UNIVERSIDAD & SOCIEDAD
Presentation date: February, 2025
Date of acceptance: April, 2025
Publication date: June, 2025

STRATEGY-BUILDING,

GUIDANCE AND DECISION-MAKING IN ADOLESCENT COGNITIVE ACTIVITY: APPLICATION OF OPERATIONS

CONSTRUCCIÓN DE ESTRATEGIA, ORIENTACIÓN Y TOMA DE DECISIONES EN LA ACTIVIDAD COGNITIVA ADOLESCENTE: APLICACIÓN DE OPERACIONES

Limunet Shafi Amrahli
E-mail: limunet@mail.ru
ORCID: https://orcid.org/0009-0009-0022-1325
Psikhogamma LLC. Azerbaijan.

Suggested Citation (APA 7th Edition)

Amrahli, L. S. (2025). Strategy-building, guidance and decision-making in adolescent cognitive activity: application of operations. *Universidad y Sociedad, 17*(3). e5236.

ABSTRACT

The cognitive activity of adolescents during the learning process is a critical area of research in psychology, particularly given the increasing emphasis on results-oriented education. Despite the longstanding history of investigating psychological foundations in learning, a notable gap exists regarding the specific influence of psycholinguistic systems on this cognitive development. This study aims to explore how these systems, which encompass the thought constructions relevant to adolescents, impact their learning experiences and problem-solving abilities. Key findings indicate that facilitating a structured educational environment promotes self-discovery, personal exploration, and self-determination in both verbal and non-verbal forms. This enhancement leads to the enrichment of cognitive constructs and the strengthening of the psycholinguistic system. Ultimately, the study suggests that integrating cognitive, emotional, and psychomotor skills in modern curricula, aligned with developmental taxonomies, is essential for fostering comprehensive cognitive skills in adolescents. The implications are significant for educators seeking to optimize learning outcomes through tailored instructional strategies that address the nuanced cognitive needs of adolescents.

Keywords: Cognitive nature, Learning process, Cognitive activity of adolescents, Need for self-development and self-affirmation, Psycholinguistic system.

RESUMEN

La actividad cognitiva de los adolescentes durante el proceso de aprendizaje es un área crítica de investigación en psicología, especialmente dado el creciente énfasis en la educación orientada a resultados. A pesar de la larga trayectoria de investigación de los fundamentos psicológicos del aprendizaje, existe una brecha notable en cuanto a la influencia específica de los sistemas psicolingüísticos en este desarrollo cognitivo. Este estudio busca explorar cómo estos sistemas, que abarcan las construcciones de pensamiento relevantes para los adolescentes, impactan sus experiencias de aprendizaje y sus habilidades para la resolución de problemas. Los hallazgos clave indican que facilitar un entorno educativo estructurado promueve el autodescubrimiento, la exploración personal y la autodeterminación, tanto verbal como no verbal. Esta mejora conduce al enriquecimiento de los constructos cognitivos y al fortalecimiento del sistema psicolingüístico. En definitiva, el estudio sugiere que la integración de las habilidades cognitivas, emocionales y psicomotoras en los currículos modernos, en consonancia con las taxonomías del desarrollo, es esencial para fomentar habilidades cognitivas integrales en los adolescentes. Las implicaciones son significativas para los educadores que buscan optimizar los resultados del aprendizaje mediante estrategias de instrucción personalizadas que aborden las necesidades cognitivas específicas de los adolescentes.

Palabras clave: Naturaleza cognitiva, Proceso de aprendizaje, Actividad cognitiva de los adolescentes, Necesidad de autodesarrollo y autoafirmación, Sistema psicolingüístico.

INTRODUCTION

Issues related to strategy building, orientation, and decision-making in adolescents during the learning process are currently one of the main research topics in cognitive psychology. The primary reason for the increased interest in this problem is the growing emphasis on results-oriented education. To achieve effective results in the learning process, cognitive activity should be organized purposefully and in stages (Chambers & Norton, 2016; Fombouchet et al., 2023; McLachlan et al., 2022). For example, Piaget, when explaining the stage-by-stage development of intellectual activity, approaches the issue from the perspective of genetic intelligence development. He considers intellectual operations as the "heavy artillery" of mental actions and believes that during the concrete operations period, children and adolescents direct all their genetic capabilities toward real actions. These actions, and their results, contain elements of the real world.

Fleyfell (1967) divides the structure of concrete operations mentioned by J. Piaget into two important parts:

a) Logical-mathematical operations.

b) Comprehension operations.

