

Social Isolation In Children: Neuropsychological Basis Of Emotional Intelligence And The Limbic System

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Abstract: This article analyzes the phenomenon of social isolation in children from the neuropsychological perspective of emotional intelligence and the functioning of the brain's limbic system. The study is based on contemporary scientific approaches in developmental psychology, affective neuroscience, and neuropsychology. In particular, the role of amygdala activity, prefrontal cortex regulation, and emotional regulation mechanisms in the formation of social behavior is examined. Furthermore, the article explores the impact of social isolation on children's psychological development and analyzes psychological models aimed at its correction and prevention.

Keywords: Social isolation, emotional intelligence, limbic system, amygdala, neuroplasticity, child psychology, emotional regulation.

Introduction: In modern psychology and neuroscience, social isolation in children is interpreted as a complex biopsychosocial phenomenon. This condition is associated not only with external social environment or educational factors, but also with a functional imbalance between the emotional and cognitive systems of the brain.

Recent studies show that the limbic system, especially the activity of the amygdala, plays a central role in the formation of social anxiety and avoidance behavior. According to Joseph Ledoux's research, the amygdala processes threat signals very quickly and prepares the body for automatic protective reactions.

According to D. Goleman's theory, emotional intelligence is one of the main psychological factors in ensuring a person's understanding, management of emotions and social adaptation (Goleman, 1995). Therefore, insufficient development of emotional intelligence in children can increase the tendency to social isolation.

Theoretical foundations

Limbic system and emotional processes

The limbic system is one of the complex neurophysiological systems that controls human emotional reactions, motivational states, and affective experiences. This system includes structures such as the amygdala, hippocampus, hypothalamus, and cingulate cortex. In particular, the amygdala forms the body's protective reactions by rapidly processing social and emotional signals coming from the external environment.

Social stimulus → Amygdala activation → Fear response → Escape strategy

According to the neuropsychological model developed by Joseph Ledoux, the amygdala detects a threat through a "fast track" mechanism before conscious analysis and prepares the body for an automatic emotional reaction. Although this mechanism has an evolutionary protective function, its excessive activity during childhood can lead to the formation of social anxiety, communicative avoidance, and emotional defensive reactions.

In such cases, the child:

- perceives social situations as dangerous;

- fears criticism or rejection;
- avoids communication with peers;
- limits social activity;
- experiences internal anxiety and psychological vulnerability.

If this psycho-emotional state lasts a long time, the neural connections associated with anxiety in the brain are strengthened. Based on the principle of neuroplasticity, repeated fear reactions gradually turn into a stable behavioral stereotype. As a result, the child begins to perceive the social environment as a constant source of danger.

According to Allan Shore's research, early emotional stress and social rejection can negatively affect the development of the limbic system and disrupt affective regulation mechanisms. This increases the tendency to develop depressive states, anxiety disorders, and social isolation in later periods.

According to Carl Rogers' theory of humanistic psychology, a child's healthy mental development is closely related to an environment of "unconditional positive acceptance." If a child does not feel valued, understood, and safe, internal anxiety increases and defensive emotional reactions occur. This can lead to excessive activation of the limbic system. Rogers believed that providing a child with genuine emotional support helps to develop a healthy self-concept. Therefore, creating a psychologically safe environment is an important factor in reducing social isolation and bullying.

Prefrontal cortex and emotional regulation

The prefrontal cortex is the central brain structure that controls higher mental functions of a person. This area performs complex functions such as decision-making, impulse control, planning, social adaptation, and emotional regulation. According to A. Luria's theory, conscious control of human behavior and goal-directed activity are associated with the activity of the prefrontal cortex. Since this system is not yet fully formed during childhood and adolescence, the child has difficulty effectively managing strong emotional reactions.

As a result, impulsive reactions increase; stress resistance decreases; the amygdala dominates in anxious situations; emotional balance is disrupted; social adaptation becomes difficult.

