



## EMOTIONAL FACTORS AS A PSYCHOLOGICAL DETERMINANT OF THE FORMATION OF STUDENTS' CRITICAL THINKING SKILLS

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**Abstract:** This article scientifically and psychologically illuminates the impact of emotional factors on critical thinking skills. It also analyzes the mechanisms by which other factors influence the thinking process, and explores ways to enhance educational effectiveness as a result of developing critical thinking skills.

**Keywords:** critical thinking, emotional intelligence, cognitive, affective, educational environment, neurobiological.

Today, the development of students' intellectual potential in the higher education system is traditionally aimed at developing cognitive abilities, specifically skills in logical analysis, argumentation, and problem-solving. However, an analysis of modern psychological research shows that the process of critical thinking is part of a complex system that cannot exist in isolation from emotional states. Students' perception of information, its analysis, and inference are closely linked to their emotional intelligence (EI) and current affective states.[1, 2, 3] This article analyzes the role of emotional factors in the formation of critical thinking skills from neuropsychological, cognitive, and pedagogical perspectives, highlighting the mechanisms for the integrated development of these two components within the higher education environment.

To understand the relationship between critical thinking and emotions, it is necessary to look at the phylogenetic history of humanity. From an evolutionary perspective, emotional reactions were formed long before complex critical thinking abilities, ensuring the organism's rapid adaptation to external threats. In modern psychology, this relationship is interpreted not as the opposition of "passion and reason," but as two complementary parts of a single system.[4]

The human mind often relies on automatic, emotional, and heuristic processes. Heuristic techniques put forward by Nobel laureates Daniel Kahneman and Amos Tversky suggest that people are more likely to trust emotional cues that conserve energy than deliberative logic, which is metabolically "expensive." [4] This "cognitive saving" is also characteristic of students, who often rely on affective heuristics when performing complex analytical tasks.[5] However, students with high emotional intelligence have the ability to control these automatic processes and direct them toward purposeful critical analysis.[1]

There are several fundamental theories explaining the formation of emotions and their impact on thinking, each of which holds a unique significance in the process of critical thinking:  
1 table.

The name of the theory	Central mechanism	Impact on critical thinking

<b>James-Lange theory</b>	Physiological arousal triggers emotion.	The student's physical state (stress, fatigue) determines their analytical abilities.
<b>Cannon-Bard theory</b>	A physiological reaction and an emotion occur simultaneously.	Emotional and cognitive processes process information in parallel..
<b>Schachter-Singer (two-factor) theory</b>	Physiological arousal is explained cognitively.	Whether a student evaluates their excitement as "interest" or "fear" determines their analytical depth..
<b>Lazarus's cognitive evaluation theory</b>	Thinking precedes emotion.	The initial analysis of the situation (risk or opportunity) shapes the subsequent emotional attitude..

All these theories show that a student's emotional state is not merely a background accompanying their cognitive activity, but an integral part of it.

Emotional intelligence (EI) is the ability to understand one's own and others' emotions, manage them, and use this information to guide thinking and behavior.[3, 6] Studies show a significant positive correlation between emotional intelligence and critical thinking (CT).[1, 2] For example, in a study of nursing students, the correlation between EI and CT was  $r=0.683$ , proving the direct impact of emotional stability on analytical effectiveness.[2]

Various components of emotional intelligence reinforce the specific aspects of critical thinking:

1. Self-awareness: The student understands their subjective views and biases. This aligns with the "intellectual honesty" principle of critical thinking.[1]
2. Emotional regulation: The ability to prevent strong emotions (anger, excitement) from disrupting the logical chain. This helps preserve cognitive resources.[2,]
3. Empathy and social awareness: Understanding other people's points of view, which allows for perspective-taking of the problem.[1, 7]
4. Motivation: The inner drive necessary to continue the analysis in complex and uncertain situations.[6]

<b>EI component</b>	<b>Degree of association with CT (r)</b>	<b>Mechanism of action</b>
Cognitive maturity	0.43	The search for the possibilities of cause and openness.
Engagement	0.42	Intellectual curiosity and the pursuit of truth.
Innovation	0.43	Awareness of the complexity of the problem and openness to new ideas.
Social awareness	0.33	Understand how the emotions of others influence beliefs.

