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LURIA LURING THE WORLD

Igor F. Mikhailov
Institute of Philosophy,
Russian Academy of Sciences,
Moscow, Russia, ifmikhailov@iph.ras.ru,
https://orcid.org/0000-0001-8511-8849

Abstract. The paper explores the contributions of Alexander Romanovich Luria, a Russian neuropsychologist who significantly influenced the study of brain function and neurocognitive science. Luria's interdisciplinary approach, bridging psychology, neurology, and linguistics, provides a novel framework for understanding brain-behavior relationships. His work has been underpinned by the Vygotskian paradigm of sociocultural development. Luria argued that complex mental functions — memory, language, and perception — are formed through social interactions, with higher cognitive functions being mediated by language. He also developed and adapted Pyotr Anokhin's concept of functional systems, proposing that cognitive processes are not localized within single brain areas but instead are distributed across various interconnected brain regions, with three core brain units each fulfilling distinct roles. This model laid the groundwork for understanding brain function in terms of distributed networks, which closely aligns with contemporary neuroscience and neuroimaging studies. The paper describes the extensive reception and influence of

Alexander Luria's work in the Anglophone academic world, even compared to that of Lev Vygotsky and Pyotr Anokhin. The author notes that Luria's comparatively more mechanistic approach, which involves immediately mapping theoretical insights onto brain physiology, is more in line with modern research standards, making his work more accessible and relatable to contemporary neurocognitive science. Luria's English language publications were well-received in the West and considered landmarks in neuropsychology. This reception is testament to Luria's influence and reputation as a precursor of cognitive neuroscience and how his work laid the foundation for modern neuropsychological testing in memory, language, and perceptual disorders. While some critiques note that his publications were somewhat dense and complex, making them more challenging for practitioners outside academia, Luria's work remains influential, shaping approaches to brain injury, cognitive development, and psycholinguistics. Overall, the paper highlights how Luria lured the world with his innovative interdisciplinary contributions to neuropsychology, which continue to inspire and shape contemporary research in cognitive neuroscience.

Keywords: Luria, cognitive neuroscience, brain, functional system, Vygotsky, Anokhin, distributed cognition, memory, brain injury, predictive processing

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МИР, ОЧАРОВАННЫЙ ЛУРИЕЙ

Игорь Феликсович Михайлов
Институт философии Российской академии наук,
Москва, Россия, ifmikhailov@iph.ras.ru,
https://orcid.org/0000-0001-8511-8849

Аннотация. В статье исследуется вклад А. Р. Лурии, российского нейропсихолога, который оказал значительное влияние на изучение функций мозга и нейрокогнитивную науку. Междисциплинарный подход Лурии, объединяющий психологию, неврологию и лингвистику, создаёт основу для понимания взаимосвязей мозга и поведения. Его работа была основана на идеях

социокультурного развития Выготского. Лурия утверждал, что сложные психические функции — память, язык и восприятие — формируются посредством социальных взаимодействий, при этом высшие когнитивные функции опосредуются языком. Он также развил и адаптировал концепцию функциональных систем Петра Анохина, предположив, что когнитивные процессы не локализованы в отдельных областях мозга, а вместо этого распределены по различным взаимосвязанным областям мозга, при этом три основных блока мозга выполняют различные роли. Эта модель заложила основу для понимания функций мозга с точки зрения распределенных сетей, что тесно связано с современными исследованиями нейронауки и нейровизуализации. В статье отмечается позитивный прием и заметное влияние работ Лурии в англоязычном академическом мире, даже по сравнению с рецепцией Выготского и Анохина. Автор отмечает, что сравнительно более механистический подход Лурии, который включает в себя непосредственную проверку теоретических идей на физиологии мозга, больше соответствует современным стандартам исследований, делая его работу более соотносимой с современной нейрокогнитивной наукой. Публикации Лурии на английском языке были хорошо приняты на Западе и считались вехами в нейропсихологии. Этот прием свидетельствует о влиянии и репутации Лурии как предшественника когнитивной нейронауки и принятии его работ в качестве основы для современного нейропсихологического тестирования при расстройствах памяти, языка и восприятия. Хотя некоторые критики отмечают, что его публикации были чересчур насыщенными и сложными для практиков за пределами академической среды, работа Лурии продолжает определять подходы к травмам головного мозга, когнитивному развитию и психолингвистике. Автор полагает, что Лурия очаровал мир своим новаторским междисциплинарным вкладом в нейропсихологию, который продолжает вдохновлять и формировать современные исследования в области когнитивной нейронауки.

 **Ключевые слова:** Лурия, когнитивная нейронаука, мозг, функциональная система, Выготский, Анохин, распределенное познание, память, травма мозга, предиктивная обработка

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Luria's contributions

Alexander Romanovich Luria (1902–1977), a Russian neuropsychologist, contributed significantly to the study of brain function and neurocognitive science. His interdisciplinary approach, bridging psychology, neurology, and linguistics, introduced a novel framework for understanding brain-behavior relationships. Although his work initially faced barriers in Western circulation due to geopolitical restrictions, Luria's theories have had a profound influence on modern neurocognitive science, shaping approaches to brain injury, cognitive development, and psycholinguistics.