To understand J. Piaget's concept of cognition, Fleyfell considers sensorimotor and operational learning, which originally lacks psychological roots. He argues that more abstract structures are necessary beyond the pre-operational phases (middle childhood and adolescence). According to Piaget, general transformations convert a child performing sensorimotor movements into a pre-operational child. These movements are repeated with the same precision in the concrete operational stage as in pre-operational children. This is made possible by four key areas of intellectual growth: conservation, classification, serialization, and transformation (Fleyfell, 1967).

Bruner states that to make more accurate decisions during action, the entire movement must proceed through a series of processes sequentially from beginning to end (Bruner, 1977). Gaaz recommends analyzing the psychological essence of movements occurring during cognitive activity stages primarily from a qualitative perspective: "The analysis of the movement process allows us to reveal the quality of the specific dynamic structure that forms the activity: familiarization, control, execution, and correction" (Gaaz, 2003). On this basis, the process of movement realization in cognitive activity can be characterized as including familiarization, control, execution, and correction. This involves concentrating on the action's main points: its structure, subject, object, procedure, conditions, and realization within the external environment, as well as decision-making.

Regarding the training process, attention is primarily focused on perception activity (learning and assimilation). Perception activity is grounded in cognitive processes. Concurrently, numerous psychomotor movements and other psychological components are also involved. The components engaged in cognitive activity perform three crucial tasks:

1. Developing a strategy to correctly direct cognitive activity: determining principles, planning work, allocating work form, conditions, methods, means, and resources.
2. Familiarizing with conditions, movements, and processes intended for cognitive activity, and adapting to their implementation style.
3. Making decisions, reaching conclusions, and making assessments.

Each of these stages is implemented through cognitive actions. To clarify the process, in this article we will separately examine what occurs in the intellectual and motor stages of cognitive activity.

DEVELOPMENT

Cognitive activity begins with the definition of strategies. Although the concept of "strategy" originally belongs to the military field, it has long been widely used in social sciences, including psychology. In psychology, this concept refers to planning, control, a general plan of action, and self-determination (Fernandez & Guilbert, 2024). It is explained as the ability to perceive obstacles, means, and potential successes. Cognitive psychologists also frequently use the concept of strategy as a "style of action" and a "strategy of perception". The concept of strategy is analyzed both in terms of its content and results, as well as its dynamics and process (Amrahli, 2018). The completeness, consistency, and speed of the strategy are key characteristics. After the system of actions established in the strategy is implemented, these actions are transformed into a skill through specific habits. In this context, a habit becomes a compressed, shortened, automated microstrategy that reveals the structure of the activity. The strategy of perception can also be understood as a concept that accompanies individual operations and is carried out through internally and externally established activities.

Researchers such as D. Bruner and L.S. Vygotsky have studied the role of strategy in the human psyche. They proposed a model based on cognitive abilities, searching for the elementary link related to its construction. Kobozeva (2011) further refined this model, identifying areas where a

well-established strategy based on cognitive abilities and personal experience substructures has an impact:

1. Intellectual and behavioral strategies are developed through understanding.
2. Behavioral style is developed (for example, through training that cultivates a specific type of intelligence and addresses business operational issues).
3. Activities aimed at enhancing behavioral flexibility and more efficient brain organization.
4. Development of higher mental functions (attention, memory, thinking, speech, etc.).

K. Pribram connects the continuity and stability of the cognitive system to external influences on cognitive actions. He argues that movement can only occur because it is "connected" or "in agreement with the 'field of external powers'" (Pribram, 1975). Pribram emphasizes that this idea should be understood as a mutual relationship between the influences exerted on cognitive actions and the components within the structure of those actions. K. Pribram refers to these elements as "explorers" and "representatives". According to the author, this connection specifically stimulates or inhibits cognitive activity (a phenomenon that can be compared to magnetism). This system functions particularly well in gifted students. Their intellectual and psycholinguistic systems are activated by sudden stimuli to obtain new information, process it, and generate innovative ideas (Rakesh et al., 2024). Consequently, effective and result-oriented cognitive activity is considered the primary condition for creative potential. It can be approximated as shown in Equation 1.

$$\text{Attention} + \text{Motivation} + \text{Interest} + \text{Situation} = \text{Productive outcome} \quad (1)$$

Galperin (1998) outlines the following requirements for organizing training to formalize the organization of mental activity in stages:

1. Explain the purpose of the work, including its direction and implementation.
2. Indicate the means of organizing work and rules of conduct.
3. Describe the work verbally, reflecting all elements in speech.
4. Determine the student's individual work style and select development tools.
5. Assess the student's attitude toward the chosen task and initiate work.