R. Davidson's studies show that the functional balance between the limbic system and the prefrontal cortex is one of the main neurobiological factors of psychological stability. If prefrontal control is weak, the hyperactivity of the amygdala increases, and the child responds to social situations with excessive defensiveness or fear.

A. Adler's theory of individual psychology also emphasizes that childhood "feelings of inferiority" and experiences of social rejection have a strong impact on personality development. According to Adler, if a child does not feel like a full member of society, compensatory protective reactions or social withdrawal may form. Adler sees the concept of "social interest" as an important criterion for human mental health. If a child does not feel his place in the community or is constantly rejected, internal anxiety and psychological instability develop. Therefore, developing social activity, cooperation, and a sense of belonging in children is important in reducing social isolation. Modern affective neuroscience research confirms that mindfulness, reflection, and emotional control exercises activate the activity of the prefrontal cortex and reduce the overreactivity of the limbic system. Therefore, developing emotional regulation is an important factor in enhancing social adaptation in children.

Emotional Intelligence Theory

The concept of emotional intelligence was interpreted by Mayer and Salovey as a cognitive ability related to the perception, understanding, management and effective use of emotions. Later, D. Goleman expanded this concept and interpreted emotional intelligence as one of the important determinants of a person's social success, leadership potential and psychological adaptation. According to him, children with developed emotional intelligence:

- can understand their emotions;
- manage negative emotions;
- show empathy;
- resolve conflicts constructively;
- establish healthy communicative relationships;
- can adapt to stressful situations.

Such children have a high level of stress tolerance and psychological adaptation. On the contrary, children with weak emotional regulation:

- aggression;
- social withdrawal;
- communication difficulties;
- internal anxiety;
- higher risk of becoming a victim of bullying.

According to A. Bandura's social learning theory, children learn emotional reactions and social behavior patterns by observing and imitating them. Therefore, family conflicts, an aggressive environment, or emotional coldness can negatively affect the development of a child's emotional intelligence.

According to V. Frankl's concept of logotherapy, one of the important factors of a person's mental stability is a sense of meaning in life. If a child feels worthless, alone, or disconnected from society, an existential void and internal psychological depression can form. Frankl emphasizes that one of the strongest human needs is the "need to find meaning." Therefore, giving a child a sense of social significance, recognizing his or her worth, and setting positive goals are important in strengthening emotional stability.

The views of K. Rogers, A. Adler, and V. Frankl show that not only biological stability is necessary for a child's healthy psychological development, but also emotional acceptance, social appreciation, and a sense of meaning in life.

Neuropsychological mechanisms

The formation of social isolation occurs on the basis of a complex neuropsychological chain (scheme):

1. Social stimulus



2. Amygdala activation



3. Fear or anxiety response



4. Formation of an escape strategy



5. Repetitive defensive behavior



6. Strengthening of neural connections



7. Social isolation and emotional withdrawal

This diagram represents the neuropsychological mechanisms of social isolation related to limbic system activity, emotional regulation, and neuroplasticity. This mechanism is explained by the principle of neuroplasticity. That is, repeated emotional reactions lead to the stabilization of certain neural pathways in the brain. The more a child avoids social situations, the more automatic this avoidance pattern becomes. Prolonged social isolation can lead to the following consequences:

- social anxiety disorder;
- depressive symptoms;
- low self-esteem;
- decreased communicative competence;
- feelings of emotional isolation.

Chronic stress also increases the activity of the hypothalamic-pituitary-adrenal system, leading to increased cortisol levels. This can negatively affect not only the psychological but also the physiological development of the child.

Empirical analysis

Modern neuropsychological, developmental psychology, and affective neuroscience studies demonstrate a complex and multifaceted relationship between social isolation, bullying, and emotional development in children. In recent years, the impact of social rejection on the functioning of the child's brain has been studied in depth using functional magnetic resonance imaging (fMRI), neurochemical monitoring, and affective neuroscience studies.

