



# The impact of memory development in middle-childhood on learning a foreign language

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### **Abstract**

In the past years most urban schools from Romania faced an increased demand from parents for foreign language education courses taught in kindergarten and early elementary school. This article addresses children's readiness for formal language education from a psychological perspective by reviewing the major developmental milestones that influence memory performance during middle childhood and their impact on learning a foreign language at this age. The article also emphasizes on how those psychological mechanisms impact the curricular process, and offers suggestions for language teachers about what type of activities they should consider planning for early elementary school children.

*Keywords:* memory; development; middle childhood; foreign language learning; milestones.

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### **Zusammenfassung**

In den letzten Jahren haben die meisten städtischen Schulen aus Rumänien mit einer erhöhten Nachfrage von Eltern für Fremdsprachkursen unterrichtet im Kindergarten und Grundschulen konfrontiert. Dieser Artikel befasst sich mit der Bereitschaft der Kinder zur formalen Sprachausbildung aus psychologischer Sicht durch die Überprüfung der wichtigsten Meilensteine der Entwicklung, die Gedächtnisleistung während der mittleren Kindheit beeinflussen und ihre Auswirkungen auf das Erlernen einer Fremdsprache in diesem Alter. Der Artikel betont auch, wie die psychologischen Mechanismen den curricularen Prozess beeinflussen und bietet Anregungen für Sprachlehrer, welche Art von Tätigkeiten sie während der Planung für die Grundschul Kinder betrachten sollten.

*Schlüsselworte:* Gedächtnis; Entwicklung; mittlere Kindheit; Fremdsprachenunterricht; Meilensteine

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## 1. Introduction

The process of second language acquisition and specifically the strategies used in learning a foreign language in the classroom has been a subject widely studied in the past decades. The increased need of learning a second language especially among European nations (Special Eurobarometer 243, 2006) and the continually proven advantages of bilingualism (Barac & Bialystok, 2012) started to put a strong emphasis on foreign language education. In Romania, recent years have seen a surge in parents' demands for school authorities to offer foreign language learning programs to children earlier than 3rd grade, which is the mandatory threshold for foreign language education (see also Dolean, forthcoming).

But, how efficiently can children in their early school years learn a foreign language in a classroom setting? Does their cognitive ability allow them to process the information necessary to master a foreign language in schools at an early age? Is it justifiable for school administrators to consider emphasizing on foreign language programs in order to meet parents' expectations?

Providing accurate and well documented answers to those questions would imply a multidisciplinary analysis of second language education in the classroom phenomenon. However, in order to address some of the questions, we need to understand the underlying psychological mechanisms that influence the efficiency of learning a foreign language. That would help educators and education policy makers adjust their strategies in order to provide the most appropriate educational programs to school-age children. That's why, this paper aims to address children's readiness to receive formal instruction in a foreign language by highlighting the features of one of the cognitive components of child development responsible for academic success in foreign language classrooms: memory in middle-childhood and its impact on second language learning.

## 2. Memory development during middle childhood

One of the major milestones that influences the memory development during middle childhood is the increased length of **attention span**, children developing the ability to focus their attention for a longer time than they used to in kindergarten. The attention span improvements come together with significant

gains in **inhibitory control**, children being able now to resist interference of less relevant information which help them focus better on the necessary one (Maguire, White, and Brier, 2011). Consequently, children at this age are doing a significantly better job in encoding the information they encounter. For instance, if a classroom foreign language teacher would use a series of pictures to associate with their translation in a foreign language, the length of such an activity would be significantly greater after the age of 7, because children's attention span would be larger, while the activity would be more efficient because children would not let themselves being distracted from other stimuli (e.g. one of their peers moving out of the seat, or the sensation of thirst).

Another factor that influences the memory of children in their early school years is overcoming the limitations of preschoolers' **metacognitive abilities**. During kindergarten, children often express confusion about mental states such as „forget” and „know”, they are not able to understand that mental inferences can be a source of knowledge, or that mental activity does not stop when people stop doing a physical activity (Berk, 2001, p.232). After the age of 6-7 the development of metacognitive abilities helps children do a better job in „thinking about their thinking” abilities, and see their mind as an active agent, able to select and transform the information. This development helps school age children process the information not only automatically, like they did until then (with little or no effort), but they also start to experience effortful encoding as well (Myers, 1989, p.259). One of the indicators of effortful information processing is the occurrence of rehearsal, or conscious repetition, which children do it more frequently at this age because they are aware that this strategy helps them remember better the information. Thus, unlike kindergarten students, children in their early school years start to be able to indicate their foreign language skills by answering teacher's questions regarding what they've learned last time in class, or the translation of certain concepts from their native language to the foreign language. This indicates that kindergarten foreign language teachers should plan activities that would rely almost exclusively on automatic memory, while language teachers who teach primary school students can introduce progressively activities that involve effortful processing as well.

