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FEATURES OF CHILDREN'S BRAIN DEVELOPMENT IN CONDITIONS OF LOW SOCIOECONOMIC STATUS (ON THE EXAMPLE OF LOW-INCOME FAMILIES)

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The family is a social environment that ensures the continuity of social life, the succession of generations, and the continuity of upbringing, and that exerts an influence on the future generation and the system of values. Family and family relations, especially the relationships between parents and children, have been among the most pressing issues since the earliest stages of human society and remain highly relevant today [1].

The modern family represents a unity of individuals connected through spousal relations and parent-child relationships. As the primary unit of society, it plays a special role in organizing household life, performing social functions, and ensuring the protection and satisfaction of the spiritual needs of the younger generation. It is well known that the family serves as the main source of information for an individual, on the basis of which a child's value orientations, spiritual needs, worldviews, attitudes toward family life, and understanding of spousal relationships are formed.

Modern research encourages a reconsideration of the popular saying "happiness is not about money." Neurobiologist and pediatrician Kimberly Noble and her colleagues have shown that a family's standard of living has a direct impact on children's cognitive abilities.

A large-scale study on brain development in children and adolescents was conducted in the United States, involving more than 1,000 children and adolescents from families with different socioeconomic backgrounds. The main focus of the study was the thin, folded outer layer of the brain—the cerebral cortex—which is responsible for a large part of complex cognitive activity. Previous studies had suggested that a larger cortical surface area is associated with higher intellectual development. However, the researchers identified another important factor influencing brain development—family income.

There is evidence that higher family income is associated with a larger cortical surface area. As is well known, these associations are related to cognitive skills, including language abilities (vocabulary and reading), as well as attention and self-regulation (self-control). It is easy to imagine the difficulties a child from a low-income family may face in the learning process. In fact, children growing up in poverty are more likely to perform worse on language and emotional tests [2].

Several important aspects of the study deserve special attention. First, the association between family income and children's brain structure is strongest in the lowest-income range. In other words, even small differences in income among the poorest families are associated with noticeable differences in brain structure in children. This can also be intuitively understood: for a family earning 150,000 dollars per year, an additional 20,000 dollars does not significantly change overall living conditions. However, for a family earning only 20,000 dollars per year, doubling that income has a substantial impact on quality of life.

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Second, the identified association does not depend on the child's age, gender, race, or ethnic background. Finally—and this is very important—there is considerable individual variability among children. The study found many children from high-income families whose cortical surface area was smaller than that of some children from low-income families, as well as the opposite cases. For example, although boys are generally taller than girls in childhood, in any primary school class there are also girls who are taller than boys. Thus, while family income may influence children's brain development, it should not be regarded as a universal rule or norm.

Let us imagine two children: one born into a poor American family and the other born into a more affluent family. At birth, there is no difference in how their brains function. However, by the time they reach kindergarten age, the cognitive abilities of a child from a poor family are known to be approximately 60 percent lower than those of a peer from a better-off family [3].

In addition, children from low-income families are five times more likely to drop out of school, and even if they complete school, their chances of obtaining higher education are significantly lower. When both children reach the age of 35, the likelihood that the child who grew up in poverty will also remain in a low-income family is 75 times higher. However, this does not have to be the case. According to neuroscientists, it is remarkable that experience can change the human brain. The concept of neuroplasticity shows that these differences in brain structure do not predetermine a child's fate.

Some estimates suggest that children from higher-income families hear, on average, about 30 million more words in the first years of life than children from low-income families. Research has shown that in children who engage in frequent and active communication with adults, the areas of the brain responsible for language and reading are larger [4]. In other words, the verbal communication environment at home is far more important than we often assume.

Therefore, the first, simplest, and most effective approach is to encourage parents to talk more with their children. This has a positive impact on brain development, and many researchers are actively exploring the potential of such interventions. For this reason, a group of researchers has proposed an important idea. They ask: what if we tried to support young children living in poverty simply by providing their families with a small increase in financial resources? Currently, a team of economists and neuroscientists is conducting the first large-scale study aimed at examining how family income levels affect children's brain development.

In May 2018, 1,000 mothers who had recently given birth and whose incomes were below the minimum living standard in the United States were selected for the study. According to the program design, these women receive monthly cash “gifts” during the first 40 months of their child's life, which they are free to spend as they wish. The amount of financial assistance varies depending on the family's income level and, in the researchers' view, on the needs required to improve quality of life (with the goal of increasing income by 20–25 percent).

The researchers hope that the results of this study will provide clearer answers to how family income affects children's brain development and how this situation can be improved during the first three years of a child's life, if possible. Definitive conclusions, however, can only be drawn after several years. Nevertheless, as the researchers emphasize, “even if we do not arrive at specific scientific conclusions, we will at least have provided financial support to these families.”

They further note that if their hypotheses are confirmed, the results of the study could serve as a basis for discussions about the level of social support needed for children's development and could affect the lives of millions of families with young children. In simple terms, if it can be

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demonstrated that an increase in family income also promotes brain development, the opportunities for a brighter future for children born into poverty will significantly expand.

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