

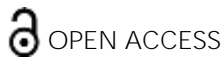


RESEARCH ARTICLE

Neuroecological Mood and Homo Spatiotemporalis

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ABSTRACT

Metabolic syndrome is epigenetically related to mood disorders. Seasonality is a predictor of metabolic syndrome. Obesity is more common in the West than in the East. This is not solely due to industrialized societies. It should be emphasized that the frequency of major depressive disorder increases as one moves north. However, seasonal affective disorder is intermeridian. Mood is also closely related to how we perceive and experience nature. This is not independent of how we perceive and experience time. Different time scales between the organism/body-brain and the world synchronize to serve the minimization of free energy. Spatial-temporal dynamics, referred to as a common currency, serve adaptation. Autism and affective spectrum disorder are spatiotemporal pathologies. In depression, internal time is slow, external time is fast. The opposite is true in mania. The loss of the connection between internal and external time, which is crucial for perception and memory, explains how the sense of self can be lost in psychosis. The aim of this article is to discuss the brain-body-mind axis within the context of neuroecological variables such as climate and geography. This discussion is expanded through a spatiotemporal perspective.

Keywords: Mood disorder, Affective spectrum, Metabolic syndrom, Epigenetics, Neuroecology, Homo spatiotemporalis

Introduction

Although initially defined as a side effect, metabolic syndrome is a medical comorbidity with epidemiological, clinical, and familial factors.¹⁻⁸ It is epigenetically associated with mood disorders.⁸

Components of metabolic syndrome include ischemic vascular disease, diabetes, obesity and dyslipidemia, purinergic dysfunction/uric acid metabolism disorders, and thrombotic dysfunction. Common pathways between metabolic syndrome and mood disorders include glucocorticoid/insulin signaling mechanisms, inflammatory and autoimmune effector systems.

Seasonality is a predictor of metabolic syndrome.⁹ There is a relationship between circadian gene variants and metabolic syndrome, which is more common in seasonal affective disorder (SAD).¹⁰ It should be emphasized that the frequency of major depressive disorder increases as one moves north. However, seasonal affective disorder is intermeridian.

Mood is also closely related to how we perceive and experience nature. This is not independent of how we perceive and experience time. The aim of this article is to discuss the brain-body-mind axis within the context of neuroecological variables such as climate and geography. This discussion is expanded through a spatiotemporal perspective.

Neuroecological Mood

According to the World Health Organization, obesity is more common in the West than in the East. This is not solely due to industrialized societies.¹¹⁻¹³ It should be emphasized that the frequency of major depressive disorder (MDD) increases as one moves north.¹⁴ However, SAD is independent of latitude.¹⁵

Summer-type depressions are more common in China.¹⁶ In a study comparing Italy and India, winter-type MDD was found to be more common in Italy, while summer-type MDD was more common in India.¹⁷ This situation has been attempted to be explained by the temperature

difference between day and night as well as photoperiodicity. Geography, climate, and migration between different geographies and climates affect mood disorders independently of sociocultural and socioeconomic factors.

When comparing African Americans and African immigrants living in Washington, winter-type SAD was similar in both groups, while summer-type SAD was more common among African immigrants.¹⁸ In 2014 in Istanbul, we found that summer-type depressions were more common in cases of migration to Istanbul and among office workers.¹⁹ These depressions were more frequently characterized by irritability. In a comparison of five different immigrant groups in Oslo, SAD was most frequently observed in Iranian immigrants.²⁰

Summer-type SAD is not found in Iceland and the UK.²¹ SAD was observed less frequently in Icelandic immigrants compared to other immigrant groups. These findings suggest the existence of both a sensitivity and a resilience to photoperiodicity.²²

When photoperiodicity decreases, signals experience a delay, and the circadian clock is forced to adapt.²³ Delayed sleep phase syndrome is pathognomonic for SAD. Metabolic syndrome is more common in these cases, along with nocturnal eating behavior. A peripheral circadian clock also exists in skeletal muscle. In connection with psychomotor retardation, I proposed that delayed sleep phase syndrome is a balancing act against impaired energy production at the cellular level.⁸

Neuroecological Mood of Homo Spatiotemporalis

Mood is the most fundamental phenomenology of consciousness.²⁴ Mood is the state of feeling and experiencing one's existence.²⁵ This state is related to the self.²⁶ At this point, it is also closely related to how we perceive and experience nature.

A new, indirectly related concept has been introduced: Human affectom, operating with certain metaphysical and mechatronic assumptions.²⁷⁻²⁹ We perceive and experience

nature in two ways: i) place/space-time (spatial-temporal) ii) spatiotemporal. The latter is a more allocentric perspective.