These scientific studies show that emotional experiences in childhood have a direct impact not only on psychological development, but also on the functional and structural formation of the brain. In particular, social rejection, bullying, and emotional coldness can lead to impaired limbic system function and a weakening of emotional regulation mechanisms.

1. Amygdala reactivity and the neuropsychological basis of social anxiety

According to the results of empirical studies, amygdala reactivity is higher in socially isolated children. Such children tend to perceive even neutral social signals as danger, rejection, or threat. As a result, stress reactions are activated more quickly and defensive behavior is formed in relation to social situations.

Joseph Ledoux's research scientifically substantiates the amygdala's "fast track" mechanism for detecting threats before conscious analysis. Richard Davidson argues that limbic system hyperactivity is the neurobiological basis for anxiety, emotional instability, and social avoidance strategies. Long-term social anxiety can lead to the following psychological conditions:

- communicative avoidance;
- elements of social phobia;
- low self-esteem;
- emotional defensiveness;
- internal psychological distress.

Chronic stress also increases the activity of the hypothalamic-pituitary-adrenal system, causing increased secretion of the hormone cortisol. This can negatively affect not only the emotional but also the physiological development of the child.

2. Emotional intelligence and psychological adjustment indicators

Empirical data show that there is a direct relationship between the level of emotional intelligence and social adjustment. Children with low emotional intelligence:

- social anxiety;
- communication difficulties;
- impulsive reactions;
- psychological vulnerability;
- a tendency to conflict is manifested to a higher degree.

According to the concept of J. Mayer and P. Salovey, the underdevelopment of the ability to understand and manage emotions leads to a weakening of adaptation mechanisms in stressful social situations. D. Goleman's research shows that the development of emotional intelligence is one of the important predictors of a child's psychological resistance, social success and communicative competence.

According to the humanistic psychology approach of K. Rogers, a healthy "self-concept" is formed only when a child develops in an environment of "unconditional positive acceptance". On the contrary, emotional coldness, constant criticism or rejection increase the child's internal anxiety and weaken the mechanisms of emotional regulation.

From this point of view, the development of emotional intelligence in children:

- stress tolerance;
- empathic ability;
- constructive conflict resolution;
- is one of the main psychological factors that enhances social adaptation.

3. The importance of family environment and emotional security

Empirical research shows that a supportive family environment is fundamental to a child's psychological stability and neuropsychological development. Children with secure emotional attachments have been shown to have lower stress responses and higher social adjustment.

According to John Bowlby's attachment theory, a child's early experience of emotional security forms the basis for their subsequent psychological development and social relationships. Affection, emotional support, and psychological security in the family stabilize the activity of the limbic system and contribute to the effective formation of prefrontal cortex control.

According to empirical observations: children with family conflicts have higher levels of anxiety; emotional neglect increases depressive symptoms..

□ parental support increases psychological resilience;

□ healthy family communication strengthens emotional regulation.

Carl Rogers also notes that a child's emotional acceptance is a decisive factor for his psychological health.

4. The psychological role of social relationships with peers

The presence of healthy communicative relationships with peers is one of the important determinants of a child's emotional development and social adaptation. Children who have a sense of social support have higher self-confidence, communicative competence, and psychological stability. According to A. Adler's theory of individual psychology, one of the main criteria for human mental health is the feeling of "social interest". If a child feels needed and valued in a team, a sense of belonging is formed and psychological adaptation is

enhanced. On the contrary, cases of rejection or bullying by peers can lead to the following consequences:

- 1) Social withdrawal;
- 2) Aggressive defensive reactions;
- 3) Emotional depression;
- 4) Communicative fear;
- 5) Feeling of loneliness.

Therefore, the formation of a healthy communicative culture in the school environment is an important condition for ensuring the psychological safety of children.

5. The impact of social isolation on cognitive and reflexive development

According to J. Piaget's theory, a child's cognitive development is shaped by active social experience. L. Vygotsky emphasizes that the main source of development is social interaction. Therefore, social isolation slows down not only the emotional, but also the intellectual, communicative and reflexive development of the child. Restriction of social activity has a negative impact on:

- flexibility of thinking;
- reflexive thinking;
- empathic ability;
- speech and communicative competence;
- problem solving skills.