Galperin and his followers prioritize the analysis-composition and explanation-comprehension stages in organizing training to ensure effective results. They emphasize that the quality organization of these stages is the primary condition for effective learning. "Familiarization" in cognitive activity (explored by C. Bruner, P.R. Galperin, J. Piaget, and others) is one of the most crucial concepts in theories of planned mental action formation. P.R. Galperin, through research on the psychological and material content of the cognitive aspect of conscious action, argues that each action comprises a guiding and executive part. He incorporates familiarization into the psychological content of the action, asserting that the nature and success of execution directly depend on the guiding part of the action. According to Galperin, the concepts of "guiding activity", "cognitive part of the action", or "familiarization" represent complex realities inherent in the movement process:

1. First, it involves the genesis of a series of movements that allow independent assimilation or clarification of the movement procedure.
2. Second, it is the process of obtaining information about the situation while the subject performs the movement.

The first complete associations of processes in cognitive activity are manifested in cognitive-research activity. A.I. Podolsky explains P.Y. Galperin's perspective on the sequence and connection of cognitive processes:

According to this researcher, the task of perception is to understand the existing situation and its objective nature. Memory aims to restore the past, solving tasks related to past reconstruction. Thinking is viewed as a process that finds and solves problems hidden from perception. (Podolsky, 2002).

Guided-research activity involves obtaining and processing information from the surrounding world. In such activity, a person explores their inner world, acquiring new abilities related to information formation and movement. When examining approaches to familiarization in the context of activity and movement, several key theses emerge.

P.R. Galperin conducted research on the psychological content and subject matter of the familiarization part of conscious movement. He asserts that each action comprises a guiding and executive part. Galperin includes the guiding part in the psychological content of the action, emphasizing that the nature and success of execution directly depend on this guiding component. The guiding part of the action is a crucial element in theories of planned mental action formation. According to Galperin (1998), "guiding activity", "the part of introduction to the subject", or "familiarization" itself represents complex realities characterized by:

1. The genesis of a series of actions involving independent mastery or clarification of the action procedure.

2. A process related to the situation in which the subject performs the action.
3. The process of obtaining situational information.

Galperin also defines the sequence and system of processes in the act of familiarization as follows:

1. Perception of information.
2. Categorization of information.
3. Ability to assess the information's essence in satisfying the subject's actual needs.

He argues that these are brain activities, not those of the subject. This forms the basis for the ability to perform actions aimed at mastering a procedure or achieving independent clarification. It represents the stage where the subject obtains information about the action's situational context. Consequently, familiarization is focused on providing relevant, goal-oriented, and operation-related settings. The familiarization stage in cognitive activity constitutes a comprehensive system of actions, with its entire course built upon these systematic actions.

Thus, anaction combines guiding, executive, control, and correction parts. The strategy is realized through guiding actions. As the action is performed, it occurs, progresses, and differentiates. This process involves the action's character, procedurality, structure, and other components. The subject of the action is an individual prepared and capable of performing that action, encompassing their knowledge, skills, abilities, motivation, action setting, and other action components. Ultimately, this structure forms a cognitive system.

Gaaz (2003) argues that analyzing the movement process reveals the quality of the dynamic activity structure: orientation, control, execution, and correction. He explains that guiding activity involves the subject's investigation of the situation, its conceptual and functional essence:

The subject measures the appropriateness of their actions, changes their form, confirming or modifying their nature. During the action's execution, objects are actively arranged in a slightly modified, updated way. As in the initial movement, the object, means, external conditions, and the individual as the movement's subject receive information. Gaaz (2003).

The cognitive system is formed on this basis. Gaaz describes the guiding actions in cognitive activity as:

1. Studying a new situation that creates changes in meaning and functionality of known information about objects and events, or confirms existing understanding.
2. The subject examining their own movements, observing changes in appearance, and noting new or restored paths during the movement process.
3. Actively regulating movement by updating it according to the nature of objects.

