

## ПСИХОЛОГИЯ ОБРАЗОВАНИЯ И ПЕДАГОГИЧЕСКАЯ ПСИХОЛОГИЯ EDUCATIONAL PSYCHOLOGY AND PEDAGOGICAL PSYCHOLOGY

Обзорная статья | Review paper

### Multilingualism and creativity in the context of cognitive regulation

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#### Abstract

**Context and relevance.** This article presents a critical and analytical review of the results of current studies aimed at researching the creativity of multilinguals, whose advantages are associated with cognitive regulation (executive functions). Thus, **the purpose** of this theoretical study was to consider the unresolved conceptual and methodological issues, that hinders the creation of unified theoretical constructs and fundamental theoretical provisions. The identification of the main trends in solving this problem determines the completeness of our review. Following from the analysis of current research, the article substantiates the need for the post-non-classical, transdisciplinary approach in order to integrate neuro- and cognitive sciences, socio- and psycholinguistics, educational psychology and pedagogy to build a holistic model of linear and non-linear connections between multilingualism and creativity. **The practical significance** is the use of the obtained data in creating effective neuro-educational technologies that stimulate the development of cognitive functions in students with different language status, ensuring the development of their creative abilities in the educational process.

**Keywords:** multilingualism, creativity, creative abilities, executive functions, transdisciplinary research perspective

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### Многоязычие и креативность в контексте когнитивной регуляции

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#### Резюме

**Контекст и актуальность.** Проведен критико-аналитический обзор результатов современных исследований, направленных на изучение креативности полилингвов, преимущества которых связаны с когнитивной регуляцией (executive functions). **Цель** настоящего теоретического исследования — рассмотреть неразрешенные концептуальные и методологические вопросы, препятствующие построению единых теоретических конструктов и фундаментальных теоретических положений. Полнота обзора определялась через выявление основных тенденций в решении поставленной проблемы. **По результатам исследования** современного состояния проблемы обосновывается необходимость в постнеклассическом, трансдисциплинарном подходе для интеграции нейро- и когнитивных наук, социо- и психолингвистики, педагогической психологии и педагогики с целью построения целостной модели линейных и нелинейных связей многоя-

зычия с креативностью. **Практическая значимость** перспективных исследований заключается в использовании полученных данных в разработке эффективных нейрообразовательных технологий, стимулирующих развитие у обучающихся с разным языковым статусом когнитивных функций, обеспечивающих развитие творческих способностей в образовательном процессе.

**Ключевые слова:** многоязычие, креативность, творческие способности, executive functions, трансдисциплинарная перспектива исследований

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## Introduction

The problem of developing creative abilities in children with different language status (monolingualism/bilingualism/trilingualism/polylingualism) and different linguistic abilities, and the search for new ways to solve this problem from the standpoint of post-non-classical science promotes the generation of breakthrough ideas, and the use of new methodological strategies and developments in a broad interdisciplinary framework: from philosophical and methodological problems of post-non-classical rationality to applied specific practical applications in the field of neurocognitive science, developmental psychology, cognitive and educational psychology. At the post-non-classical stage of the modern science development, transdisciplinarity and polyparadigmality dictate the need to build generalizing models of development that reflect the mutual influence, interaction, and interpenetration of various sciences (neurocognitive sciences, psychology, pedagogy, linguistics, cultural studies, etc.), meaningfully enriching holistic knowledge (Гусельцева, 2020).

This study employs a critical-analytical methodology to examine contemporary research on the nexus between multilingualism and creativity, with specific emphasis on the mediating role of cognitive regulation (executive functions). This is particularly evident when neural differences are interpreted in the absence of concomitant behavioral disparities between individuals of differing language statuses. Although structural neuroanatomical divergences between bilinguals and monolinguals are frequently observed, the current body of evidence lacks consistent demonstrations that specific brain networks associated with creativity and cognitive control exhibit reliable bi- or multilingual differentiation (García-Pentón et al., 2016). Consequently, there is a pressing need to develop more precise theoretical frameworks and generate testable hypotheses concerning the behavioral and neural relationships between multilingualism and creativity. Future progress necessitates transdisciplinary laboratory studies with clearly defined hypotheses and rigorous methodologies to enable reliable interpretation of findings across diverse multilingual contexts.

## Methodological Framework

Methodologically, this study employs: systematic critical analysis of international and Russian scholarship spanning neuroscience, psychology, and linguistics; thematic classification of empirical datasets and conceptual frameworks; comparative validity appraisal of methodological approaches; integrative synthesis of neurocognitive, psycholinguistic, and pedagogical constructs.

