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# AGE-RELATED CHARACTERISTICS OF MEMORY DEVELOPMENT

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**Abstract**
This article examines the development of memory from the perspective of age-related characteristics and psychology. The author discusses the evolutionary changes in memory processes-encoding, storage, and retrieval-from early childhood to old age based on psychological and neurophysiological approaches. The article explains the formation and interrelationship of different types of memory, including involuntary and voluntary memory, mechanical and logical memory, as well as figurative and verbal-logical memory. Furthermore, it analyzes the role of logical operations and mnemonic techniques in improving memory efficiency and examines the impact of the educational process on the capacity and quality of memory. This article serves as a valuable scientific resource for specialists and students in the fields of pedagogy, general psychology, and cognitive research.

**Keywords**: memory ontogenesis, logical memory, mnemonics, cognitive development, voluntary memory, neuropsychological approach.

**Memory** is the process of retaining, storing, and later recalling the things we have previously perceived, experienced, and done. Every day we learn something new, and our knowledge gradually expands. A person's ideological orientation plays an important role in the functioning of memory. This orientation is shaped by life circumstances and influences an individual's activities. People tend to remember events and experiences that are important to them, while things of little significance are remembered poorly and quickly forgotten.

Returning to the definitions of memory, many sources describe it as follows: **"Memory is the process by which an individual retains, stores, and later recalls information from personal experience."** However, it should be noted that this definition does not fully reflect the complexity and broad nature of memory.

During **early childhood**, memory is the primary cognitive function and contributes to the development of all forms of cognition. At this stage, a child's memory develops rapidly. Initially, motor, emotional, and visual (imagery-based) memory play a significant role in acquiring life experiences, with motor and emotional memory being the most dominant. At this age, memory is mainly involuntary. As children are frequently read books, fairy tales, poems, and stories, they are able to remember them. However, this ability does not necessarily indicate either their overall intellectual development or individual memory capacity. Rather, it results from the general flexibility of the nervous system, which is characteristic of all children in early childhood. Since children cannot yet fully understand the sequence of events in their own lives and surroundings, they are unable to retain them completely in memory.

Until the age of three, the words children acquire mainly refer to the names of objects and actions. These names primarily express the function of an object or action, and even if its appearance changes, its name usually remains the same. Therefore, children quickly learn the names of objects by associating them with their functions. As perception develops, memory also improves. Memory plays a crucial role in a child's overall development.

The memory of preschool-aged children continues to improve as they engage in new activities and face new developmental demands. The memory of preschool children is mainly characterized by visual and imagery-based memory. Involuntary memorization and recall are dominant at this stage. Children often repeat words without understanding their meaning. However, under the guidance and influence of adults, voluntary memorization gradually develops. Children easily remember vivid and emotionally rich material. A three-year-old child is capable of retaining impressions for several months. The development of memory is supported by games, various educational activities, memorizing poems, listening to and retelling fairy tales and stories, and observing the environment during walks.

Children at this age can also easily remember new words, including words from foreign languages. However, although they memorize material quickly, they often do not fully understand its meaning and may find it difficult to use these words in speech. Therefore, the role of adults is not only to help children remember as many words and concepts as possible but also to ensure that they acquire meaningful and useful knowledge. Children apply this knowledge in their games, drawings, and conversations with teachers or adults. Such knowledge contributes to their intellectual and moral development.

Learning activities require children to retain the educational material presented to them in memory. Teachers provide instructions about what students should remember. The student repeats what needs to be remembered and tries to understand it. However, at this age, **involuntary memory** still predominates. What a child remembers largely depends on their interest in the task. Understanding the learning material is the primary condition for successful memorization.

Because the **first signal system** is relatively more dominant than the **second signal system** in primary school children, **visual and motor memory** is more developed than logical memory. Therefore, they remember concrete facts, events, images, and objects more quickly and retain them longer than abstract concepts, theoretical rules, and principles.

According to the Uzbek psychologist **E.G. G‘oziyev**, this can be explained by several factors:

1. Mechanical memory is better developed than other types of memory, allowing children to reproduce information accurately without alteration.
2. Students often fail to fully understand the teacher's task and interpret the instruction "explain correctly" as simply repeating the material word for word.
3. Their limited vocabulary, including insufficient knowledge of scientific terminology and language rules, prevents them from creatively expanding or modifying the material, making verbatim repetition easier.
4. They have not yet mastered effective memorization strategies.