It is noteworthy that internal, psychic movement components are structured in an external, material form. These are qualitatively distinct from mental components, representing mental processes that constitute the brain's "activity" rather than the subject's direct actions (Getzzg, 2024). The "executive part in cognitive activity" (explored by C. Bruner, P.R. Galperin, J. Piaget, and L.S. Vygotsky) corresponds to theories of staged (planned) mental action formation. When considering psychological activity and mental operations, the actions occurring during this activity must be understood as mental actions. The performance of the afferent part of an action may require the subject to execute multiple information-receiving acts. Interestingly, the same act can simultaneously function as both an executive and an afferent action, a phenomenon substantiated by theories of staged mental action formation. In such cases, one act serves as the primary action, while the other functions as its fragment.

"The Controlling Part in Cognitive Activity" (J. Bruner, N.A. Leontiev) represents the essence of familiarization and a continuation of the subject's execution. It receives information about the adequacy of the action and its potential result, using this information to prepare for subsequent actions or make corrections. While the guiding part of an action aims to obtain information about its main structural points, the controlling part seeks to understand the nature and sequence of intermediate products and actions. In this context, control completes the familiarization process and functions as an organizational component of the action. "Corrective Part of Cognitive Activity" is characterized by action repetition with nuanced aspects. The corrective action focuses not on the complete product but on specific work stages or sections (such as essay parts, continental geographical analysis). During this process, the action's conditions, means, execution time, and quality evolve with each iteration.

The primary reasons for correction include:

1. Reflection..
2. Psychological adaptation of the locomotor area.
3. Focus on knowledge.
4. Actualization of habits and skills.

At this stage, mistakes are corrected, errors are addressed, and a new result is generated. When the process is strictly monitored during the control phase, correction becomes less necessary. Only strategic elements of the movement process are considered, typically used when

one becomes distracted, deviates from the intended path, or makes errors. Based on research by C. Bruner, J. Piaget, C.P. Guilford, and M.I. Posner, the perception field connects to cognitive activity as a complex of interrelated processes. Cognitive activity emerges from their interaction, forming new structures specific to age, gender, and individual characteristics.

The cognitive structure serves as the intellectual foundation for regulating and organizing an individual's cognitive activity. It represents a unique organizational form underlying adolescent experience. However, adolescents do not always successfully obtain necessary information when performing tasks. In such instances, they select appropriate movement modes, considering:

- Nature of movement means.
- Personal physical capabilities.
- Potential changes.
- Object's state.

Despite developing logical thinking, adolescents still struggle with precision in performing unfamiliar actions. They often encounter difficulties in academic settings, with entrepreneurial understanding derived from fragmented family observations and experiences. Nevertheless, actions performed through personal experience help determine cognitive activity strategies, making it easier for teenagers to learn and achieve results through demonstrated and guided actions.

Final Considerations

So, we have clarified a number of issues summarized below.

- The strategy of cognitive activity is understood as a sequence of mental operations and actions aimed at the realization of the results of cognitive (training) activity. The strategy of cognition is formed in personal experience on the basis of a number of structures: mental operations revealed in external actions, abilities, style of activity, projection of higher mental functions, etc. Their elements are cognitive skills, and skills are transferred to the strategy structure and actions, realizing a whole system of cognitive activity (Lauenroth et al., 2016).
- There is a close relationship between the level of implementation of guiding actions in cognitive activity and the intellectual development of adolescents, as well as their intellectual experience. The more opportunities for research are created for adolescents in the learning process, the more effective cognitive development will be.
- The controlling part of cognitive activity is a kind of continuation of familiarization. The teenager prepares for the next action, thinking about whether the result he will achieve in the execution is necessary for him.
- From the guiding part of cognitive activity to the satategi of actions deviates from the path, does not go in the right direction, makes mistakes and in cases where malpractice is allowedis used more precisely.
- The familiarization part of cognitive activity serves the formation of cognitive skills in this process. Cognitive skills are formed on the basis of the corresponding structures of habits. At this time, it is not enough for the teenager acting to receive information only about the initial situation. Familiarization continues throughout the entire process in which the act is performed. The more different executive components this process has, the more he has to develop appropriate procedures for all these components.
- One of the important issues we focus on in the cognitive activity of adolescents during the training process is their sensorimotor development was the identification of perceptual skills (James et al., 2020). It became clear that one of the main reasons for the poor development of cognitive activity is the poor perceptual experience in adolescents . In the training process, the teenager learns to solve tasks based on past experience and random choicesThe main cognitive methods include: deriving from cognitive constructs, intellectual criticism, operations on concepts, application of accessible constructs, projection, solving algorithms, pictography, ideography, observer. The lack of use of analogy, comparison, analysis-composition, etc. does not allow the formation of alternative skills. In such conditions, adolescents look for solutions based on their own impressions of concepts, texts, schemes, models, pictures. However, modern education requires students to reveal their internal psychological resources in the learning process, create opportunities for self-discovery, and revive cognitive images and maps stored in long-term memory. The way to do this is to actualize the intuitive field, use methods such as algorithms, ideograms, pictograms, etc.