Modern research shows that social activity and healthy communicative experiences are important factors that stimulate the development of neural connections.

6. Bullying, cyberbullying, and long-term psychological trauma

Recent studies have shown that bullying, cyberbullying, and social rejection in school environments can lead to long-term psychological trauma in children.

In particular, chronic bullying exacerbates the following negative consequences::

- depressive symptoms;
- social anxiety disorder;
- affective dysfunction;
- low self-esteem;
- emotional isolation.

A. Shore's research scientifically substantiates the fact that early psychological traumas negatively affect the development of affective regulation systems. Also, according to V. Frankl's theory of logotherapy, a person's mental stability is closely related to his sense of the meaning of life.

In cases of bullying and social rejection, a child:

- unworthy;
- alone;
- isolated from society;

• may feel psychologically vulnerable. This can lead to existential emptiness, inner depression, and psychological instability.

According to Frankl's concept, the formation of a sense of social significance in children, their appreciation and psychological support are one of the important factors that strengthen mental resistance.

7. General scientific conclusions of the empirical analysis

The above scientific results show that the problem of social isolation and bullying in children is not only a pedagogical or behavioral problem, but also a complex phenomenon with neuropsychological, affective and social determinants. Therefore, the following areas are of priority in modern psychology:

- a) ensuring the emotional safety of children;
- b) developing emotional intelligence;
- c) implementing anti-bullying preventive programs;
- d) strengthening family psychological support;
- e) developing a psychological monitoring system in schools;
- z) implementing neuropsychological correction methods in practice.

This integrative approach is one of the important scientific and practical foundations for ensuring healthy emotional development, psychological stability and social adaptation in children.

Correction and intervention models

Development of emotional regulation

Development of emotional regulation is one of the most important psychological areas in reducing bullying and social isolation in children. Studies show that children who are able to understand and manage their emotions

have significantly lower levels of aggressive behavior and social withdrawal. Therefore, it is recommended to widely use mindfulness, breathing control, emotional reflection and self-observation techniques in practical psychological work.

Mindfulness exercises focus the child's attention on the "present moment", reduce the overexcitability of the amygdala and activate the activity of the prefrontal cortex. As a result, the child learns to respond consciously and in a controlled manner instead of impulsive reactions. The following are effective practical exercises:

- "Naming the emotion" technique;
- deep diaphragmatic breathing exercises;
- "What am I feeling right now?" reflexive question;
- emotional journaling;
- body relaxation exercises.

These methods reduce anxiety in children who are victims of bullying and form a sense of psychological protection.

Gradual exposure therapy

Children who are bullied often develop a strategy of avoiding social situations. This leads to the amygdala coding the social environment as a "danger zone". The gradual exposure method used in cognitive-behavioral therapy helps to reshape these fear reactions.

The essence of this method is to gradually involve the child in small, safe and controlled communicative situations, rather than in a complex social environment at once. For example:

- individual interview with a psychologist;
- small group discussion;
- pair-based tasks;
- participation in general class activities;
- short public speaking.

During this process, the child relearns at the neuropsychological level that social situations are not dangerous. As a result, the protective reactions of the amygdala gradually weaken and social trust is formed.

Optimization of the family environment

According to D. Bowlby's attachment theory, the child's initial emotional security is the fundamental basis for

subsequent social development. Coldness, constant criticism or emotional neglect in the family form an anxious attachment model in the child. This increases the risk of becoming a victim of bullying or developing aggressive behavior.

Therefore, it is important to conduct psychoeducational training with parents in correctional work. Parents are recommended to develop the following skills:

- a) active listening to the child;
- b) emotional support;
- c) education based on explanation rather than punishment;
- d) creating a safe communicative environment;
- d) not denying the child's feelings.

Research shows that family support helps stabilize the limbic system and reduce stress hormones.