The development of attention span, together with the inhibitory control processes, as well as the developmental of metacognitive abilities lead to a significant increase in **working memory capacity** during middle childhood, which was found responsible for academic performance in school (Baddeley, 1986). Camos and Barrouillet (2011) found that age 7 is a threshold for cognitive load of information processing in young children. The study indicates that at this age children start to show significant gains

compared with younger children, suggesting that they start to use some mechanisms to maintain verbal information. The authors also found in the same study that starting with age 6 there is an increased ability of cognitive monitoring during the information processing periods. Thus, children at this age start playing an active role in information processing, by reactivating older pieces of information they considered useful which in turn helps them store the information more efficiently. That means, foreign language teachers can expect children's performance not to be dependent mostly on the amount of time children are exposed to the language, but also on other factors (e.g. motivation) that would determine students to reactivate the information on their own.

The memory development in middle childhood is also strongly dependent on children's ability to organize information. One example of such ability is the **categorization**. Lewandowsky (2011) indicated there is a strong relation between the working memory capacity and the categorization ability, in the sense that the more people are able to organize items into categories, the higher the working memory is. Starting around age 7, children enter in an intellectual development phase which Piaget referred to as the concrete operational stage. One of the characteristics of cognitive abilities in this stage is that children become less egocentric, which makes them able to focus on multiple aspects of a problem. They can now group items into manageable pieces of information, which consequently expands their working memory ability. For instance, during middle childhood children can understand that in English most words that indicate things and end with „s”, mean multiple items (e.g. tables, cups). Foreign language teachers can now expect children learn some basic grammar rules; however, the development of this cognitive ability is only in its beginning stages, and an abundance of grammar rules might be overwhelming for children in their early school years.

Another ability to organize information developed during middle-childhood is the **efficient use of memorizing strategies**, like mnemonics. Children at this age start to be able to organize information in units that make sense. Thus, the strategy used in kindergarten to remember new words by frequently rehearsing the items that need to be learned (e.g. the English word „balloon”) can be now replaced progressively with items' association with a familiar word (e.g. the character „Baloo”, from „Jungle Book”). Even though during the first years of middle childhood children could use help from an adult to efficiently organize the information, this ability becomes autonomous, children being able to elaborate strategies by themselves in order to increase memory performance (Berk, 2001, p.295), and around age 8 they start to demonstrate consistently the ability to use strategies spontaneously and independently, like

grouping items based on specific criteria (Schwenk, Bjorklund and Schneider, 2009).

The frequent use of mnemonic strategies is not just a consequence of memory development, but is also a **cause of memory improvement** during middle childhood. Brehmer, Li, Muller, von Oertz and Lindenberger (2007) showed on a study conducted on a sample of subjects whose age ranged from 9 to 78, and who participated in several memory training sessions, that children's memory not only benefited the most after the sessions, but also children's performance became better than the one of the adults'. The results suggest that using mnemonic strategies help improve memory performance and have the most impact during middle childhood. However, working memory strategy training itself does not necessarily improve academic performance as measured by academic tests (St Clair-Thompson, Stevens, Hunt & Bolder, 2013), that's why teachers should focus on using those mnemonics in their lessons, rather than spending time on developing memory strategies training sessions.

A particular aspect in cognitive development of memory in middle childhood concerns the strategies used to remember **visual information**. We already know that among the earliest memories which develop at about the age of 4 or 5, are mental pictures (Myers, 1989, p. 262), which indicates that visual imagery plays an important role in encoding efficiently. We also know that visual items produce strong memories (e.g. Shepard, 1967, Standing, 1973). However, Sanefuji et al (2011) showed that the phonologic strategies develop only around age 7, and the association of visual and phonological items are most efficient during middle childhood. At this age starts the development of another major component of cognitive ability, namely **language awareness** (Berk, 2001, p.304). Children are now able to think about learning a different language, and that using visual strategies makes them more proficient in foreign language learning. Therefore, language teachers should consider starting to use more visual stimuli in their lessons after the age 6-7, as a way to explicitly teach children new concepts in a foreign language, as well as imagery based mnemonics.

### 3. Conclusion

The present article aimed to briefly highlight the most important milestones in memory development during middle-childhood that influence learning a foreign language in the classroom. The paper put an emphasis on what foreign language teachers need to know in order to understand some of the psychological mechanisms that influence the process of language learning and develop the lesson plans based on children's developmental abilities.

The review emphasized on the fact that the development of attention span as well as inhibitory control helps early elementary school children to focus longer on foreign language lessons, and ignore the unimportant stimuli that would interfere with the learning process. This developed ability, together with improvements in metacognitive abilities, help children increase their working memory capacity. Another major developmental feature of this age is the ability to organize information into units that make sense. Children can now group items by categories and use mnemonic strategies to improve their retention of new information. Those developmental characteristics suggest that around the age of 6-7, children become ready to receive formal foreign language instruction. However, most of their cognitive abilities are still in their early stages of development, which indicate that language teachers should consider introducing formal language instruction gradually, while organizing activities specific to pre-school children that still rely on automatic information processing (implicit language learning) and frequent rehearsals (like songs and nursery rhymes). One particular feature of language learning in the classroom in early school years is represented by the powerful impact that visual images have on retention. Studies indicate that starting with age of 7, teachers can use efficiently visual based mnemonic strategies to enhance association of phonological and visual items, and to facilitate encoding of new concepts in a foreign language.

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