This data suggests that by learning to manage their emotions, a student not only achieves mental peace but also increases their analytical power.[1, 8]

The Affect Infusion Model (AIM), developed by Joseph Forgas, is the most powerful theoretical model explaining the extent to which emotions are "infused" into cognitive

processes. According to this model, the more complex and novel the task, the more strongly the student's mood influences their conclusions.

Forgas divides cognitive activity into four strategies, each of which is differently sensitive to emotional impact:

1. Direct access: When a student is answering a simple and familiar question (for example, mentioning their favorite dish), their current mood does not influence their decision.[9]

2. Motivated processing: When a student desperately wants to achieve a specific result (for example, in defending their incorrect argument), they seek only information that serves their purpose. Here, too, the effect of mood is low, as attention is "directed." [9]

3. Heuristic processing: The student answers based on the question "What am I feeling right now?" due to a lack of time or resources. Here, emotions act as a "shortcut" in decision-making.[9]

4. Substantive processing: This is the highest level of critical thinking, where the student must deeply analyze information, search for and synthesize new evidence from memory. Paradoxically, it is at this level that the influence of emotions is greatest. The student's mood causes the activation of "affect-congruent" (mood-corresponding) information in their memory. For example, a student in a depressed mood sees only the negative aspects of the problem, while a student in high spirits notices more opportunities.

This model provides an important conclusion for higher education teachers: "neutralizing" or positively directing students' emotional states before assigning complex logical tasks can fundamentally change the quality of analysis.

The connection between critical thinking and emotions is also reflected in the physiological structure of the brain. Neurobiological studies indicate that cognitive control and emotional reactions are governed by the closely interconnected centers of the brain.

Integrated brain system:

- Prefrontal cortex (PFC): This part of the brain is responsible for concentration, decision-making, planning, and logical reasoning. It is the "engine" of critical thinking.[3]
- Lymbic system (Amygdala): This area generates primary emotions such as fear, anger, and excitement. The amygdala quickly evaluates external stimuli as "dangerous" or "beneficial." [3]

In healthy analysis, the PFC controls the activity of the amygdala. However, if the student is in a state of severe stress or anxiety (Foreign Language Anxiety, exam fear), the amygdala "blocks" the activity of the PFC. This condition is known in psychology as "amygdala hijack." [2] As a result, the student temporarily loses the ability to understand and analyze logical arguments, as all cognitive resources are spent on "survival" (e.g., avoiding the audience or defending oneself).

Individuals with high emotional intelligence have stronger neural connections between the PFC and the amygdala, allowing them to resolve emotional pressure in favor of cognitive analysis through "top-down" regulation.[3]

The process of forming students' critical thinking in the higher education system of Uzbekistan has its own socio-psychological characteristics. In particular, the work conducted by researchers from Bukhara State University (Umida Fayzieva et al.) demonstrates a deep connection between the emotional state of students and their professional mastery.[10]



Research group	Key find	Psychological indicator
General students	Pre-exam stress	70% feel depressed and nervous.
Military cadets	Emotional maladaptation	High stress level, low analytical attention.
Pedagogical students	Socio-emotional adaptation	Positive perception of oneself and others is high.
Junior students	Escapist tendency	A tendency to avoid problems instead of solving them.

These data indicate that ensuring emotional stability in teaching critical thinking is a priority for students in Uzbekistan.[10, 11] High levels of anxiety among students prevent them not only from achieving academic performance but also from being skeptical and analytical about information. The lack of "social intelligence" and "emotional intelligence" in pedagogical activity causes students to succumb to emotional impulsivity instead of making logical decisions in conflict situations.[10,]

Critical thinking is not just an intellectual act, but a combination of physical and psychological resources. MDPI research indicates that cognitive-affective processes are strongly influenced by the following factors [12]:

1. Sleep quality and cognitive load: Lack of sleep limits working memory and disrupts emotional reactions. Instead of getting to the bottom of the problem, the exhausted student is forced to make superficial (heuristic) decisions.[12, 13]

2. Proper nutrition and physiological resilience: Deficiencies in omega-3 acids and antioxidants decrease brain neuroplasticity, which undermines cognitive flexibility based on new evidence.[12]

3. Cognitive biases: "Confirmation bias" — a student only sees evidence that supports their existing emotional beliefs. This is the antithesis of critical thinking.

