

## FEATURES OF CULTURAL RESEARCH IN THE FRAMEWORK OF CULTURAL NEUROSCIENCE: DEVELOPMENT PROSPECTS AND ETHICAL DILEMMAS

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The purpose of this article is to determine the objectivity of culture from the perspective of the neuroscience's research interests of and to identify neuroethical problems that arise in the process of using neurotechnologies and applying research results. The following aspects were set: to provide a clear understanding of the reasons behind neuroscience's growing interest in culture; to identify new scientific and neurobiological directions studying the relationship between a culture and humans; to substantiate the importance of the emergence of cultural neuroscience, to identify some ethical categories revealed through analysis of research results; to highlight ethical problems that arise or may arise near future during the application of neurotechnologies and the use of research results in this field. The main conclusion of this article is that the development and application of neurotechnologies will be the main priority for many countries, especially taking into account the interest in understanding the cultural characteristics of all people living in the same territories. On the one hand, the knowledge can help to prevent cross-cultural conflicts and improve the effectiveness of management systems in the social sphere. On the other hand, it may lead to bioethical problems due to possible manipulations in various fields as business and politics.

**Keywords:** cultural neuroethics, cultural neuroscience, ethical problems, bilingualism

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## ОСОБЕННОСТИ ИССЛЕДОВАНИЯ КУЛЬТУРЫ В РАМКАХ КУЛЬТУРНОЙ НЕЙРОНАУКИ: ПЕРСПЕКТИВЫ РАЗВИТИЯ И ЭТИЧЕСКИЕ ДИЛЕММЫ

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Цель данной статьи — определить объектность культуры с точки зрения исследовательского интереса нейронаук и выявить нейроэтические проблемы, возникающие в процессе использования нейротехнологий и применения результатов исследований. В качестве задач были выбраны следующие аспекты: дать четкое представление о причинах появления интереса нейронаук к культуре; определить новые научные нейробиологические направления, изучающие связь между культурой и человеком; обосновать значимость появления культурной нейронауки, выделить некоторые этические категории, которые выявляются благодаря анализу результатов исследований; обозначить этические проблемы, возникающие или которые могут возникнуть в ближайшее время в ходе применения нейротехнологий и использования результатов исследований в этом направлении. Основным выводом данной статьи может быть такое заключение: очевидно, что развитие и применение нейротехнологий будет основным приоритетом любой страны, особенно с учетом интереса к культурным особенностям всех народов, проживающих на одной территории. С одной стороны, такое знание позволит избежать межкультурных столкновений и улучшить работу систем управления в социальной сфере, с другой, оно может привести к появлению биоэтических проблем из-за возможных манипуляций в разных сферах бизнеса и политики.

**Ключевые слова:** культурная нейроэтика, культурная нейронаука, этические проблемы, билингвизм

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Neuroethics emerged as a response to the consequences of developing new biotechnologies in neuroscience, aimed at studying brain function, consciousness, the psyche, and various cognitive processes. These technologies are also being applied in fields such as business, marketing, and politics. Neuroethics possesses interdisciplinary characteristics that make it difficult to fully delineate its scope and areas of responsibility due to

the limited understanding of many aspects of neuroscience. For instance, research areas like neural networks that underpin conscious experiences and unconscious processes, cognitive functions, and brain plasticity across different age groups remain underexplored. The complexity of neuroethics is further compounded by the inconsistency of research data and the rapid pace of advancements in neurotechnologies.

Originally part of bioethics, neuroethics quickly sought autonomy because the unique and fast-evolving research in neuroscience presents specific ethical challenges that require specialized analysis. Its interdisciplinary nature has also played a role in this shift, as neuroethics draws upon neuroscience, philosophy, psychology, and other fields to address these ethical concerns. A deeper understanding of behavioral mechanisms, decision-making, and cognitive processes holds the potential for significant breakthroughs, with neurotechnologies being increasingly integrated into both the real and digital lives of individuals.

