DOI: 10.35218/rae-2025-0022 Review of Artistic Education no. 29 2025 165 - 167
https://doi.org/10.35218/rae-2025-0022

2. THE IMPLICATIONS OF SPORT IN THE EVOLUTION OF CEREBRAL ACTIVITY IN THE CASE OF ARTISTS

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Abstract: *The neuroscientific benefits of sports on brain activity involve blood flow and brain oxygenation, resulting into an improved capacity of concentration and cognitive flexibility. The effects of sports on the hormones associated with stress are well known, and in the case of artists, this aspect have a particular importance, because of its anxiogenic effect that can inhibit creativity, causing blockages in the artists' activity. But, beyond another consideration, it can be said that sports who increase endurance as well as those that require motor coordination and balance are directly involved in stimulating divergent thinking, involved in artistic creativity, because this process can generate new, original ideas, an essential aspect in the artistic field.*
Key words: sport, cerebral activity, artists, creativity

1. Aspects of the role of essential neurotransmitters in brain activity

Following a niche approach to a broad topic with implications in many aspects of life, we attempt a brief explanation of how sports influence brain activity, introducing physiological concepts without delving deeply into the field. The effects of sports on stress-related hormones are well-known, but some clarifications should be made to raise awareness about the impact of physical activity on the body, as well as the effects of sedentarism, beyond their visible consequences. Dopamine and serotonin are interdisciplinary topics discussed here due to their involvement in both physical and mental health.

Dopamine is a naturally occurring chemical in the human body, produced by a group of nerve cells in the brain’s center, where it functions as a neurotransmitter. Depending on the region of the brain in which it acts, dopamine plays a variety of important roles, from regulating movement to influencing emotional responses. The concentration of dopamine in the brain affects crucial functions such as memory, learning, concentration, and mood. Despite making up less than 1% of the brain's neurons, dopamine is essential for these functions. Maintaining a proper balance of dopamine is vital for both physical and mental well-being. A deficiency in dopamine can lead to medical conditions such as depression and Parkinson's disease[135].

Exercise stimulates the secretion of dopamine, improving mood and well-being while also enhancing attention. Dopamine is linked to motivation and focus. Studies have shown that regular exercise increases dopamine storage in the brain and promotes the production of enzymes that create dopamine receptors, leading to feelings of satisfaction following success. When there is demand, dopamine-related genes are activated to produce more, preparing the body for better control of addictions[136].

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[135] *https://www.reginamaria.ro/articole-medicale/dopamina-hormonul-fericirii*
[136] Spark: John Ratey, The Revolutionary New Science of Exercise and the Brain", LB, New York, 2008, p. 121

Serotonin is produced in the brain and gut from an amino acid. In the brain, it functions as a neurotransmitter, a chemical that facilitates communication between brain cells. Most of the serotonin in the blood is concentrated in platelets, from which it is released during the clotting process. The effects of serotonin are diverse throughout the body: it helps reduce sadness, regulate anxiety, promote wound healing, and plays a key role in regulating sleep, appetite, and digestion. When serotonin levels in the brain are low, depression can occur, while excessively high levels lead to overactivity of nerve cells[137]. Serotonin is also influenced by physical exercise and plays a key role in impulse control and maintaining self-esteem. It helps reduce stress by counteracting cortisol and stimulates cellular connections in the cortex and hippocampus, which are crucial for the learning process[138].

2. Types of Exercise and Their Effects on Brain Function

2.1. Aerobic Exercise

Aerobic activity promotes the formation of new nerve cells and enhances connections between neurons. However, the environment in which the exercise takes place can be just as important as the exercise itself. A growing body of research highlights the positive impact of nature on cognition and mental health[139]. Research evidence supports the idea that exercising in natural environments provides more benefits for the brain than exercising indoors[140]. Berman's results showed that, on a cognitive task performed after the walk, participants who walked in the forest performed better than those who walked in an urban environment. This led to the conclusion that nature played a key role in restoring cognitive resources depleted by the memory task[141].

2.2. Resistance Exercise

Studies show that resistance training supports higher cognitive functions[142], such as attention, decision-making, and planning. In addition to the benefits shared with aerobic exercise, resistance training reduces systemic inflammation, which can negatively impact brain health and is associated with neurodegenerative diseases[143].

3. Mindfulness exercises

Physical exercises have a significant impact on creativity in artists and on concentration and achieving the state of *flow*, described as total involvement in the creative act[144]. The concept of *flow* was developed by Mihály Csíkszentmihályi[145], who describes a psychological state of attention and maximum involvement. Creativity has been empirically linked to the experience of flow; therefore, the study

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[144] Gioia Chilton, Art Therapy and Flow: A Review of the Literature and Applications, *Art Therapy* 30 (2): 64-70, 2013
[145] Hungarian-American psychologist. He recognized and named the psychological concept of "flow," a highly focused mental state that leads to productivity

of flow has implications for the research and practice of art therapy.

The most suitable physical activities that can stimulate creativity are those in the mindfulness area. Yoga or Tai Chi combine movement with meditation, having effects on the brain areas responsible for self-control and relaxation. In one of her studies on the motor skills of artists, Ana-Cristina Leșe observed that biomechanics exercises for theater schools and the practice of Tai Chi can considerably influence the psychological and motor potential of actors in training, maximizing it and consequently improving professional performance.

The Tai Chi system includes elements of balance, coordination and flexibility. Also called energetic dance, the technique itself consists of connected movements, performed at a slow, gentle pace with the person, in harmony with breathing. The movement is continuous and harmonious, thus the individual accumulates a large amount of energy. Tai Chi is a form of meditation that is beneficial for the development of attention, memory and in general all mental and spiritual faculties. The systematic practice of these exercises results in balance, inner and outer harmony, coordination and perseverance.

The method as such involves learning and executing the movements fluently, they go harmoniously from one to the other in a continuous flow. The body weight moves alternately from the left foot to the right, while balance is always maintained by focusing on the abdominal muscles. This is also an aspect of Biomechanics for the theater. The benefits of Tai Chi are especially in the area of the body and mind. Thus, at the body level, the joints become more elastic, the muscles relax and the entire body becomes more supple and agile[146].

4. Conclusions

Regular physical activity, outdoor exercise or practicing a certain sport not only improves physical health, but also plays an essential role in supporting brain activity and maintaining emotional balance.

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