Luria's work is rooted in the Vygotskian paradigm of sociocultural development. Building on Lev Vygotsky's ideas, Luria explored how culture, language, and environment shape cognitive processes. He argued that complex mental functions — memory, language, and perception — are formed through social interactions, with higher cognitive functions being mediated by language.

He also inherited and further developed Pyotr Anokhin's concept of *functional systems*.

Particularly, Luria proposed that cognitive activities do not localize strictly within single brain areas but instead are distributed across various interconnected brain regions. He identified three core brain units with distinct roles:

- The first unit, involving brainstem structures, regulates arousal and attention;
- The second unit, centered on the posterior cortical areas, handles information processing;
- The third unit, involving the frontal lobes, integrates information for action planning and execution.

This model laid the groundwork for understanding brain function in terms of distributed networks, an idea that aligns closely with contemporary neuroscience and neuroimaging studies.

P. K. Anokhin developed this idea [Anokhin, 1974, p. 190–254] as part of his work on physiological and biological mechanisms underlying *behavior*, particularly focusing on how different components within an organism work together as a coordinated system to produce complex actions and responses. He described functional systems as self-regulating, goal-directed units that integrate multiple physiological processes across different regions to achieve a specific outcome.

A. R. Luria later adapted and expanded Anokhin's concept of functional systems [Luria, 1966, p. 24–38] to neuropsychology, applying it to explain *cognitive processes* and the organization of *complex mental functions*. While Anokhin initially introduced functional systems in a more physiological and reflexive context, Luria took this framework further, using it to propose that cognitive functions are also distributed

across interconnected brain regions rather than being localized to specific areas. Luria's adaptation of the functional systems model emphasized how different brain regions dynamically interact to support higher cortical functions such as language, memory, and perception, contributing to the foundation of neuropsychological rehabilitation approaches.

Thus, while Anokhin pioneered the original concept, Luria's application of it to neurocognitive processes was transformative and provided a critical bridge from physiological to psychological understanding within neuropsychology.

Another Luria's innovation after Anokhin's framework was that his observations replicate and expand upon Vygotsky's original ideas, and Luria contributed with a cross-modal functional organization of brain areas by speech mediation, according to which "...external aids or historically formed devices are essential elements in the establishment of functional connections between individual parts of the brain, and that by their aid, areas of the brain which previously were independent become components of a single functional system" [Luria, 1976a, p. 31].

Luria also developed *syndrome analysis*, a method to study deficits by analyzing disrupted functional systems rather than isolated regions. Syndrome analysis evaluates specific symptom clusters resulting from brain damage, considering both direct and indirect effects. His case studies, including detailed work with brain-injured soldiers during World War II, showcased this approach's clinical utility, emphasizing personalized rehabilitation over generalized treatment. These particular achievements still persist and shape some of the more modern studies of psychic deseases and cognitive deficits [Zaytseva *et al.*, 2015].

Luria's methodological rigor was evident in his use of case studies, particularly in [Luria, 1968] , which examined the remarkable memory of patient Solomon Shereshevsky. The approach utilized focused on the individual's subjective experience, integrating qualitative and quantitative data, which was a precursor to modern neurocognitive case study methodologies. The applied techniques also presaged cognitive neuropsychology's detailed assessment of brain-behavior relationships and laid the foundation for neuropsychological testing used in assessing memory, language, and perceptual disorders today.

English editions and their reception

Luria's presence in the anglophone academic press has been nearly comprehensive, even compared to that of Vygotsky and Anokhin, and proved his influence and reputation as one of the precursors of cognitive neuroscience. This may be due to his comparatively more mechanistic approach, which involves immediately mapping theoretical insights onto brain physiology, which is more in line with modern research standards.

In “Higher Cortical Functions in Man” (1966) [Luria, 1966] Luria outlines the role of the frontal lobes and the setup of higher mental functions. His explanations are essentially based on case studies and clinical data. This book has added essentially to the promotion of his name and achievements to the Western academic world. His version of functional systems theory explaining the brain's adaptive capabilities won quite a number of adepts among Western scholars. At the same time, this book, otherwise provoking and insightful, has been found somewhat too dense and complex, especially for a wide circle of practicing physicians.

The second volume, “The Working Brain: An Introduction to Neuropsychology” (1973) [Luria, 1976a], gives a vaster picture of Luria's theoretical findings, while paying special attention to distribution of cognitive processes among brain regions. Its detailed analysis and practical implications not only yielded academic praise, but also advised particular rehabilitation strategies to those working in clinics. Although professional and fruitful, the book was noted by some as quite demanding of background in neuropsychology.