At the same time, the interdisciplinarity of neuroscience can also be examined through the broader lens of culture. Moreover, neuroethics itself is embedded in culture and falls within the purview of cultural studies, which examine various forms and manifestations of culture. "Culture is a complex and multifaceted concept that significantly influences science, including neuroethics, affecting both its development as a scientific field and its role in society. Cultural influence on science and public perception is especially relevant for neuroethics, as it seeks to create an interface between neuroscience and society as a whole, addressing the ethical, legal, social, cultural, philosophical, and scientific issues raised by neuroscience and related technologies" [1]. From a scientific standpoint, cultural studies can suggest that ethics be understood as part of spiritual culture, centered on humanism and spirituality, where the function of ethics in the modern world is to protect human life and health. Alternatively, it can be viewed as a means of preservation. On the other hand, culture encompasses all that humans create with their hands and minds, including the technological advancements that drive our civilization's progress.

In the twentieth century, biologists began to observe that cognitive processes, interpersonal interactions, and behavior could not be fully explained by instincts, genetics, or purely physiological causes. Unlike animals, humans are capable of overriding their instincts and acting contrary to their innate programming. Humanity has developed new capacities that have become part of the cultural framework of individuals, nations, and societies. Humans created culture, and in turn, culture shapes human personality. The Russian philosopher and mathematician Fet A argued that humans possess two hereditary systems: genetics and culture. The genome does not contain all the necessary information for survival. "Instinctive behavioral sequences that other animals automatically perform are typically fragmented in humans, linked by 'conscious' behavior. In certain critical instances, such behavior can only be learned from cultural traditions" [2].

The peculiarities of human cognition have become the focus of a new scientific field known as cultural neuroscience, or cultural biology. Researchers in this area aim to tackle a macro task: studying and comparing how individuals from different cultures perform mental operations and why similar conditions do not lead to identical outcomes in behavior, communication patterns, creation of stereotypes, and other cultural phenomena. On one hand, cultural neuroscience examines values, beliefs, practices, and behavior through the lens of neuroscience by analyzing genetic and neural processes. On the other hand, it investigates neurobiological mechanisms to explore similarities and differences in cultural traits within the genotype.

Cultural neuroscience originated in the twentieth century, with its main objective being to explain the socio-cultural phenomena of human life from the perspectives of biology, medicine, genetics, and physiology, among other disciplines. In essence, it seeks to establish a connection between

human cultural environments and neurobiological systems. Cultural neuroethics incorporates ideas and viewpoints from related fields such as anthropology, psychology, and cognitive neuroscience to study sociocultural influences on human behavior [3]. To date, several subfields have emerged within cultural neuroscience, including cross-cultural psychiatry, cross-cultural psychology, epigenetics (biology), evolutionary anthropology, and sociobiology. Each of these areas has its own history and key figures.

Sociobiology, for instance, was influenced by the work of philosopher Daniel Dennett, who built on the ideas of Thomas Hobbes in explaining the origins of morality through a sociobiological lens. During the twentieth century, prominent interdisciplinary scholars such as geneticist John Paul Scott, biologist Edward O Wilson, ethologist Konrad Lorenz, Russian mathematician and philosopher Fet A, and evolutionary biologist Niko Tinbergen studied human behavior based on animal behavior research. These comparisons allowed for the identification of both similarities and differences, leading to the belief that evolution and genetics unite humans with the broader living world, while culture makes humans unique by granting them capabilities that animals do not possess in their natural environments.

Evolutionary ethics was rooted in the evolutionary theory of Charles Darwin. Scientists such as Herbert Spencer, William Graham Sumner, Moore I, and Williams GC explored this area. The theory of genetic and cultural co-evolution emerged later, toward the end of the twentieth century, and was championed by Luigi Luca Cavalli-Sforza, who argued that sociocultural reality develops in tandem with biological evolution. Co-constructivists attempted to explain cultural biases by focusing on the responses of neurons associated with fear. However, these biases were often found to be more individualistic than societal. Some theories, such as Hofstede's Cultural Dimensions Theory, have also been critiqued. Researcher Danilkina S, for example, concludes in her article that "the possibilities of studying social impact within the framework of the natural science approach are significantly limited" [4], particularly due to the lack of philosophical analysis and deeper understanding of the phenomenon under study.