CONCLUSIONS

From the analyses conducted in the study, we can conclude that to ensure motivation in the cognitive activity of adolescents during the learning process, the first issue that should be addressed is the clear perception and recognition of the information transmitted to them, motivation to work on this information, and emotional-volitional regulation of intellectual activity. The main feature that distinguishes cognitive activity from perceptual activity is the unity of affective processes (subconscious) and perceptual processes (consciousness). Cognitive activity occurs

only when specific areas of memory, the creative aspects of thinking, and emotional-volitional power are activated, bringing adequate forms of cognitive images and maps to life, with not only consciousness but also the subconscious sphere joining this activity. Since the predominance of perceptual processes in the learning activity of adolescents gives way to memory and thinking processes, only in this case does a stimulus arise for their activation. For a teenager, new, interesting, attractive, and surprising topics serve as stimuli, motivating them to engage in cognitive activity.

REFERENCES

Amrahli, L. Sh. (2018). ***Cognitive Psychology: A Systematic Approach to Cognitive Activity***. MS Publishing House.

Bruner, D. (1977). *Psychology of Cognition*. Progress.

Chambers, D. A., & Norton, W. E. (2016). The Adaptome: Advancing the Science of Intervention Adaptation. ***American Journal of Preventive Medicine***, ***51***(4), S124–S131. https://doi.org/10.1016/j.amepre.2016.05.011

Fernandez, J., & Guilbert, J. (2024). Self-regulated strategy development's effectiveness: Underlying cognitive and metacognitive mechanisms. ***Metacognition and Learning***, ***19***(3), 1091–1135. https://doi.org/10.1007/s11409-024-09398-7

Fleyfell, C. (1967). ***Genetic Psychology Jean Piaget***. Prosveshchenie.

Fombouchet, Y., Pineau, S., Perchec, C., Lucenet, J., & Lannegrand, L. (2023). The development of emotion regulation in adolescence: What do we know and where to go next? ***Social Development***, ***32***(4), 1227–1242. https://doi.org/10.1111/sode.12684

Gaaz, F. I. (2003). ***Pedagogical Psychology***. Academy.

Galperin, P. Y. (1998). Psychology of Thinking and Teaching about Step-by-Step Formation of Mental Actions. In ***Psychology as an Objective Science: Selected Psychological Works*** (pp. 272–317). NPO MODEK.

Getzzg. (2024). Editor's view: Is the brain's perception of ideas an underappreciated human sense? ***JOGH***. https://jogh.org/2024/jogh-14-01002/

James, C. E., Zuber, S., Dupuis-Lozeron, E., Abdili, L., Gervaise, D., & Kliegel, M. (2020). Formal String Instrument Training in a Class Setting Enhances Cognitive and Sensorimotor Development of Primary School Children. ***Frontiers in Neuroscience***, ***14***. https://doi.org/10.3389/fnins.2020.00567

Kobozeva, M. A. (2011). ***Cognitive and Speech Strategies of Entering Topics in Scientific and Popular Discourse*** [Author's Ref. Dissertation]. Stavropol.

Lauenroth, A., Ioannidis, A. E., & Teichmann, B. (2016). Influence of combined physical and cognitive training on cognition: A systematic review. ***BMC Geriatrics***, ***16***(1), 141. https://doi.org/10.1186/s12877-016-0315-1

McLachlan, J., Mehdikhani, M., Larham, B., & Centifanti, L. C. M. (2022). Borderline Personality Traits and Emotion Regulation Strategies in Adolescents: The Role of Implicit Theories. ***Child Psychiatry & Human Development***, ***53***(5), 899–907. https://doi.org/10.1007/s10578-021-01169-8

Podolsky, A. I. (2002). Psychological System of P.Ya. Galperin. ***Questions of Psychology***, ***5***, 15–28.

Pribram, K. (1975). ***Languages of the Brain***. Progress.

Rakesh, D., McLaughlin, K. A., Sheridan, M., Humphreys, K. L., & Rosen, M. L. (2024). Environmental contributions to cognitive development: The role of cognitive stimulation. ***Developmental Review***, ***73***, 101135. https://doi.org/10.1016/j.dr.2024.101135