“The Neuropsychology of Memory” (1980) [Luria, 1976b] identifies particular brain processes underlying memory as a principal cognitive function. Its standpoint has been extended and generalized in numerous subsequent studies by Western scholars. While integrating its theoretical insights into clinical practice of memory rehabilitation has been found by some a bit of challenge, yet its insights proved to be of value.

Impact on Western Neurocognitive Science

Findings from Luria’s quest for neurophysiological proof of the cognitive processes underlying language acquisition had a profound effect on psycholinguistics and the study of aphasia, inspiring researchers to develop models for understanding language processing in brain-damaged patients. His thorough theory of language organisation, which proposed that linguistic functions are distributed throughout the left hemisphere, has influenced aphasia treatment and neurocognitive models of language.

Norman Geschwind and Edith Kaplan, two influential figures in neuropsychology, were significantly inspired by Alexander Luria’s ideas, particularly his work on the functional systems of the brain and his focus on how complex behaviors are the result of interconnected neural processes. Their work was instrumental in expanding Luria’s insights within Western neuropsychology, especially in language processing, brain-behavior relationships, and neuropsychological assessment.

Thus, Norman Geschwind [Geschwind, 1965], often regarded as a father of behavioral neurology in the West, was particularly influenced by Luria’s concept

of distributed functional systems and the relationship between brain structure and complex cognitive functions. His study of *disconnection syndromes* were inspired by Luria's view that mental functions arise from coordinated activity across multiple brain regions. He proposed that cognitive and behavioral deficits could arise not only from direct damage to specific brain regions but also from disruptions in the connections between them. This focus on brain connectivity became a fundamental idea in understanding how pathways linking different brain areas support language, perception, and other cognitive functions.

Geschwind's research into *aphasia* — the study of language impairments — drew heavily on Luria's methods and principles. He expanded Luria's work by focusing on how specific brain lesions affect language functions and by advocating for the idea of hemispheric specialization, with a strong emphasis on the left hemisphere's role in language. In particular, Geschwind studied *Broca's area* and *Wernicke's area* and the connections between them, identifying how disruptions in these areas could lead to different types of aphasia, such as Broca's aphasia (impairment in language production) and Wernicke's aphasia (impairment in language comprehension). This approach established a foundation for the study of brain-language relationships and emphasized the role of anatomical connections in language processing.

The *neurolinguistic pathways* [Geschwind, 1970] discovered by Geschwind, which stem from Luria's ideas of distributed processing, are actually routes within the brain structure that facilitate language functions. The proposed "Geschwind-Wernicke model" of language, explains the dependence of language comprehension and production on complex interactions across different brain areas. This model has had a great impact on neuropsychology, as it shows that language is not confined to isolated regions but emerges in complex, interconnected systems — an idea that directly refers to Luria's own views.

Edith Kaplan, known for her contributions to the theory and practice of neuropsychological assessment, has heavily based on Luria's approaches to brain-behavior relationships [Delis, Kaplan and Kramer, 2001]. She has promoted a systematic approach to cognitive deficits, utilizing Luria's *qualitative, process-oriented* understanding of causual connection between brain damage and behavior.

Kaplan's understanding of *neuropsychological assessment* owes a lot to Luria's syndrome analysis, as it specially highlighted the processes underlying observed cognitive deficits. Her emphasis on *qualitative observation* essentially complemented purely quantitative scoring, not only registering patients' success or failure on tasks but also identifying the way they approached these tasks. This brought her to identifying patterns and strategies of discovering underlying cognitive strengths and weaknesses, which was reminiscent of Luria's approach to

analyzing manifestations of functional disruptions in brain systems in observable behaviors.

Her best-known achievement has been the Boston Process Approach [Kaplan, 1988] to neuropsychological assessment formulated as a direct application of Luria's qualitative assessment techniques to modern neuropsychology. It primarily consists in examining cognitive processes and problem-solving strategies with the aim to reveal the impact of brain injuries on specific cognitive functions. Reaching beyond standardized scores, Kaplan's approach allows for qualitative assessment of patients' performance to effectively guess on their cognitive processes. This method is now widely accepted in clinical practice and has helped a lot of people in providing their individualized rehabilitation and treatment plans.

In sum, Kaplan's work has allowed to develop new assessment tools that implemented Luria's concept of complex, interdependent functions. Her collaboration on the Boston Diagnostic Aphasia Examination (BDAE), for example, provided a comprehensive assessment of language abilities by evaluating the individual's speech, comprehension, repetition, and other linguistic abilities in detail. This tool reflected Luria's ideas about functional systems by examining language deficits through multiple dimensions rather than in isolation, helping clinicians distinguish among types of aphasia and better understand the neuropsychological basis of language impairment.

