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COGNITIVE AND NEUROLINGUISTIC ASPECTS OF THE INFLUENCE OF THE CHINESE LANGUAGE ON THE STRUCTURE OF HUMAN THINKING AND WORLDVIEW

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ABSTRACT

The article is devoted to the study of cognitive and neurolinguistic aspects of the influence of the Chinese language on the processes of thinking and the formation of a worldview. The differences in language structures and their impact on brain function, including the activity of the left and right hemispheres, the features of information processing, and the formation of abstract concepts, are considered. Special attention is paid to the influence of the logographic writing of the Chinese language on visual perception and the development of spatial thinking, as well as the analytical approach typical of the English language. The cultural and historical factors contributing to various cognitive strategies of native speakers of these languages are analyzed.

Keywords: Cognitive linguistics, neurolinguistics, English, Chinese, structure of thinking, worldview, neuroplasticity.

INTRODUCTION

It is worth asking a person what language is, and with a high degree of probability, he will answer that language is a means of communication, a way of expressing thoughts and transmitting cultural information. Each nation has its own unique language, as well as the culture associated with it. These definitions represent language as a tool for specific purposes. Nevertheless, does this give us the right to consider it as something isolated? Definitely not!

LITERATURE REVIEW

When learning a foreign language or talking to native speakers, people often encounter mutual misunderstandings. The reason for this is that the language is inextricably linked with the culture of the people who speak it, with the realities of the country where it is used, and with the worldview of its native speakers, who are accustomed to expressing their thoughts within the framework of this language. A person who has grown up in this language environment begins to perceive the world through its prism and describes reality within this language as much as it allows. Scientists suggest that differences in vocabulary and grammar can affect thinking: depending on the language, reality is perceived and understood in different ways. The process of globalization in the modern world encourages us to study not only the languages

of other peoples but also the peculiarities of their thinking and mentality. This paper examines the relationship of Chinese, English and Japanese languages with the cognitive processes of their native speakers.

Left and right hemispheres: According to a study conducted in 1861 by scientists P. Brock and K. Wernicke, it was concluded that the location of the Brock and Wernicke zones in the left hemisphere and the absence of significant speech disorders in case of damage to the right hemisphere indicate the dominant role of the left side of the brain in speech activity. At the same time, the right hemisphere has long been regarded as less significant, associated with primitive functions. Later, in the 1960s, thanks to the research of Roger Sperry, Joseph Bogen and Michael Gazzanig, who studied patients after crossing the corpus callosum, it was found that both hemispheres of the brain have different specializations. The left hemisphere is focused on the analytical processing of information, especially in verbal form, and perceives visual images in parts. In contrast, the right hemisphere processes information holistically, actively participates in music perception, visualization, and solving problems related to gradual parameter changes. The left hemisphere plays a key role in speech generation and logical thinking, while the right hemisphere is responsible for intonation, facial expressions, gestures, and accents in utterances. Studies have shown that the right hemisphere significantly affects speech perception: turning it off leads to difficulties in recognizing intonation, even in the absence of noise interference. Such patients have difficulty identifying melodies and playing songs – the words may be said correctly, but the melodic pattern turns out to be distorted. On the contrary, with depression of the left hemisphere, a person, despite the inability to understand words, demonstrates increased sensitivity to intonation and easily repeats the melody he hears, but cannot remember the text of even a familiar song. Thus, the scientists came to the conclusion that visual information and primarily the right hemisphere, in contrast to textual and verbal content, processes intonational characteristics of speech for which the left hemisphere is responsible. For example, in the process of perceiving gestures and finger movements in the language of the deaf and dumb, the right hemisphere plays a leading role, despite the fact that these signs perform the functions of letters, words, and even whole sentences.

Chinese characters as visual images: The Chinese language is based on a hieroglyphic writing system in which each character is an independent graphic unit. Research shows that Chinese characters are like pictures for native speakers of this language, because if you look at the original hieroglyphs such as the human character (人) horse (馬), you can understand that these hieroglyphs were copied from objects. That is, they were drawn as similar as possible with the help of features. By this, I want to say that for the Chinese, the hieroglyph is perceived not as a letter, but as a picture, after looking at which they immediately understand what it means. Unlike alphabetic languages such as Russian, English in which they reveal their meaning only after reading all the letters they consist of, in the order of their spelling. Thus, it can be argued that when reading and writing Chinese characters, right-hemisphere imaginative thinking is activated, since their meaning is perceived holistically, without an

analytical analysis of the elements. While reading the Russian text, left-hemisphere logical-verbal thinking is involved, focused on sequential character processing.

