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Features of Bilingual Brain

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Based on the research 50% of world's population is bilingual [1]. Such people are of interest not only to psychology and sociology, but to neurolinguistics too. Neurolinguistics is the study of neural mechanisms in the human brain that control the comprehension, production, and acquisition of language. According to research, bilingual brain may actually look and work differently than monolingual.

Depending on the conditions of the language acquisition, there are two types of bilinguals:

1. Coordinate. It means that the bilingual person has equal levels of linguistic competence. For example, children growing in bilingual family acquire the same set of language concepts simultaneously.

2. Subordinate. In this case, one of the languages plays more important role than another one [2].

Particular types of bilingualism influence the brain differently. There is a hypothesis of critical period, according to which the ability to study language is connected with biological age [3]. In this way, children studying the foreign language are able to feel the emotional aspect of speech, while adults can feel this aspect less often. In addition, older learners rarely achieve the native-like fluency [4].

How to explain this difference? Obviously, the answer is in the structure of the brain, the main organ carrying out the speech processes. Brain consists of two parts: left and right hemispheres. Both of them are involved in higher nervous activity, but the left hemisphere is more dominant in analytical and logical processes, while the right hemisphere is more active in emotional and social ones. In most adults, language is lateralized to one hemisphere, usually the left one, while children brain has more plasticity, which lets them use both hemispheres in language acquisition [5].

Depending on the age of second language acquisition (SLA), different parts of the brain may be responsible for the speech. Bilinguals demonstrate similar activation patterns in the brain when using either one of the two languages they fluently know [6]. In contrast to those who acquired their multiple languages at different periods in their life, those who acquire multiple languages in youth, and at virtually the same time, show similar activations in parts of [Broca's area](#) and left inferior frontal lobe. If the second language is acquired later in life,

specifically after the critical period (after the age of 6-7 years), the language becomes centralized in another part of Broca's area [5], [6].

Despite the age of person, SLA has its own benefits affecting the brain structure.

First, scientists discovered that bilingual people have greater density of gray matter, which consists of neuron bodies. They identified gray matter concentration in the left inferior parietal cortex of bilinguals relative to monolinguals, and showed that the density in this region increases with the level of second-language proficiency. In addition, negative correlation between the age of SLA and gray matter density was established: the more the age of SLA, the less the density [7].

Second, switching between languages requires greater activity of dorsolateral prefrontal cortex, which plays a crucial role in executive functions, problem solving, switching between tasks and focusing while filtering out irrelevant information. Recent research has shown that reaction time and mistakes increase for some bilingual children in cross-language tests, but their prefrontal cortex is more active relative to monolinguals [8].

Third, bilinguals are able to distinguish the language from the early childhood. The scientists studied how "code switching" (spontaneous switching between two languages during conversation) is responded at an early age. The experiment conducted involved 24 children (aged 19 to 21 months) growing in bilingual families. Children were shown images of two objects and asked to show the object that was named in a sentence pronounced with or without code switching. With the help of an eye tracker (a device for measuring eye movements), the researchers measured how the size of the pupils changed while code switching – it is an involuntary reaction that occurs during the processing of information. The scientists found that the pupils expand significantly when the code switching occurs from the mother language to the second one. Thus, the results of the study show that bilingual children acquire the ability to distinguish languages at the age of two [9].

Finally, bilingual brain is more resistant to dementia caused by Alzheimer's disease. In average, the bilinguals in the study were five years older than the monolinguals, despite being at the same stage of Alzheimer's disease. Researchers used brain scans that detect glucose uptake to reveal how active different parts of the brain were and how well they were functionally connected to other brain regions. Compared to monolinguals, bilinguals showed increased functional connections between areas of the brain involved in executive control [9].

To summarize, it is never too late to start learning a foreign language. Bilingualism may not necessarily make people smarter, but it improves brain's executive functions and makes it more complex.

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Современные педагогические технологии в обучении иностранному языку

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Аннотация:

В данной статье даются определения различных педагогических технологий и демонстрируются приемы и методы, применяемые на практике в рамках обучения студентов иностранному языку.

Текст доклада:

Технология обучения — это то, что характеризует и организует учебный процесс и является руководством для достижения поставленных целей обучения. Следовательно, технология обучения является системной категорией, ориентированной на дидактическое применение научного знания, научные подходы к анализу и организации учебного процесса с учетом эмпирических инноваций преподавателей и направленности этого процесса на достижение высоких результатов в развитии личности студентов [1].

В современной педагогике применяются различные педагогические технологии, которые способствуют значительному повышению качества образования. Преподаватели, творчески подходящие к своей профессиональной деятельности, расширяют свои возможности за счет интеграции знаний по преподаваемому предмету и современных педагогических технологий.

Существует огромное количество педагогических технологий, различающихся всевозможными критериями. Условно их можно разделить на три группы:

- 1) объяснительно-иллюстрированное обучение, основанное на вербальном и визуальном представлении материала;
- 2) личностно-ориентированное обучение, направленное на индивидуальный подход и саморазвитие личности;
- 3) развивающее обучение, основу которого составляет включение внутренних механизмов развития личности.