Both Geschwind and Kaplan helped popularize and expand Luria's ideas within Western neuropsychology. Geschwind's work on disconnection syndromes and neurolinguistic pathways highlighted the importance of brain connectivity in cognition, while Kaplan's process-oriented assessments and the Boston Process Approach brought Luria's qualitative methods into clinical practice. Together, their contributions helped establish a more comprehensive, nuanced approach to understanding brain-behavior relationships, particularly in the realms of language, cognition, and clinical neuropsychological assessment.

The role of Michael Cole

Luria's theories on the *social origins of cognitive development* have had a significant impact on developmental psychology, particularly in the work of Michael Cole [Cole, 2002; 2003; 2022] and others who applied Vygotskian and Lurian principles to Western educational contexts. This focus on sociocultural dynamics provided an alternative to Piagetian [Cole, Wertsch, 1996] views and has informed approaches to understanding learning disabilities, ADHD, and autism.

Luria's syndrome analysis, with its emphasis on understanding cognitive deficits in functional systems terms, became foundational in neuropsychological rehabilitation. His work directly influenced cognitive rehabilitation approaches by

focusing on restoring disrupted cognitive pathways rather than treating isolated symptoms. Western neurorehabilitation programs now widely incorporate Lurian principles, focusing on holistic recovery processes that support neuroplasticity and functional compensation.

Being a prominent American psychologist and cognitive scientist himself, Michael Cole was inspired by Alexander Luria's work, particularly in what concerns cultural-historical approach in general and developmental psychology. Owing to Cole, Luria's ideas penetrated into cross-cultural psychology that studies the shaping of cognitive processes by cultural tools, language, and social contexts.

1. Cultural-Historical Approach to Cognitive Development. Cole managed to apply the view on cultural-historical nature of psychological processes to research on cognitive development in different cultural contexts [Cole, 1996]. He opposed the universality of cognitive functions in favour of them being shaped by the cultural environment, language, and tools utilised by humans. This defined his research on cultural variation in cognition, while setting up experiments with indigenous and rural communities in Africa and other non-Western areas.

Cole' innovative research in cross-cultural cognition dealt with problem-solving and learning in people of different cultural environments. As Luria's disciple [Cole, 2003; 2022; Cole, Levitin and Luria, 2005], he found that cognitive processes vary across cultures due to differences in social practices, educational systems, and language. Owing to his work, the Western-centric assumptions about cognitive development were challenged, and the need to study psychological functions within specific cultural and historical contexts was emphasized instead.

2. Development of Cultural Psychology as a Discipline. The impact of Luria's ideas on Cole went as far as to him establishing cultural psychology as a distinct discipline about cognition being socially mediated and historically situated. Cole opposed the negligence of the role of culture by traditional cognitive psychology by incorporating Luria's and Vygotsky's insights into the field. Hy emphasized the dependence of cognitive functions development on interaction with cultural artifacts, language, and other symbolic systems, which was obviously inspired by Luria's understanding of the interplay between culture and cognition.

Cole managed to collect a vast corpus of empirical data on the participation of cultural tools, such as language and symbols, in learning and development. Particularly, he explored issues of literacy, basing on Luria's studies of how written language and literacy practices impact cognitive development. His experiments showed that literacy doesn't boil down to just decoding text but also engages cultural norms and traditions of processing information, remembering, and reasoning — thus reflecting Luria's insights on higher mental functions.

3. Collaborative Work on Laboratory of Comparative Human Cognition (LCHC). Committed to Luria's integrative and cross-cultural approach to psychology, Cole founded the Laboratory of Comparative Human Cognition (LCHC). The LCHC was designed to bring together researchers of relevant strains who study human cognition as dependent on cultural and social context. Often using ethnographic methods and cultural comparisons, they went on unveiling the principal connection of cognition to the historical and sociocultural contexts of its development.

The predominating paradigm for LCHC's research into shaping cognitive functions with cultural tools were Luria's studies in Uzbekistan, which showed, in particular, that groups of Uzbek men and women differing in their social and educational statuses were differently susceptible to the well-known optical illusions that used to affect Westerners' vision more or less uniformly [Lamdan, 2013]. Cole's team examined the role of culturally specific tools, such as counting systems and traditional practices, in shaping memory, perception, and reasoning, drawing clear inspiration from Luria's findings that cognitive processes are deeply influenced by sociocultural factors.

4. Focus on Practical and Functional Cognitive Skills. As well as Luria, who preferred adapting his research to practical, everyday cognitive tasks, Cole set up his studies of cognitive skills in real-life contexts rather than constraining them to made-out laboratory staging. This approach is partly determined by Luria's functional systems model that posits mental processes as relevant to real-world demands and social interactions.

Cole's work emphasized how cognitive functions such as memory and problem solving depend on the context in which they occur. For example, he demonstrated that people could perform cognitive tasks better or differently when they are embedded in meaningful, real-world contexts, rather than in abstract, decontextualized tests. This echoes Luria's approach to analyzing cognitive functions in practical, functional terms, emphasizing how context influences cognition.