The brain, as a spatial-temporal structure, belongs to the body, in other words, to the world. The brain shapes the world, and the world shapes the brain. As in early life events, the VMPFC entropy level shapes N200 on the EEG, which is related to internal decision-making processes.¹

The world also shapes the mind. For example, music consciously or unconsciously moves it. Phase beginnings align with heartbeats, which is a triple synchronization.³⁰ At this point, two distinct neural correlates can be considered: i) content-specific, and ii) content-independent. In both cases, minimizing free energy is essential. The goal is the highest level of harmony.

According to the general principle of productivity, energy emerges simultaneously in the world and in the brain.³¹ This energy moves according to the density of variation, shaped by expectation and prediction. At this point, interaction, in other words change, occurs not only biologically but also neuroecologically. Beyond the boundaries of the brain, there are one or more variables. The brain, as an organ aiming to minimize free energy, is only neuronal when the body is concerned.

However, dreams are spatiotemporal. They answer the question of why consciousness exists. Consciousness is essential for continuity. The common currency between the two is spatial-temporal dynamics.

Consciousness exists for the continuity of both the self and the generation.²⁵ Self formed in different cultures are neither entirely internal nor entirely external. They have been formed and created to contain different balances and different contents.

On the other hand, at the point of the deep continuity of the mind, we are faced with an activity without scale.³² Temporal thicknesses and depths are shaped by spatiotemporal dynamics. Such consciousness, in other words the unconscious, is

spatiotemporal. At this point, our search for the neurobiological/chemical foundations of mental characteristics should perhaps be reversed. Does this change our perspective on dementia?

Neurons have a collective behavior.³³ This behavior occurs at the mesoscopic level. An event occurring at the microscopic level is not reflected linearly at the mesoscopic level. Chaos lies in the dynamics of the collective behavior of neurons. This chaos is reflected in mood, decision-making processes, and creativity. At this point, the question of which electrode, which region, is not very meaningful. Mesoscopy bends microscopy. In other words, the law of the whole/universe is not determined linearly. Is the unconscious a kind of black hole?

The generalized synchronization between the organism/body-brain and the world can be thought of as two systems synchronizing different time scales, like Huygens clocks, in order to minimize free energy.³⁴

At this point, I would like to draw attention to the determining role of our internal and external time velocities. They are harmonized, they are interconnected. This is crucial for perception and memory. In depression, internal time is slow, external time is fast.³⁴ In mania, it's the opposite. The loss of the interconnectedness between internal and external time explains how the sense of self can be lost in psychosis.²⁶ Virtual trajectories and extraordinary attractions can be considered as fantasies or hallucinatory experiences. This completes the missing component between the world and the brain, in other words, between free energy and mental properties.

Spatial-temporal dynamics, referred to as the common currency, serve adaptation. They play a central role in the transformation of free energy, in other words neuroecological activity, into mental characteristics such as mood, self, and consciousness.³⁵

On the other hand, scale-free activity produces different oscillations and fluctuations in different time periods.^{26,33} There are different dynamics at

different frequencies, different trajectories, various centers with attractors/attractive forces. It models different points in time, which is not a linear flow. The points where it is linear include stochastic degrees of convergence/correspondence with spacetime.

Consciousness, as a flow/presentation, is characterized by retrospection and foresight. Can an inner temporal consciousness, revealed by retrospection and foresight, capture spatiotemporality?

When we attempt to match, scale-free activity resembles the spontaneous activity of the brain. Awareness on the resting network moves the arousal threshold on the executive network.

Consciousness can achieve Nirvana and similar scale-freedom through the integration of different temporal scales on the psychological plane. Subjective experiences, such as autocorrelation windows or cross-frequency matching, can be recognized by different spatial-temporal coordinates.

Conclusion

In conclusion, autism and affective spectrum disorder are spatiotemporal pathologies. At this point where the neuronal and the mental do not match/overlap, I would like to share an insight into the missing component. This missing component is a witness, an observing eye, close to the definition of the self-object.²⁵ Like atoms in quantum theory, which behave differently spontaneously and differently when observed. Or like bipolar disorder type 2, romanticized as one-winged angels, which Akiskal's minimized as failure in romantic relationships. Is reality something that can escape fiction?

The fundamental law is the continuity of both mind and life. This is beyond the brain. At this point, the universe and evolution move together. At this point, can artificial intelligence capture spatiotemporality?

Conflict of Interest:

The authors have no conflicts of interest to declare.

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