Cultural neuroscience has the potential to address these limitations by identifying neurophysiological correlates of social behavior and the mechanisms by which individual social processes transition to collective ones. Although cognitive processes were once the focus of cultural anthropology, the integration of neuroscience into this research has led to the development of a new subfield that studies cognitive processes formed within specific cultural groups and social environments.

The idea of integrating different areas of scientific inquiry was proposed by the American researcher Cole M, who, in his article "Culture and Cognitive Science" (2003), emphasized the importance of such collaboration for understanding human and societal social behavior. According to Falikman M and Cole M, authors of the article "The Cultural Revolution in Cognitive Science: From Neural Plasticity to the Genetic Mechanisms of Acquiring Cultural Experience", the field is divided into two main areas. "The first area focuses on studying system formation in the human brain under the influence of culture (e.g., schooling, professionalization, etc.). The second examines the stylistic features of cognition across different cultures, especially those that differ in the relationship between individuals and the group (i.e., 'individualistic' versus 'collectivist' cultures), as well as their evolutionary foundations, neurophysiological correlates, and potential genetic underpinnings" [5]. The authors assert that the first area of research aligns with the ideas of renowned psychologists Vygotsky LS and Luria AR.

The development of functional magnetic resonance imaging (fMRI) in the late twentieth century significantly advanced neuroscience's understanding of neural networks. Previous research using simplified brain circuits often failed to explain why individuals choose certain objects or actions and why predictions about behavior often lacked precision. Data obtained through fMRI provided new insights into cognitive processes, answering some longstanding questions and enabling the inclusion of disciplines such as linguistics, philology, and literary studies into interdisciplinary research.

The addition of the "Philosophy of Consciousness" to cultural neuroethics has been crucial in preventing this field from becoming a purely brain-centric science, detached from human concerns. The aim is to ensure that research results benefit individuals. Socially-oriented programs developed within this framework are now widely applied in various professional domains. For instance, these programs can assess the suitability of job applicants by evaluating their predispositions for certain professional requirements. These tools can also be used to evaluate the suitability of professional groups (e.g., musicians, taxi drivers, etc.). However, it is important to maintain an individualized approach, as an incorrect or overly rigid evaluation process may discourage individuals from pursuing their careers. A template-driven approach that fails to account for individual differences may lack objectivity and accuracy in evaluating personal abilities and professional potential.

There have also been positive results in cultural neuroscience research, particularly in studies on bilingualism. This field not only explores professional groups but also examines the phenomenon of bilingualism, which has long been recognized. Bilingualism refers to the alternate use of two languages by an individual or group of people. Since language reflects culture, it is reasonable to study cultural patterns through language. Bilingualism, which involves the simultaneous use of two languages, offers a unique perspective by encompassing two distinct cultural worldviews. Early twentieth-century linguists were astounded by how individuals could integrate multiple linguistic and cultural semiotic systems within themselves, enabling quick thinking, unique cognitive processes, and the development of creative potential. Research on bilingualism demonstrates that full proficiency in two cultures and languages contributes to an individual's success in both career and life [6]. This success is fostered by a structured educational system and ongoing motivation. Studying brain function as individuals master content in two languages, while maintaining cultural distinctions, offers the potential to develop programs that can effectively integrate monolingual individuals into foreign linguistic and cultural environments, building a bilingual worldview.

Russia's multicultural makeup and the internal migration of various national groups provide a compelling rationale for advancing cultural neuroscience, particularly in developing methodologies for teaching multilingual children and adults. The importance of promoting the neuroscience of bilingualism as a cultural phenomenon is clear. Without a deep understanding of the cultural characteristics of the native speakers of a studied language, full immersion into that language is not possible. The urgency of these studies is underscored by the risks posed by neglecting a country's cultural and linguistic policy, which can lead to ethnic hostility and conflict.

Psychologist Zinchenko YuP identifies key challenges in studying bilingualism, such as "methodological difficulties that hinder the systematization and generalization of data, as well as the application of results in various fields of social practice" [7]. Like other subfields in cultural neuroscience, bilingualism research faces challenges, including data subjectivity,

insufficient interdisciplinary collaboration, a lack of objective data on the relationship between culture and language(s), and inconsistent findings [8]. Psychologist Novitsky NYu notes that "one of the most significant neurobiological issues of our time is understanding the mechanisms of language interaction in the bilingual brain and their effects on speech and non-speech brain functions" [9]. He also highlights the challenge of "cognitive control" in forming bilingual and multilingual subject groups.