5. Theoretical Contributions to Socio-Cultural Mediation and Learning. Luria's and Vygotsky's idea of cultural tools *mediation* of cognitive development influenced Cole greatly. His work focused on external symbolic systems, language the most important of them, that fundamentally shape cognitive development by mediating thinking, learning, and problem-solving.

So, in Cole's work, cognitive development appeared to be a mediated process, whereby cultural artifacts and practices shape how individuals learn and think. Luria's concept of the mediation and Vygotsky's concept of internalization of social practices and knowledge forage Cole's idea to a great extent.

Overall, Cole's work extended Luria's ideas by emphasizing that cognitive functions cannot be separated from the cultural contexts in which they are located.

His contributions laid the foundation for the field of cultural psychology by expanding on Luria's belief that cognition is shaped by social, historical, and environmental factors. Cole's cross-cultural research, his emphasis on real-world cognition, and his work on mediated learning all illustrate the profound influence of Luria's ideas on the development of socio-culturally oriented approaches to cognitive science. Cole's integration of Luria's theoretical framework helped to bridge Eastern and Western perspectives, advancing our understanding of how cognitive development is a culturally and contextually bound process. Through his work, Cole not only preserved but also extended Luria's legacy by reinforcing the importance of culture in the study of human cognition.

More on Luria's impact

Several Western researchers have played an important role in integrating and expanding Alexander Luria's theories into neurorehabilitation practice. Their work often draws on Luria's principles of functional systems and syndromic analysis, particularly in cognitive rehabilitation following traumatic brain injury. Some of the most important contributors include Muriel Lezak, Barbara Wilson, Yehuda Ben-Yishay, George Prigatano, Elkhonon Goldberg, and Donald Stuss.

Muriel Lezak is known for her contributions to neuropsychological assessment and rehabilitation. Her seminal work, *Neuropsychological Assessment* [Lezak, Howieson and Loring, 2004], drew on Luria's principles of syndromic analysis while focusing on qualitative assessment methods for a holistic understanding of cognitive deficits. Lezak's approach to assessing brain injury and developing individualized rehabilitation programs has become a cornerstone of Western neurorehabilitation, emphasizing patient-centered and functionally meaningful strategies.

Barbara Wilson is a neuropsychologist who has applied Luria's concepts extensively to the rehabilitation of memory and cognitive function after *traumatic brain injury* [Wilson, Winegardner and Clare, 2007]. Her work in establishing rehabilitation centers and treatment programs in the UK and her development of the Rivermead Behavioural Memory Test are direct applications of Luria's principles. Wilson's work emphasizes functional restoration and patient-centered approaches, which are fundamental to modern neurorehabilitation.

As a pioneer in the field of holistic neuropsychological rehabilitation, Yehuda Ben-Yishay's methods are inspired by Luria's view of the brain as an interconnected system of functions. Ben-Yishay's holistic approach to *rehabilitation after traumatic brain injury* [Ben-Yishay and Diller, 2011] in New York integrated psychological, social, and functional aspects, applying Luria's idea of using structured, real-world tasks to help patients regain independence and cognitive abilities.

Luria's holistic approach served as inspiration for George Prigatano's research on the neuropsychology of self-awareness in rehabilitation following traumatic brain injury [Prigatano, 1999]. He highlighted the need of self-awareness in healing, which Luria had discussed in his case studies as a component of cognitive rehabilitation. In order to encourage more comprehensive neurorehabilitation techniques, Prigatano created interventions to help patients become more self-aware and regulate their emotions.

Luria's pupil Elchonon Goldberg was instrumental in bringing Luria's views of *frontal lobe function* and *functional systems* to Western neuropsychology [Goldberg, 2009]. In order to address deficiencies in these areas after damage, he adapted his research on executive functions [Goldberg, 2001] and the function of the frontal lobes in behaviour regulation and problem solving [Goldberg, Harel, Malach, 2006] to cognitive rehabilitation strategies.

Donald Stuss's research on *frontal lobe functioning* [Stuss and Benson, 1986] and its role in complex behaviors and executive functions reflects Luria's functional systems model. His contributions to understanding how frontal lobe damage affects cognition and his rehabilitation work in developing strategies for executive dysfunctions have been highly influential in Western neurorehabilitation.

Besides, some authors may be mentioned as being implicitly led by Luria's findings.

Michael Merzenich, a pioneer in neuroplasticity [Merzenich, 2013], is indirectly influenced by Luria's concepts of brain plasticity in response to injury. Merzenich's work on the brain's capacity to reorganize itself, especially through sensory and motor training, mirrors Luria's belief in the adaptive, plastic nature of the brain. While Merzenich's work is more experimental and rooted in cortical mapping, his theories on functional reorganization and rehabilitation draw on Luria's principle that different brain regions can compensate for others in distributed cognitive networks.

