Self-Awareness, the "me" Feeling, and Mental Disorders

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Abstract: Self-awareness capacity allows us to know that we exist in a particular form and a specific place. It guides our attentional, emotional, cognitive, decision making, executive functions, and body physiology to get the best advantages and survival. Current definitions of mental disorders describe dysfunctions of the said processes. This article stands out the relevance of self-awareness dysfunctions in mental disorders and draughts the importance of considering its activity as the main parameter that should be carefully regulated to maintain mental health. It also highlights the role of the inner ear's vestibular/balance system as a regulatory factor of self-awareness function that allows the integration of sensorial inputs with the perception of the own body movements giving birth to the feeling of unity and ownership, the "me" feeling.

Keywords: Self awareness-mental disorder-insular cortex-vestibular system-behavior.

SELF-AWARENESS

Human beings developed the extraordinary ability of self-perception, the capacity to know in a conscientious way that we exist in a particular form, separate and different from others. Through this capacity, we also know how we are, allowing us to feel unique persons. Self-conscience starts to emerge during the development of the brain. From that moment, it shapes all that we think and do. Self-awareness is constantly created in a permanent, fluent, dynamic, and alive process in essence. This neuronal construct is maybe the abstract idea of ourselves, about our complete person, mind, and body. Self-awareness is dynamic; we actualize it minute by minute, second by second. Self-awareness judges and evaluate himself constantly, confirm or discard the self-image. This permanent feeding is the essence of life, of feeling alive.

SELF-AWARENESS ACTIVITY INFLUENCES COGNITIVE ABILITIES AND BEHAVIOR

All our reasoning and thinking processes are impregnated and colored by the self-perception we have. What calls our attention, what kind of interests we have, how focused on a specific task is shaped by the actual self-image of ourselves. Intelligence and cognitive abilities probably have the evolutionary finality to preserve the "life" of the person represented by self-awareness activity. All we do as humans, our rational activity, our conscientious and unconscious behavior, including our body activity and physiological conditions, would exist to maintain self-awareness to maintain the person's life. We pay attention, incorporate and process the information intelligently, judge, decide and execute what is useful for our survival. A proper self-awareness function helps us select what is better for us, allowing us to filter what to say and what to do.

In sum, self-awareness activity influences intelligent cognitive functions, reasoning, emotions, decision making, executive functions, and behavior.

Partial or complete loss of self-awareness indemnity will affect those processes.

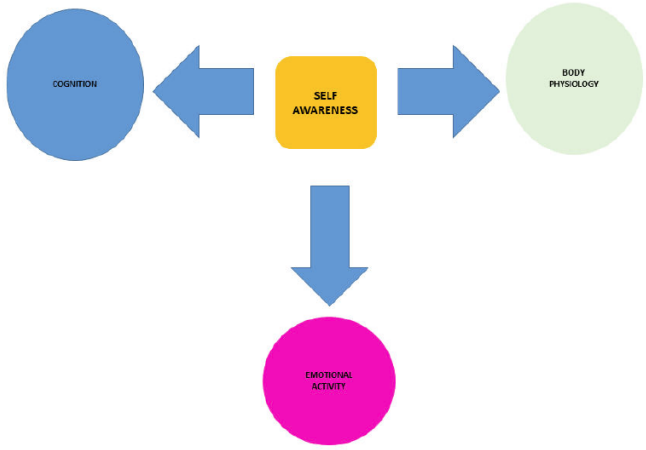

Figure 1: Body physiology, cognitive and emotional processes depend on the indemnity of self-awareness activity.

According to the definition of the American Psychiatric Association in the 'Diagnostic and statistical manual of mental Disorders, "A mental disorder is a syndrome characterized by clinically significant disturbance in an individual's cognition, emotion regulation, or behavior that reflects a dysfunction in the psychological, biological, or developmental processes underlying mental functioning" [1].