A different, anthropological approach is proposed by American psychologist Shinobu Kitayama. To address the issue of identifying the roots of social phenomena, he suggests using genetic markers (known as ancestry informative markers) to determine "whether observed cultural differences are truly cultural (mediated by acculturation) or at least partially genetic (mediated by genetic proximity to certain ethnic ancestors)" [10]. By understanding the foundations of certain cultural phenomena, researchers can effectively resolve methodological challenges in studying bilingualism and apply specific methods in practice.

The ethical orientation of "cultural neuroscience" led to the emergence of a new field in the humanities: cultural neuroethics. This discipline is intended to identify, analyze, and address ethical dilemmas arising from the use of research results in the study of values, beliefs, habits, and behaviors across different cultures. Cultural neuroethics demands that researchers maintain objectivity when analyzing data related to the cultural characteristics of various nationalities and ethnic groups. Failure to uphold this impartiality risks reinforcing artificial stigmas or biases toward certain nations or peoples.

A critical issue is the potential for geographical or cultural stigmatization. For instance, if research suggests that a person born and raised in a valley (with its specific climate) may be less suited for employment than someone from a mountainous region, this could reinforce discriminatory practices. Historically, people have tended to select companions and colleagues based on cultural and national similarities, and the misuse of scientific findings could exacerbate such tendencies, fostering stereotypes and divisions between different groups. Even the scientifically verified differences between people from different regions, such as between the East and West, may intensify pre-existing tensions if misused. Although humans belong to the same species — *Homo sapiens* — such knowledge could lead to increased feelings of incomprehension and division. The relationship between language and culture is another important consideration in cultural neuroethics. Language serves as a core component of culture, and misinterpretations between languages can give rise to misunderstandings. For example, the phenomenon of "false friends" in translation — where similar words have different meanings in different languages — illustrates the complexity of cross-cultural communication. This further highlights the inseparable link between culture and language.

## CONCLUSION

Cultural neuroethics is a field faced with numerous ethical challenges, such as brain mapping and research involving human subjects. This makes the study of cultural neuroethics multifaceted and complex. While it is impossible to address all of these challenges in this article, the potential of cultural neuroscience for understanding human consciousness, perception, and creativity is significant. The study of bilingualism is particularly promising, as it provides insights into how the use of two languages influences cognitive processes and personal

development. Research shows that bilingualism fosters unique cognitive and creative abilities, linked to distinct neural connections in the bilingual mind. These insights could help to better understand the emergence of creative potential and the concept of creative freedom.

The significance of cultural neuroscience and neuroethics lies in their ability to explore the interplay between cultural factors and neurobiological processes. This contributes not only to theoretical advances but also to practical applications

in fields such as education, professional development, and cultural integration. Cultural neuroscience approaches can aid in designing programs that facilitate the integration of monolingual individuals into new linguistic and cultural environments — an especially relevant task in multinational and migratory societies. In conclusion, research in cultural neuroscience opens new avenues for understanding the complex relationship between culture and cognitive processes, while offering practical solutions for improving social integration and quality of life.