Vladimir Alexandrovich Moscovitch, a prominent figure in memory research and cognitive neuroscience, has worked extensively on distributed memory networks and brain connectivity [Moscovitch, 1994]. Moscovitch's studies on how memory processes involve dynamic networks of regions across the cortex echo Luria's idea that complex functions are products of interaction across neural systems. His model of memory incorporates frontal, temporal, and parietal systems, illustrating the interconnected, distributed nature of cognition that Luria originally proposed.

Bruce Miller, a prominent neurologist specializing in frontotemporal dementia [Miller and Seeley, 2013], has conducted extensive research on distributed networks, particularly those involving the frontal and temporal lobes. Miller's research on

how neurodegenerative diseases affect distributed cognitive networks is inspired by Luria's work on the interconnected roles of brain regions in language, behavior, and emotion. Miller's use of cognitive exercises to stimulate preserved networks in patients reflects Luria's approach to neurorehabilitation and cognitive plasticity.

Antonio Damasio's work on *emotion and decision-making* [Damasio, 1994] is influenced by Luria's concept of functional systems involving networks that integrate cognitive and emotional processes. Damasio's *somatic marker hypothesis*, which describes how the brain integrates bodily signals with cognitive processing, reflects Luria's ideas about the distributed nature of cognition, where higher mental functions arise from interactions among systems rather than isolated areas.

The studies by Leslie Ungerleider and Mortimer Mishkin on the "*two-streams hypothesis*" [Mishkin, Ungerleider and Macko, 1983] of visual processing are aligned with Luria's functional systems approach. Their theory that the dorsal (where) and ventral (what) streams work together to create cohesive visual perception highlights distributed cognitive networks. While their work is largely experimental and focused on visual pathways, it aligns with Luria's concept of distributed networks working together to support complex cognitive functions.

Randy Buckner's research on the *default mode network (DMN)* [Buckner, Andrews-Hanna and Schacter, 2008] and its role in memory and self-referential thought draws on Luria's functional system ideas, demonstrating how brain areas across cortical and subcortical regions collaborate to support complex cognitive functions. Buckner's work on brain connectivity and distributed networks, especially related to the DMN, builds on Luria's perspective that mental functions are dynamically distributed across interconnected brain regions [Buckner and Carroll, 2007].

Marsel Mesulam's research on attentional networks and language processing [Mesulam, 1990] is directly influenced by Luria's approach to brain function. His studies on distributed networks for language and attention emphasize the roles of interconnected areas, reflecting Luria's belief that cognition is not localized to single regions but emerges from coordinated systems. Mesulam has explored how different areas contribute uniquely to functions like attention, memory, and language, much like Luria's approach to analyzing aphasia and other cognitive impairments [Summerfield *et al.*, 2008].

These researchers, directly and indirectly inspired by Luria, have expanded his theories on brain connectivity and plasticity, using advanced neuroscientific methods to further understand distributed cognitive networks and the adaptive potential of the brain. Their contributions have validated and expanded Luria's insights, reinforcing the idea that cognitive functions emerge from the dynamic, interconnected, and plastic nature of brain networks.

Luria and Predictive Processing

Karl Friston, known for his development of *dynamic causal modeling* and the *predictive processing* framework, has been indirectly influenced by Luria's functional systems theory. Friston's work models how brain regions work in concert to predict and respond to stimuli, reflecting Luria's views on the distributed and adaptive nature of cognitive functions [Friston, 2010]. His emphasis on the brain as a self-organizing system aligns with Luria's idea of the brain as a complex, integrated network of interconnected functions.

Karl Friston and his co-authors have rarely referred to Luria's findings (as, e. g., in [Parr *et al.*, 2021]) in their elaborations of *dynamic causal modeling*, *predictive coding*, or the *free energy principle*. Friston's work, while philosophically and conceptually aligned with some of Luria's theories, is largely rooted in a computational and mathematical approach to understanding brain function. Friston draws extensively from physics, information theory, and Bayesian inference rather than from clinical neuropsychology or functional systems theory as developed by Luria.

However, Friston's ideas on distributed and hierarchical brain function, the integration of sensory and motor systems, and the adaptivity of cognitive networks share important conceptual ground with Luria's functional systems theory. The free energy principle, for instance, emphasizes the brain's role as a predictive machine that minimizes uncertainty — a view that resonates with Luria's notion of the brain as an integrated, adaptive system in which distributed regions interact dynamically to achieve functional goals.

While Friston's theoretical frameworks in neuroscience are more abstract and computational, they extend the spirit of Luria's ideas about brain connectivity and the non-localized, systemic nature of cognitive functions.

Some later commentaries and secondary literature on Friston's work have noted these conceptual connections to Luria. There is a small but growing body of literature [Parr *et al.*, 2020; Thornton, 2017]) that reveals conceptual links between Karl Friston's theories (such as the free energy principle and predictive coding) and Alexander Luria's ideas about brain function, particularly the distributed and adaptive nature of cognitive processes. This topic may be worth of further elaborating, particularly because of Luria's extensive experimental heritage.