This definition describes the causal origins and consequences of mental disorders, avoiding the

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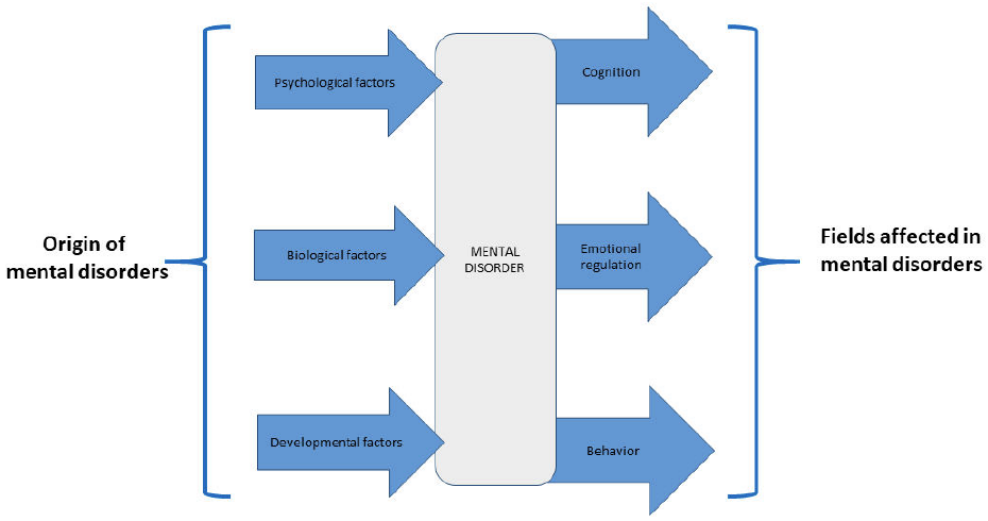

Figure 2: Scheme of mental disorders according to American Psychiatric Association definition.

essence of mental disorders. Probably we first need to understand and define the meaning of "mental." It seems that mental activity is more than just the arithmetic sum of biological, psychological, and developmental processes. The interaction between them occurs so that it gives origin to a different entity: the mind.

SELF-AWARENESS AS A PHYSIOLOGIC FUNCTION

The body's physiologic parameters are continuously monitored in order to maintain homeostasis. Even insignificant perturbations can start regulatory mechanisms that allow returning to normality. Regulatory mechanisms appeal to different strategies to maintain healthy levels. Each parameter can be controlled by more than one mechanism. For example, low blood pressure in hemorrhage can be regulated either by enhancing the vascular tone, stimulating sympathetic activity, saving water at the kidneys, or waking up a thirst.

Whatever self-awareness activity be located in the nervous system, it should be a regulatory mechanism that allows its maintenance along the lifetime. Even more, it is probably the most carefully guarded. Like any other physiology parameter, each person's self-awareness regulatory mechanisms maintain self-awareness within "healthy limits," taking different compensatory strategies. As several factors threaten self-awareness, compensatory strategies would also consider infinite combinations of compensatory mechanisms. When perturbations surpass the regulatory capacity, we lose self-awareness abilities.

A healthy self-awareness has overcome an enormous challenge; it has joined the body sensory information, the memories, the thoughts, and the emotional processes, as coming from a single person. This complex, refined and delicate integration produce the "it is me" feelings: it is my body, my mind, my emotions, and etcetera. Disorders in this process will lead to different forms of disintegration, fragmentary and non-completeness self-feelings proper of mental diseases, frequently accompanied by anguish and pain in depression and bipolar disorders. Hallucinatory activity in psychotic patients and distortions of body perception in anorexia-bulimia are other manifestations of miss function of self-awareness activity.

Self-awareness is carefully regulated. Our brain creates our conscientious self-perception. Sensorial information, i.e., visual, auditory, tactile, gives information about our environment; meanwhile, the cognitive reasoning and the thinking activity can produce emotional responses in our body (i.e.heat rate, gut mobility changes), allowing feeling that" the thinking" is "our" thinking.

THE VESTIBULAR SYSTEM AND SELF-AWARENESS

The vestibular system or "balance system" in the inner ear perceives each movement of our body, giving us information about its position in the space continuously. Its receptors inform permanently and in a subliminal way about different positions of ourselves in space along time, allowing us to realize that we are alive. As body movements are inherent to life, human's self-conscience is continuously being created in specific brain centers and fed by vestibular information.