The musicality of Chinese hearing: Chinese is tonal: the meaning of a word depends on its intonation. The official spoken language of China, that is, in Putonghua, there is a northern and southern dialect in the first of which there are four tones, and in the second, the number of tones reaches nine. In a language environment where distinguishing the meanings of words directly depends on tonal modulation, having a well-developed ear becomes not just an advantage, but a prerequisite for effective communication. A similar pattern is observed among speakers of other tonal languages, for example, among Vietnamese, who from early childhood get used to perceive and reproduce complex sound structures of their speech. It is assumed that the ability to subtly distinguish the sound characteristics of speech, up to almost absolute musical hearing, was formed in the Chinese as a result of cognitive evolution as an adaptive reaction to the peculiarities of their language system. Moreover, it is likely that this ability has been fixed at the genetic level, providing a high level of auditory perception among representatives of the Chinese population.

Chinese riddles and their influence on thinking: Due to the large number of homonyms in the Chinese language, riddles are often based on wordplay, which develops the ability of native speakers to associative and creative thinking. Since childhood, Chinese people have been learning to notice hidden meanings, analyze the connection between words and hieroglyphs, and also find logical connections based on pronunciation and the graphic appearance of signs. For example a shining example of homonyms: 两点水，不是冰. (Liǎng diǎn shuǐ, suck Shi bīng.) that means: Two drops of water, but not ice. The answer to this riddle is soup. In Chinese, "two drops of water" alludes to the water radical 氵 (shuǐ), which is used in many hieroglyphs associated with liquids. However, the riddle emphasizes that the answer is not ice. Remembering other words related to water, one can guess that we are talking about 汤 (tâng, soup), which is liquid but not frozen. The ambiguity of hieroglyphs allows them to be used in various unrelated contexts, which becomes the basis for creating riddles based on wordplay. For example, consider the following riddle: "A man left home, took money with him, but when he returned, he did not have it, although he did not buy anything. Why is that?" Answer: 他破产了 (Tā pòchǎn le) – "He went bankrupt." This riddle is based on the double meaning of the hieroglyph 破 (pò), which can mean both "to break down, to collapse" and to be part of the word 破产 (pòchǎn), meaning "bankruptcy". The hieroglyph 产 (chǎn), in turn, translates as "property, property." Thus, the literal meaning of 破产 is –destruction of property," which figuratively means "financial collapse." The riddle is based on the fact that the reader initially takes the situation literally, assuming a physical loss of money, but the correct answer reveals its metaphorical meaning associated with financial difficulties. This type of riddles promotes the development of flexibility of thinking, the ability to interpret words in different meanings and find hidden semantic connections, which is an important feature of the perception of the Chinese language. Chinese riddles help to develop observation, logical and associative

thinking. They train the ability to analyze the shape of hieroglyphs, their pronunciation and hidden meanings. Thanks to this, native Chinese speakers learn from childhood to find connections between words, which makes their thinking more flexible and imaginative.

However, the influence of language is evident not only in folklore, but also in the traditions of the Chinese people. Many customs arose due to the consonance of words, giving symbolic meaning to certain actions. Therefore, in some regions there was a wedding tradition: the bride's dowry was displayed in the groom's house, including clothes, bedding, needlework, as well as vegetables – celery, garlic and onions. Their choice was not accidental: the word "celery" (qing) sounds the same as "hardworking" (qing), "garlic" (suan) is consonant with the word "count" (suan), and "onion" (cong) resembles the word "smart" (cong). Thus, it was demonstrated that the bride is hardworking, reasonable and economical. In medieval China, the ritual of "bathing a newborn" was widespread, during which the baby was lowered into a basin of water, adding coins and onions to it. It symbolized the desire for wealth and intelligence. Another custom associated with the pun is the farewell gift of a willow branch. The word "willow" (liu) sounds the same as "stay" (liu), expressing the wish not to be separated. Chinese New Year is also accompanied by traditions based on homonyms. For example, a mandatory dish on the festive table is fish, since the word "fish" (yu) is pronounced the same way as "surplus" (yu), symbolizing prosperity. Another popular ritual is the inverted hieroglyph "happiness". The expression "happiness has turned upside down" (fu dao le) is consonant with the phrase "happiness has come" (fu dao le), which is perceived as a good sign.