Conclusion

Alexander Luria's contributions to neurocognitive science transcend disciplinary and national boundaries. His work not only advanced our understanding of the brain's complexity but also introduced methodologies and frameworks that continue to shape neurocognitive research and clinical practices in the West. Luria's insights

into the brain's functional systems, his methodological innovations, and his patient-centered approach to clinical neuropsychology underscore his profound and lasting influence on the field. As neurocognitive science progresses, Luria's legacy pertains, demonstrating the enduring relevance of his pioneering vision.

The core of his legacy lies in his comprehensive view of the brain as an integrated, dynamic system. His theories anticipated contemporary concepts of brain connectivity and plasticity, which are now supported by neuroimaging research showing distributed networks for cognitive tasks. Furthermore, Luria's humanistic approach to neuropsychology — acknowledging the lived experience of individuals with cognitive impairments—remains a cornerstone in patient-centered care within Western neurocognitive science.

Список источников

Anokhin P. K. Biology and neurophysiology of the conditioned reflex and its role in adaptive behavior. Pergamon Press, 1974.

Ben-Yishay Y., Diller L. Cognitive Remediation in Traumatic Brain Injury: A Holistic Approach. Oxford University Press, 2011.

Buckner R. L., Andrews-Hanna J. R., Schacter D. L. The Brain's Default Network: Anatomy, Function, and Relevance to Disease // Annals of the New York Academy of Sciences. 2008. Vol. 1124, no. 1. P. 1–38.

Buckner R. L., Carroll D. C. Self-projection and the brain // Trends in Cognitive Sciences. 2007. Vol. 11, no. 2. P. 49–57.

Cole M. Cultural Psychology: A Once and Future Discipline. Harvard University Press, 1996.

Cole M. Alexander Luria, Cultural Psychology, and the Resolution of the Crisis in Psychology // Journal of Russian & East European Psychology. 2002. Vol. 40, no. 1. P. 4–16.

Cole M. Alexander Romanovich Luria: A scientific biography // Journal of the History of the Behavioral Sciences. 2003. Vol. 39, no. 1. P. 90–91.

Cole M. Remembering Alexander Luria... // Cultural-Historical Psychology. 2022. Vol. 18, no. 3. P. 54–57.

Cole M., Levitin K., Luria A. R. Autobiography of Alexander Luria: A Dialogue with the Making of Mind. Psychology Press, 2005.

Cole M., Wertsch J. V. Beyond the Individual-Social Antinomy in Discussions of Piaget and Vygotsky // Human Development. 1996. Vol. 39, no. 5.

Damasio A. Descartes' Error: Emotion, Reason, and the Human Brain. G. P. Putnam's Sons, 1994. 312 p.

Delis D. C., Kaplan E., Kramer J. H. Delis-Kaplan Executive Function System (D-KEFS). Examiner's manual // The Psychological Corporation. 2001.

Friston K. The free-energy principle: A unified brain theory? // Nature Reviews Neuroscience. 2010. Vol. 11, no. 2. P. 127–138.

Geschwind N. Disconnexion Syndromes in Animals and Man // Brain. 1965. Vol. 88, no. 2. P. 237–237.

Geschwind N. The Organization of Language and the Brain // Science. 1970. Vol. 170, no. 3961. P. 940–944.

Goldberg E. The new executive brain: Frontal lobes in a complex world. New York: Oxford University Press, 2009. 334 p.

Goldberg I. I., Harel M., Malach R. When the Brain Loses Its Self: Prefrontal Inactivation during Sensorimotor Processing // Neuron. 2006. Vol. 50, no. 2. P. 329–339.

Kaplan E. Boston Process Approach to Neuropsychological Assessment. The Guilford Press, 1988.

Lamdan E. Who had illusions? Alexander R. Luria's Central Asian experiments on optical illusions // Dubna Psychological Journal. 2013. No. 3. P. 66–76.

Lezak M. D., Howieson D. B., Loring D. W. Neuropsychological Assessment. Oxford University Press, 2004. Iss. 4.

Luria A. R. Higher Cortical Functions in Man. New York: Basic Books, 1966.

Luria A. R. The Mind of a Mnemonist: A Little Book about a Vast Memory. New York: Basic Books, 1968. 169 p.

Luria A. R. The working brain: An introduction to neuropsychology. 1976a.

Luria A. R. The Neuropsychology of Memory. John Wiley & Sons Inc, 1976b. 372 p.

Merzenich M. Soft-Wired: How the New Science of Brain Plasticity Can Change Your Life. Parnassus Publishing, 2013.

Mesulam M. Large-Scale Neurocognitive Networks and Distributed Processing for Attention, Language, and Memory // Annals of Neurology. 1990. Vol. 28, no. 5. P. 597–613.

Miller B. L., Seeley W. W. Frontotemporal Dementia // Neurobiology of Brain Disorders. Elsevier, 2013.