4. Fear of Uncertainty: Critical thinking often requires seeking answers to ambiguous and complex questions. An emotionally vulnerable student becomes anxious about this uncertainty and seeks to find the "only correct answer" as quickly as possible (even if it is incorrect).[13]

To foster critical thinking in students, the classroom should be a "psychologically safe zone" rather than just a place where information is provided.[28, 29]

Stages of psychological safety (Clark's model):

- Inclusive safety: The student considers themselves a full member of the group, and their personality is respected.

- Learning safety: The student is not afraid to ask questions, say "I don't know," and make mistakes. A mistake is seen not as a punishment, but as a point of growth.

- Safety of contribution: The student will have the courage to use their knowledge to introduce something new to the discussion.

- Security of objection: This is the highest level of critical thinking, where the student can "respectively" question the opinion of the teacher or the textbook and propose alternatives.

The teacher must set an example through their emotional openness, admit their mistakes, and reward the students' critical feedback. This reduces affective filters in students and allows them to focus on full logical analysis.

Cognitive effectiveness of emotional regulation techniques

Students must possess specific emotional regulation (ER) tools to manage their cognitive processes. In psychology, two main approaches are distinguished: Cognitive Reassessment and Awareness.[14, 15]

#### Cognitive reassessment

This is a CBT (Cognitive Behavioral Therapy) technique where the student learns to change their negative thinking patterns. For example, converting the thought "I can't solve this complex problem, I'm a failure" into the format "This problem is new to me for now, but if I analyze it in parts, I will understand it."

- Mechanism: This method frees up cognitive resources and directs the student toward problem-solving instead of avoiding it.

Mindfulness is the ability to observe one's emotions without judgment. Research indicates that mindfulness exercises improve students' concentration and maintain working memory volume.[15, 16]

Students who regularly use these techniques make fewer cognitive errors when performing complex logical operations.[14, 16]

In the modern era of "post-reality," information algorithms and social networks manipulate a person's thoughts by exploiting their emotional subtleties.[12, 16] For students, critical thinking is no longer just about knowing logical patterns, but about turning their emotional reactions into an information filter.

The "dual-dimensional model" suggests that cognitive and emotional education in higher education should be carried out in collaboration.[16] Only through awareness of emotions can a student resist the affective charm of "fake" news. In the future, strategies for developing critical thinking should also include artificial intelligence (AI) and digital literacy, explaining to the student how algorithms can change opinion through emotions.[12]

#### Conclusion

The process of developing students' critical thinking is inseparable from their emotional intelligence and the ability to manage their affective states. This research report indicates that emotional factors are not merely a companion to the cognitive process, but serve as its energetic foundation and guiding filter.

#### Key takeaways:

- Students with high emotional intelligence allocate cognitive resources more efficiently when performing complex logical tasks and are less prone to bias.[1, 2]

- Joseph Forgas's AIM model proves that the highest levels of critical thinking (substantive processing) are the areas most exposed to emotional impact, highlighting the importance of a positive emotional climate in education.

- In the context of Uzbekistan, high levels of exam stress and nervousness among students (70%) prevent them from fully demonstrating their analytical potential.[10]

Psychological safety and emotional regulation techniques (Mindfulness, Cognitive Reappraisal) are key tools for creating a critical environment in the audience.[15]

The main recommendation for the higher education system is that critical thinking development programs should include emotional intelligence training alongside logic lessons, and teachers should provide the affective support necessary for students to achieve the psychologically safe environment stage.

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