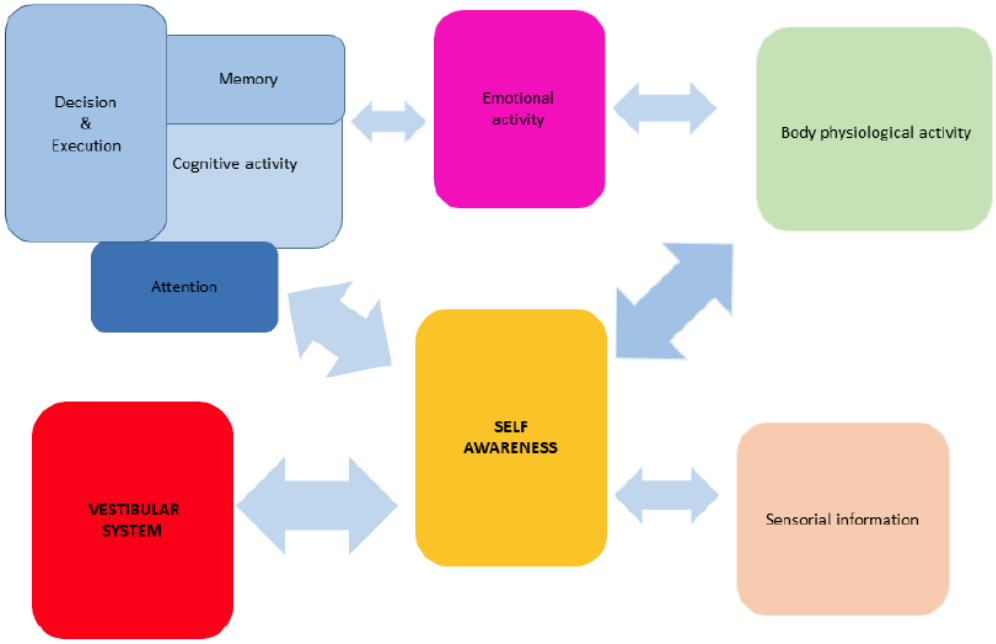

Figure 3: Self-awareness regulatory factors.

It allows us to know where we are within the environment, distinguishing between "me" and the rest of the world, the limits of my body, where I am. The vestibular information allows understanding that the one who is seeing, touching, hearing, thinking, and feeling emotions is the same that is moving. It contributes to the convergence of perceptions in a specific body;

"my body," it is me."

The involvement of the vestibular system in the regulation of self-awareness has taken protagonism during recent years [2-4] not only because of its effects on self-awareness brain areas properly but also by the effects on cognition and memory/hippocampal and circadian activity at the hypothalamus. Vestibular information has an essential role in the acquisition of memories [5, 6], influencing hippocampal throphism and neuronal cell account [7, 8]. It modulates the hippocampus's positional cells, allowing the person to know his location in outer space [9, 10]. The vestibular system affects the neuronal activity of the insular cortex, parietal insular vestibular cortex (PIVC), as shown in functional magnetic resonance images (fMRI) studies. This area that is considered the primary cortex for the vestibular system is also a brain area involved in self-awareness functions and embodiment. Its role on selective attention, salience, decision making, and executive networks suggests the relevance of this brain area on the study of mental disorders.

In sum, the vestibular system modulates self-awareness brain areas, cognitive/hippocampal, and circadian/hypothalamic neuronal networks, all involved in mental disorders.

CONCLUSIONS

In most, if not all mental disorders, self-awareness is somehow affected.

Self-awareness is a brain construct.

It is finely regulated by information coming from cognitive, emotional brain areas, and sensory information. The vestibular input is probably an essential factor that allows integrating that the sensory information and memories are of a different person from the environment. The vestibular system allows understanding that this single person is "me".

The vestibular system contributes to creating neural circuits that produce the feeling of being a unitary person. All the functions that depend on self-awareness (attention, reasoning, decision, cognition, emotional and physiological body activity) also depend on the vestibular activity.

Mental disorders are self-awareness dysfunctions that produce emotional, cognitive, and attentional disturbances, physiologic body changes, sleep, and autonomic abnormal functioning.

Defining and distinguishing the factors that regulate self-awareness activity could be essential for identifying possible targets to effectively restore self-awareness and solve mental disorders.

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