Mishkin M., Ungerleider L. G., Macko K. A. Object Vision and Spatial Vision: Two Cortical Pathways // Trends in Neurosciences. 1983. No. 6. P. 414–417.

Moscovitch V. A. Cognitive Resources and Dual-Task Interference Effects on Retrieval in Normal People: The Role of the Frontal Lobes and the Medial Temporal Lobes // Neuropsychology. 1994. Vol. 8, no. 4. P. 524–534.

Parr T. et al. Prefrontal Computation as Active Inference // Cerebral Cortex. 2020. Vol. 30, no. 2. P. 682–695.

Parr T. et al. The computational neurology of movement under active inference // Brain. 2021. Vol. 144, no. 6. P. 1799–1818.

Prigatano G. P. Principles of Neuropsychological Rehabilitation. Oxford University Press, 1999.

Stuss D. T., Benson D. F. The Frontal Lobes. Raven Press, 1986.

Summerfield C. et al. Neural repetition suppression reflects fulfilled perceptual expectations // Nature Neuroscience. 2008. Vol. 11, no. 9. P. 1004–1006.

Thornton C. Predictive processing simplified: The infotropic machine // Brain and Cognition. 2017. Vol. 112. P. 13–24.

Wilson B. A., Winegardner J., Clare L. Rehabilitation of Memory. Guilford Press, 2007.

Zaytseva Y. et al. Luria revisited: cognitive research in schizophrenia, past implications and future challenges // Philosophy, Ethics, and Humanities in Medicine. 2015. Vol. 10, no. 1. P. 4.

References

Ben-Yishay, Y. & Diller, L. (2011) *Cognitive Remediation in Traumatic Brain Injury: A Holistic Approach*. Oxford University Press.

Buckner, R. L., Andrews-Hanna, J. R. & Schacter, D. L. (2008) "The Brain's Default Network: Anatomy, Function, and Relevance to Disease," *Annals of the New York Academy of Sciences*, 1124(1), pp. 1–38.

Cole, M. & Scribner, S. (1974) *Culture and Thought: A Psychological Introduction*. Wiley.

Cole, M. (1996) *Cultural Psychology: A Once and Future Discipli*ne. Harvard University Press.

Damasio, A. (1994*) Descartes' Error: Emotion, Reason, and the Human Brain*. G. P. Putnam's Sons.

Delis, D. C., Kaplan, E. & Kramer, J. H. (2001) *Delis-Kaplan Executive Function System (D-KEFS)*. The Psychological Corporation.

Friston, K. (2010) "The Free-Energy Principle: A Unified Brain Theory?" *Nature Reviews Neuroscience*, 11(2), pp. 127–138.

Geschwind, N. (1965) "Disconnexion Syndromes in Animals and Man, Parts I and II", *Brain*, 88(2), pp. 237–294.

Goldberg, E. (2001) *The Executive Brain: Frontal Lobes and the Civilized Mind*. Oxford University Press.

Kaplan, E. (1988) *Boston Process Approach to Neuropsychological Assessment*. The Guilford Press.

Lezak, M. D., Howieson, D. B. & Loring, D. W. (2004) *Neuropsychological Assessment* (4th edn). Oxford University Press.

Luria, A. R. (1966) *Higher Cortical Functions in Man*. New York: Basic Books.

Luria, A. R. (1968) *The Mind of a Mnemonist: A Little Book about a Vast Memory*. New York: Basic Books.

Merzenich, M. M. (2013) *Soft-Wired: How the New Science of Brain Plasticity Can Change Your Life*. Parnassus Publishing.

Mesulam, M.-M. (1990) "Large-Scale Neurocognitive Networks and Distributed Processing for Attention, Language, and Memory," *Annals of Neurology*, 28(5), pp. 597–613.

Mishkin, M., Ungerleider, L. G. & Macko, K. A. (1983) "Object Vision and Spatial Vision: Two Cortical Pathways," *Trends in Neurosciences*, 6, pp. 414–417.

Moscovitch, M. (1994) "Cognitive Resources and Dual-Task Interference Effects on Retrieval in Normal People: The Role of the Frontal Lobes and the Medial Temporal Lobes," *Neuropsychology*, 8(4), pp. 524–534.

Stuss, D. T. & Benson, D. F. (1986) *The Frontal Lobes*. Raven Press.

Wilson, B. A., Winegardner, J. & Clare, L. (2007) *Rehabilitation of Memory*. Guilford Press.

Information about the author: Igor F. Mikhailov — DSc in Philosophy, Leading Research Fellow at the Institute of Philosophy, Russian Academy of Sciences. Address: 12/1 Goncharnaya Str., Moscow, 109240, Russian Federation.

Информация об авторе: Игорь Феликсович Михайлов — доктор философских наук, ведущий научный сотрудник Института философии РАН. Адрес: Российская Федерация, 109240, Москва, ул. Гончарная, д. 12/1.

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