neuroscientific mechanism about how the repressed mental events reach the conscious awareness; the lock of neural synchronization between two mental layers of conscious and unconscious. At the last section, we will discuss the data about schizophrenia as a clinical example of our proposed hypothesis.

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1. Introduction

In the human brain, several cognitive operations occur without conscious participation. Most of our thoughts, perceptions, emotional processes, and even learning processes occur without cognitive awareness. Thus, unconscious processes form the majority of our daily mental activities. Cognitive science, in branches such as neuroscience, neural linguistics, neural modeling, and cognitive psychology, has focused its attention on the nature of this unconsciousness. However, by introducing models that are based on non-clinical data, cognitive science has also departed from older psychoanalytic formulations (Ekstrom, 2004). Neuroscientists have used laboratory paradigms, such as subliminal perception, implicit learning and directed forgetting, to understand the neural correlates of unconsciousness (Stein, Solms & van Honk, 2006). Meanwhile, clinical data are presented as observations about patients that are experiencing vegetative states, epileptic seizures, or general, anesthesia-induced unconsciousness (Mashour, 2004). However, these types of unconscious states are different from the psychoanalytic Freudian unconscious. The unconsciousness that cognitive scientists study is automatic, cold, and cognitive (Berlin, 2011).

In this paper, we propose a hypothetical explanation of the neural correlates of the psychoanalytic unconscious. To fulfill this aim, we first review the previous theories concerning the neural correlates of conscious and unconscious mental states, such as brain oscillations, synchronicity of neural networks, and cognitive binding. In doing so, we hope to establish a neuroscientific basis for our hypothesis concerning neural correlates of the psychoanalytic unconscious, which states that parallel, yet unsynchronized, neural networks exist between cortical and subcortical brain structures. We then propose a neuroscientific mechanism by which the unconscious mental events become conscious. Finally, we discuss data concerning schizophrenia as a clinical example of our proposed hypothesis.

However, before doing so, we first need to clarify the frequently used terms of this paper. We define “consciousness” as a state of mind in which there is knowledge of one’s own existence and of the existence of surroundings, as described by Damasio (2010). Conversely, we define “unconsciousness” as both the mental state in which one operates outside one’s awareness and the dynamic and complex state of mind, which includes the distinct aspects of a person’s self, such as wishes, drives, instincts, non-rational processes (i.e., id, as described by Freud), emotions, cognitions, and memories, which form the basics of one’s self. By doing so, we will use the term “unconscious” in a broader sense than Freud did because more recent research suggests that one can no longer speak of the “unconscious” as though it were a unified and isolated sector of the mind. The association of the unconscious with broader types of activity and entities resulted in a shift in the concept of the unconscious from its initial exclusively psychodynamic context (and the associated instincts and libidinal drives) to a broader, psychological context (Uleman, 2005).

We will use Searle’s description of the unconscious because it is most relevant to our hypothesis. Searle (2004, pp. 165–172) distinguishes between four different types of unconsciousness, which he describes as “preconscious,” “dynamic unconscious,” “deep unconscious,” and “non-conscious.” He described the “preconscious” as approximately corresponding to Freud’s notion of the “systems preconscious.” The preconscious includes mental events that have been forgotten for an extended period of time but can easily be brought to conscious awareness by simply attending to the events (e.g., name of your primary school teacher). Then, there is the “dynamic unconscious,” which describes cases wherein the “unconscious mental states function causally, even when unconscious” (Searle, 2004, p. 167). This is approximately equivalent to the “dynamic or repressed unconscious” in Freud’s theory, wherein the dynamic unconscious is formed by repression. The contents of the dynamic unconscious can reveal themselves in dreams (but as a latent meaning of the dream, as described by Freud) and during discussion of the repressed items in psychoanalysis. Thus, they can be brought into the consciousness. The third type of unconscious is what Searle describes as the “deep unconscious.” Here the unconscious mental state is neither conscious nor accessible in consciousness, as it is not “the sort of thing that can form the content of a conscious intentional state” (Searle, 2004, p.18). The deep unconscious contains innate mental abilities, such as the knowledge of the rules of language prior to developing the ability to speak. Finally, the fourth type of unconscious, the non-conscious, does not include mental events but includes the brain’s functions that are crucial to the control of our mental lives, such as secretion of serotonin at the synaptic cleft. Searle assumes that neither the deep unconscious nor the non-conscious can, in principle, be brought into consciousness.

2. Neural correlates of consciousness

To understand the neuroscientific explanation of psychoanalytic unconsciousness, it is important to understand the previously suggested neuroscientific approaches to consciousness. Recently, several neuroscientific hypotheses of consciousness have been suggested. Damasio (1994) considers that the mind is a set of *representations* or *neural configurations* that become images and that can be manipulated to become forms of higher consciousness. Edelman (2003) considers cyclic processing, which he describes as the re-entrance of neural activity in the same region after circulating in so-called re-entrant (or feedback) circuits, is crucial for the constitution of consciousness. His *theory of neural group selection* is based on the ability of cortical neuron groups to select certain response patterns, which constitute *cerebral maps*, in reaction to a given stimuli. These maps reciprocally interact through a “reentry” process, thereby enabling the different cerebral areas to coordinate their activity to produce new and increasingly complex functions (such as memory, symbolization and thought) (Edelman, 1992).

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