

The Role of Electronic Games in the Development of the Mirror Neuron System

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Dear Sir,

Executive functions are high-level cognitive processes that make the production of new behavior easier and develop a person's perspective on new situations that enable people to have a purposeful life. Some examples are: planning for the future, shifting from one task to another, or to inhibiting the desire [1].

A study on 3- to 6-year-old Chinese children, examined the relationship between electronic games and the three components: inhibition, working memory, and planning of executive function. They showed that time spent on electronic games on computers, consoles, mobile phones or tablets has a positive correlation with the overall executive function score, as well as the three components measured in this test [2].

One of the most important discoveries in neuroscience related to observational learning is the discovery of the mirror neuron system. It is thought that with the help of this system, one can understand the actions taken by others, and perhaps this system is responsible for our observational and imitative learning. Using magnetic stimulation and imaging techniques, researchers were able to provide evidence that human motor neurons are also capable of mirroring, that is, observing the movements of others activates the same circuits in us that if we do the same [3].

My 6-year-old daughter, after two months of attending pottery classes, when she first used a potter's wheel, was able to make an empty glass-shaped cylinder in a matter of minutes, much to the surprise of her experienced instructor; while children are usually able to do this after a few practice sessions. My daughter claimed that she knew how to make a glass with a potter's wheel because she had already played it on my cell phone. It is necessary to know that in order to be able to make a glass from mud clay with a potter's wheel, you must have an accurate picture of the shape of the glass and the steps of making it as a goal in working memory. Then form the motor part of your brain with the skill of hands and fingers and their coordination with the sensory part and the eye to the rotating mud clay.

In the above experience, learning has clearly taken place through observation and imitation, which is thought to be the function of the mirror neuron system, as well as the skills in planning, execution, and implementation in which the motor part of the brain and executive function are involved.

Based on the above studies and experience we suggest:

1. Electronic games cause the growth and development of the mirror neuron system by providing conditions for observational learning.
2. The mirror neuron system has a positive relationship with the motor part of the brain and its growth promotes the development and improvement of motor skills.
3. The mirror neuron system has a positive relationship with executive function and its growth causes the development of executive function and its working memory, inhibition, and planning components.

References

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