However, such characteristics are not necessarily inherent in all children of this age. Mechanical memorization often results from insufficient attention paid by teachers to developing students' logical memory. During the learning process, logical memory improves as students remember and recall the meaning, essence, reasoning, evidence, and scientific foundations of educational material. Beginning in the first grade, the ability for **voluntary recall** develops rapidly. Effective learning requires both voluntary memorization and voluntary recall; without them, normal learning cannot take place. Students are expected not only to acquire knowledge but also to be able to remember and reproduce it. Systematic memorization of educational material is possible only through voluntary recall.

During **adolescence**, all types of memory develop rapidly in terms of their qualitative characteristics. Since the volume of educational material increases considerably, it becomes difficult to master it through repeated memorization alone. Adolescents gradually abandon rote memorization and instead strive to remember material according to its meaning. At this stage, **logical memory** develops actively, whereas the development of **mechanical memory** slows down somewhat. This may sometimes lead to negative consequences. As adolescents study new subjects requiring them to retain large amounts of information, the weakening of mechanical memory may create difficulties in memorization. Consequently, adolescents may complain about having a poor memory, which can reduce their interest in learning. Therefore, it is essential for students to analyze the content of the learning material and understand its logical structure. During early adolescence, memory becomes closely connected with logical operations, progressing from the level of mechanical memory to logical memory.

According to the observations of **N.D. Levitov**, during **late adolescence (early youth)** the role of **abstract verbal-logical memory** and meaningful memorization increases significantly. Although voluntary memory becomes dominant, involuntary memory does not disappear. Instead, it acquires distinctive features closely related to adolescents' interests, particularly their cognitive interests and career aspirations. Nevertheless, in acquiring knowledge, studying, and participating in social activities, voluntary memory continues to play the leading role.

During **early adulthood (18–25 years)**, psychological functions develop intensively. Memory, attention, thinking, and other cognitive processes demonstrate constructive and positive changes, reaching their peak levels. Stabilization generally occurs between the ages of **33 and 35**. Until approximately **35 years of age**, the functional unity of intellectual activity is maintained. Between the ages of **30 and 33**, attention, memory, and thinking reach particularly high levels of development, whereas around the age of **40**, these functions begin to decline slightly. Between the ages of **41 and 50**, thinking also becomes somewhat less efficient compared to the period between **36 and 40** years. Toward the end of adulthood, **verbal long-term memory** remains relatively stable until old age, while **reaction speed**, **short-term memory**, and **retrieval ability** gradually decline. Nevertheless, improvements in **professional memory** may not always correspond to the overall decline in mnemonic functions.

According to studies examining age-related differences in cognitive processes among older adults, standard memory tasks are completed at different speeds by individuals aged 30 and those aged 70. In simple cognitive tasks, such as comparing the size of different objects from memory, older adults required approximately **50% more time** than younger adults. When the tasks became more complex, older participants required **twice as much time** as younger individuals (Baltes, 1993).

The results of studies investigating **long-term memory** also reveal age-related differences. Several studies have shown that older adults perform better on **recognition tasks** than on **free recall tasks**, such as recalling a list of words (Craik & McDowd, 1987). They also demonstrate greater selectivity in determining which information to retain in memory. Memorizing lists of meaningless words often creates internal resistance among older adults. Consequently, in studies involving the memorization of meaningless words, they generally achieved lower scores. However, when asked to remember meaningful words or interesting phrases, older adults performed better than younger participants (Meyer, 1987). **Tertiary memory**, which refers to the recollection of events from the distant past, remains largely intact in old age.

Memory is closely interconnected with **logical operations**. **Theoretical and discursive thinking** relies on concepts that are compared with one another, allowing transitions from one

idea to another. As a result, memory develops from the level of **mechanical memory** to that of **logical memory**. At the same time, as language develops, thinking becomes richer and more diverse, advancing across all its forms, including motor, imagery-based, and logical thinking. Consequently, adolescents become capable of mastering a wide range of practical and intellectual activities.

The development of memory is a **complex cognitive process** characterized by qualitative changes at every stage of human ontogenesis. As individuals mature, memory mechanisms evolve from simple involuntary memorization to more sophisticated logical and voluntary forms of remembering. This developmental process is influenced not only by biological factors but also by the social environment and educational experiences. Therefore, taking into account the developmental characteristics of each age period is essential for effectively realizing an individual's intellectual potential.

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