METHODOLOGY

The influence of language on the mathematical mindset: Learning Chinese is closely related to mathematical concepts, as the structure of hieroglyphs often reflects numerical elements. This distinguishes Chinese from many Indo-European languages, such as Russian or English, where numerals represent separate lexical units. For example, in Russian, the word "twelve" means the number 12, whereas in Chinese, the number 12 is written as a combination of the hieroglyphs 十 (shí, 10) and 二 (ér, 2), which literally means "ten and two." Thus, the principle of number formation in Chinese resembles mathematical addition, which can contribute to a better understanding of arithmetic operations among native speakers. At the same time, a similar structure of numerals is found in some West Germanic languages, including English. For example, in English, "twenty-one" (21) literally stands for "twenty and one," which is similar to the Chinese way of forming numbers. Learning Chinese requires simultaneous perception of sounds, graphic symbols (hieroglyphs), and numerical structures, which activates different areas of the brain. Unlike native speakers of Russian or English, who alternate the activity of the right and left hemispheres depending on the type of task, Chinese speakers have both hemispheres working more synchronously. This has a positive effect on the development of mathematical abilities, creative thinking, problem-solving skills, and emotional intelligence.

FINDINGS AND DISCUSSION

The influence of grammatical structure and linguistic concepts on cognitive processes: The discussion about the influence of the grammatical structure of the Chinese language (including the absence of inflections, fixed word order, and frequent subject omission) and the

hieroglyphic writing system on the way native speakers think arose in the 20th century as part of sinological and linguistic research. Von Humboldt, in his work "On Grammatical construction in the Chinese language," hypothesized a close relationship between grammatical features and cognitive processes, which led to the question of the sufficiency of the Chinese language as a tool for accurately expressing thoughts in terms of its morphological specificity. Some researchers believed that the lack of morphological markers and strict word order reduces its suitability for logical thinking compared to European languages, while others argued that the simplified grammatical structure makes Chinese more objective and subject to clear linguistic patterns.

Modern scientists continue to study this problem, relying on advances in cognitive linguistics and experimental psychology. Thanks to new methods of computer analysis, it has become possible to quantify the degree of influence of linguistic features on thinking. The question of the influence of language (both native and foreign) on cognitive processes was raised as part of a series of experiments conducted by the American cognitive psychologist L. Boroditsky. In his article, "Does Language shape thinking? Concepts of time among native speakers of Chinese and English," she examined how linguistic features affect the perception of time relations. The study was based on differences in time representation: English is dominated by horizontal metaphors (for example, "ahead of schedule", "looking forward to next week"), whereas Chinese uses predominantly vertical representations (for example, "last year" as "upper year", "next day" as "lower day").

L. Boroditsky hypothesized that native Chinese speakers should respond more quickly to questions about time when solving spatial problems presented in a vertical format, while native English speakers should respond more quickly when working with horizontal schemes. All participants in the experiment performed tasks in English, which allowed them to test the hypothesis about the influence of their native language on cognitive habits. If native Chinese speakers demonstrated a tendency to vertical perception of time even when using English, this would confirm the significant role of language structure in the formation of cognitive models.

During the three experiments, the subjects were offered a number of tasks that included spatial images (vertical and horizontal), questions about them, as well as questions related to temporal relationships. The visual stimuli were scenes with various objects, for example, a red cube in front of a blue one (horizontal orientation) or a yellow circle above a green one (vertical orientation). The target questions concerned time relations expressed in terms of "before/after" pairs (for example, "February precedes March") or "earlier/later" (for example, "spring comes before summer"). The reaction rate of the participants was recorded in milliseconds, which made it possible to quantify the influence of language factors. The results of the first experiment showed that native Chinese speakers show a tendency to vertical perception of time even when using English. They were faster to determine that February preceded March if they were previously shown a vertical sequence, whereas English speakers coped with this task faster if there was a horizontal row. The second experiment revealed a relationship between the age at which bilinguals began learning English and their degree of inclination to vertical time representation. The later the English language learning began, the more the participants maintained a tendency towards vertical perception of time categories. The third experiment was aimed at exploring the possibility of changing cognitive strategies among

native English speakers by teaching them alternative language models. The subjects mastered the Chinese system of spatial metaphors for time, after which they demonstrated the same cognitive inclinations as native Chinese speakers. This led to the conclusion about the plasticity of cognitive processes and the significant influence of language structure on the formation of intellectual habits.

CONCLUSION

Language is not just a way of communication, but at the same time, it is a unique opportunity to think differently. To see the world through the lens of a new language. Sometimes, when we learn another language, we unconsciously create a new self, a new personality who can speak and think in this language, expressing our thoughts more clearly: creating a character. In addition, sometimes we can borrow a piece of the personality of any native speaker, copying the accent and gestures, thus becoming a native speaker of a particular language ourselves.

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