Social skills training

Social skills training is particularly important in reducing bullying. Because many children do not know enough about healthy conflict resolution, empathy, or protecting their boundaries.

The following competencies are developed during the training:

- empathy and understanding of others;
- assertive communication;
- conflict-solving culture;
- teamwork;
- emotional expression and listening culture.

Role-playing, dramatization, group discussion, and "situational training" techniques are particularly effective. For example, scenario exercises such as "What would you do if you were teased?" or "How would you defend a friend?" enhance children's psychological preparedness.

School-wide prevention programs

It is important to view bullying not only as an individual problem, but also as a product of the school's social environment. For this reason, school-wide prevention programs are highly effective. Such programs include:

- 1-Development of anti-bullying policy;
- 2-grade-anonymous referral system;
- 3-grade-psychological monitoring;

4-grade-training for teachers;
5-grade-“peer mediators” program;
6-grade-emotional intelligence lessons.

In particular, the Olweus anti-bullying program used in Scandinavian countries has been scientifically proven to significantly reduce school violence.

Discussion

Social isolation and bullying are multi-layered phenomena that result from a complex integration of biological, psychological and social factors. Limbic system hyperactivity, amygdala overreactivity and weak prefrontal control increase anxiety, aggression or social withdrawal reactions in children. Also, insufficient development of emotional intelligence reduces children's ability to resolve conflicts constructively. As a result, bullying manifests itself not only as a social, but also as a neuropsychological problem. From this point of view, solving the problem only through disciplinary measures or punishment is not enough. For effective correction, an integrative biopsychosocial model is necessary, in which:

- neuropsychological approach;
- development of emotional intelligence;
- family therapy;
- school prevention;
- social skills training should be used together.

This comprehensive approach helps to form a sense of psychological security in children and ensure healthy social adaptation.

Conclusion

From the point of view of modern neuropsychology, the formation of social isolation in children is explained by the complex functional relationship between the activity of the limbic system, the development of emotional intelligence and the social environment. Studies show that excessive reactivity of the amygdala, weak control of the prefrontal cortex and insufficient formation of emotional regulation mechanisms increase the tendency to social anxiety, communicative withdrawal and social isolation in children. The studies of J. Ledoux and R. Davidson scientifically substantiate the central role of the limbic system in stress and fear reactions. According to the concepts of D. Goleman and Mayer and Salovey, the development of emotional

intelligence is one of the important psychological factors determining the social adaptation of a person, stress resistance and the quality of interpersonal relationships. The results of this study show that emotional experiences in childhood directly affect the formation of neural systems of the brain. In particular, emotional support in the family, secure attachment, and a healthy communicative environment are the main factors that strengthen the stability of the limbic system. John Bowlby's attachment theory also emphasizes that the child's early socio-emotional experience is of fundamental importance for subsequent psychological development.

Also, according to the theories of L. Vygotsky and J. Piaget, a child's psychological development is shaped by social interaction. Therefore, social isolation negatively affects not only the child's emotional state, but also his cognitive and communicative development. However, the principle of neuroplasticity, substantiated by modern neuroscience, shows that the human brain is a changeable and adaptable system. This allows for effective correction of the consequences of social isolation and bullying through targeted psychological interventions, emotional intelligence training, cognitive-behavioral therapy, mindfulness exercises, and social skills programs. Scientists, including A. Shore, note that an emotionally safe environment plays a crucial role in the development of a child's affective regulation and psychological stability. From this point of view, integrative cooperation between school, family and psychological service systems is one of the most important factors in forming a sense of social security in children. In conclusion, disciplinary or pedagogical measures alone are not enough to eliminate the problems of social isolation and bullying in children. It is necessary to look at this problem as a complex system based on a biopsychosocial and neuropsychological approach. Developing emotional intelligence, strengthening healthy family relationships, implementing anti-bullying programs in schools, and ensuring the psychological safety of children are among the urgent scientific and practical tasks of today.

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