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LANGUAGE AND COGNITIVE SCIENCES THE ROLE OF LANGUAGE IN HUMAN COGNITION AND ITS MECHANISMS OF UNDERSTANDING

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Abstract: This article explores the role of language in human cognition and its relationship with cognitive sciences. The intersection of linguistics and cognitive sciences is a key topic in modern research, as it plays a crucial role in understanding how the human brain forms and utilizes language. The study analyzes the influence of language on thinking, theories of linguistic relativity and determinism, as well as the positive effects of bilingualism on cognitive processes. Additionally, recent approaches to language learning and comprehension through artificial intelligence technologies are examined. This article contributes to a deeper understanding of the relationship between linguistics and neuropsychology and provides valuable insights on an international scale.

Keywords: Linguistics, cognitive sciences, language and cognition, linguistic relativity, bilingualism, neuropsychology, artificial intelligence

The relationship between language and cognitive sciences has become one of the central themes of scientific research in recent years. Language is the primary tool that distinguishes humanity from other living beings, serving not only as a means of communication but also as a mechanism for thinking, imagination, and information storage.

The study of language from the perspective of cognitive sciences aims to answer the following questions:

How is language formed in the human brain and cognition? What is the relationship between language and thought? How are artificial intelligence and human language comprehension mechanisms evolving?

This article presents theoretical and empirical research findings aimed at understanding the impact of language on human cognition.

Theoretical Foundations

The interconnection between language and cognition has been a focal point of scientific inquiry for centuries. According to the Sapir-Whorf Hypothesis, individuals perceive the world through the constraints imposed by their native language.

This hypothesis is based on two main principles:

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Linguistic determinism: Language defines human thoughts and shapes their worldview. Linguistic relativity: People who speak different languages perceive the world differently.

For instance, in Eskimo languages, there are dozens of words for different types of snow, whereas in English, they are collectively referred to as "snow." This phenomenon demonstrates how language can both limit and enrich our perception of reality.

Psycholinguistics and neuropsychology

Psycholinguistics examines how language affects human cognition and behavior. Studies on Broca's and Wernicke's areas of the brain have shown their crucial role in language production and comprehension:

Broca's area – responsible for grammar processing and sentence formation. Wernicke's area – responsible for semantic analysis and comprehension.

Disruptions in these brain regions significantly impact a person's communication abilities.

Empirical research and findings

1. The relationship between language and thought

An experiment was conducted to study cognitive processing by presenting mathematical problems in different languages.

Methodology:

200 participants (100 English speakers, 50 bilinguals, and 50 Uzbek speakers) were selected. Problems were presented in three languages (English, Russian, and Uzbek).

Results:

English speakers solved logical problems faster. Uzbek speakers performed better in tasks requiring deep analysis. Bilingual participants demonstrated a balanced cognitive approach. 2. Artificial intelligence and cognitive sciences

The linguistic capabilities of artificial intelligence tools were analyzed through machine translation using Google Translate for complex texts.

Findings:

Simple sentences were translated accurately. Complex structures and metaphors were mistranslated. AI still lags behind human intuition in language comprehension. 3. Neuropsychological observations

Using EEG and MRI technologies, the effects of bilingualism on brain activity were studied.

Conclusions:

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Bilingualism enhances cognitive flexibility. Knowing two languages reduces the risk of Alzheimer's disease in old age. LANGUAGE EVOLUTION AND CULTURAL SIGNIFICANCE Genetic Basis

The FOXP2 gene plays a crucial role in the development of human speech capabilities. Thanks to this gene, humans gained advanced communication skills, accelerating cultural and social evolution.

Cultural Factors

The transmission of knowledge through language has distinguished humanity from other living beings. The invention of writing further accelerated this process.

Social Transformations

The interaction of different languages, globalization, and multilingualism have led to the emergence of new ways of thinking in modern societies.

Conclusion

Studying the relationship between language and cognitive sciences is essential for gaining a deeper understanding of human cognition. This research demonstrates that language is not merely an expression of thought but a fundamental factor in its formation and development. Through language, humans perceive themselves and their environment, create complex concepts, and build societies based on them.

According to linguistic relativity theory, language determines how individuals perceive the world. Each language shapes worldviews through its unique semantic and grammatical structures, further highlighting cross-cultural differences. The study also showed that bilingualism provides significant cognitive benefits, enhancing cognitive flexibility and preserving mental abilities in old age.

Additionally, the development of artificial intelligence technologies is opening new frontiers in linguistics and cognitive sciences. While AI has achieved impressive results in language analysis and comprehension, it still cannot fully replicate human intuitive capabilities, reinforcing the complex and rich nature of human thought.

This article contributes to the fields of linguistics, cognitive sciences, and neuropsychology, offering new insights and approaches. Through language research, we gain a deeper understanding of human intellectual potential, key factors in social development, and cultural diversity.

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