## References

1. Karlén M. Cultural threads in neuroethics exploration. Uppsala universitet. 2024. Available from URL: <https://www.uu.se/en/centre/crb/news/archive/2024-01-24-cultural-threads-in-neuroethics-exploration>
2. Fet AI. Instinkt i sotsial'noye povedeniye. Rehoboth, New Mexico, USA. 2015; 108
3. Causadias JM, Telzer EH, Gonzales NA. The handbook of culture and biology. Hoboken, NJ: John Wiley et Son, 2018; 560 s.
4. Danilkina AS. Kul'turnaya neyronauka: issledovaniye obshchestvennykh protsessov na makrourovne? Kaspiskiy region: politika, ekonomika, kul'tura. 2020; 65 (4): 120–123.
5. Falikman MV, Koul M. «Kul'turnaya revolyutsiya» v kognitivnoy nauke: ot neyronnoy plastichnosti do geneticheskikh mekhanizmov priobreteniya kul'turnogo opyta. Kul'turno istoricheskaya psikhologiya. 2014; 10 (3): 13.
6. Kovaleva TV. Istoricheskii bilingvizm v Rossii kak otrazheniye kul'turno-yazykovoy traditsii: monografiya. SPb.: SPbFO, 2011; 203
7. Zinchenko YuP, Shaygerova LA, Dolgikh AG, Savel'yeva OA. Metodologicheskiye problemy issledovaniya vliyaniya dvuyazychiya na kognitivnyye protsessy i etnokul'turnuyu identichnost'. Vestnik Moskovskogo universiteta. Psikhologiya. 2019; 14 (1): 174–194.
8. Bylund E, Antfolk J, Abrahamsson N, Olstad AM, Norrman G, Lehtonen M (June 2023). "Does bilingualism come with linguistic costs? A meta-analytic review of the bilingual lexical deficit". Psychonomic Bulletin & Review. 2023; 30 (3): 897–913.
9. Novitskiy NYu. Osobennosti funktsionirovaniya mozga bilingvov pri vypolnenii rechevykh i obshchikh kognitivnykh zadach. Sovremennaya zarubezhnaya psikhologiya. 2016; 5 (4): 77–84
10. Kitayama Sh, Huff S. Cultural Neuroscience: Connecting Culture, Brain, and Genes. Emerging Trends in the Social and Behavioral Sciences. 2015; 1–16. Available from URL: [https://www.researchgate.net/publication/299863606\\_Cultural\\_Neuroscience\\_Connecting\\_Culture\\_Brain\\_and\\_Genes](https://www.researchgate.net/publication/299863606_Cultural_Neuroscience_Connecting_Culture_Brain_and_Genes)

## Литература

1. Karlén M. Cultural threads in neuroethics exploration. Uppsala universitet. 2024. Available from URL: <https://www.uu.se/en/centre/crb/news/archive/2024-01-24-cultural-threads-in-neuroethics-exploration>
2. Фет А. И. Инстинкт и социальное поведение. Rehoboth, New Mexico, USA. 2015; 108
3. Causadias JM, Telzer EH, Gonzales NA. The handbook of culture and biology. Hoboken, NJ: John Wiley et Sons. 2018; 560 с.
4. Данилкина А. С. Культурная нейронаука: исследование общественных процессов на макроуровне? Каспийский регион: политика, экономика, культура. 2020; 65 (4): 120–123.
5. Фаликман М. В., Коул М. «Культурная революция» в когнитивной науке: от нейронной пластичности до генетических механизмов приобретения культурного опыта. Культурно историческая психология. 2014; 10 (3): 13.
6. Ковалева Т. В. Исторический билингвизм в России как отражение культурно-языковой традиции: монография. СПб.: СПбФО, 2011; 203
7. Зинченко Ю. П., Шайгерова Л. А., Долгих А. Г., Савельева О. А. Методологические проблемы исследования влияния двуязычия на когнитивные процессы и этнокультурную идентичность. Вестник Московского университета. Психология. 2019; 14 (1): 174–194.
8. Bylund E, Antfolk J, Abrahamsson N, Olstad AM, Norrman G, Lehtonen M (June 2023). "Does bilingualism come with linguistic costs? A meta-analytic review of the bilingual lexical deficit". Psychonomic Bulletin & Review. 2023; 30 (3): 897–913.
9. Новицкий Н. Ю. Особенности функционирования мозга билингвов при выполнении речевых и общих когнитивных задач. Современная зарубежная психология. 2016; 5 (4): 77–84.
10. Kitayama Sh, Huff S. Cultural Neuroscience: Connecting Culture, Brain, and Genes. Emerging Trends in the Social and Behavioral Sciences. 2015; 1–16 p. Available from URL: [https://www.researchgate.net/publication/299863606\\_Cultural\\_Neuroscience\\_Connecting\\_Culture\\_Brain\\_and\\_Genes](https://www.researchgate.net/publication/299863606_Cultural_Neuroscience_Connecting_Culture_Brain_and_Genes)