## Multilingualism and Creativity: A Research Overview

Most studies of the relationship between multilingualism and creativity have focused either on cognitive factors that are only indirectly related to creativity, or on its relatively isolated and specific manifestations (Leikin, Tovli, Woldo, 2020; Zabelina, Friedman, Andrews-Hanna, 2019).

Foreign psychology adheres to the following understanding of creativity: «the interaction between abilities and the process, by which an individual or group creates an outcome or product that is new and useful in a particular social context» (Plucker, Beghetto, Dow, 2004, p. 90). «Creativity» is described through its factor model that combines four factors: a creative person (creative potential of an individual); a creative product (creative outcome); a creative process (creative activity); a creative press (creative environment) (Rhodes, 1961). Simonton (Simonton, 1995) expanded this model, in which creativity is considered as a form of leadership, since creative people are leaders who influence the world and the people around them. Runco (Runco, 2007) subsequently proposed to reorganize the basic structure of creativity, presenting it as a hierarchical structure and differentiating creative potential and creative performance. Gruszka and Tang (2017) strengthened the practical application of the 4Ps (product, process, person and press of the environment) creativity model in various fields, including education, business, engineering, and other areas by linking creativity to the professional environment.

From the standpoint of the «confluence approach to creativity» (Sternberg, Lubart, 1995), a creative personality is shaped under the influence of several variables, such as

intelligence, thinking style, knowledge, personality, and motivation. Certain combinations of these variables (for example, an open personality, inquisitive thinking style — a creative thinking style, motivation to generate and develop new ideas) usually lead to high creative abilities or high creative potential.

The analysis of modern research results reveals a focus on social and psychological predictors of creativity and key indicators of creative potential, on the links between creativity and cognitive processes and personality traits, as well as on the development and adaptation of diagnostic tools (Karwowski, Lebuda, 2016; Wang, Sakata, Moriguchi, 2021).

There exists a growing scientific interest in the relationship between bilingualism and creativity (Dijk, Kroesbergen, Blom and Leseman, 2019; Kharkhurin, 2010; Khotinets, Medvedeva, 2021; Shishova, 2020). The results of studies by Xia, An and Guo (2022) indicate that bilingual education can contribute to the development of various components of creativity due to high cognitive flexibility and strong cognitive inhibition. Thus, bilinguals' cognitive flexibility has a positive effect on social intelligence in general; social flexibility provides the ability to easily switch and adapt across different social contexts and accurately read social cues in the environment (Ikizer, Ramírez-Esparza, 2018).

One's knowledge of several languages is associated with their immersion in different cultural environments. Each language carries unique cultural values, meanings and senses, models of behavior and communication, ways of perceiving and understanding the world. Expanded cultural experiences provide a richer semantic repertoire, which serves as «building material» for original ideas and solutions (Kharkhurin, 2010). Russian studies, based on cultural-historical psychology, emphasize the role of the symbol (language) and cultural context in the development of higher mental functions, including creative thinking and imagination.

Multilingual individuals often have higher metalinguistic awareness — the ability to perceive language as a system, understand its structure and functioning. Awareness of alternative ways of organizing thinking, leading to the production of thoughts in different languages, is associated with semantic flexibility — the ease of associating different concepts, which is the basis of creative thinking. In Russian psycholinguistics, metalinguistic activity is considered to be an important factor in the cognitive development, potentially influencing creativity. The results of the studies, devoted to the relationships between multilingualism and creativity, can be conventionally divided into two areas (Fürst, Grin, 2021, 2023).

The first line of research includes relatively indirect evidence linking bilingualism/multilingualism with certain cognitive abilities that may be related to creativity. Such abilities typically include cognitive regulation: general mental control and cognitive flexibility, which are more pronounced in bilinguals (Bialystok, 2017; Bialystok, Craik, Luk, 2012). Other studies show that these abilities may be related to creativity, including metalinguistic awareness and, as a result, metacognition and general intellectual development (Marsh, Hill, 2009). Despite the relatively large num-

ber of studies, the relationship between multilingualism and creativity is almost never considered as the main research area, hence the indirect nature of the research results.

The second line of research includes studies that focus on the links between multilingualism and creativity. The results show a statistically significant positive correlation between multilingualism (especially balanced bilingualism/multilingualism) and indicators of divergent thinking (fluency, flexibility, originality of ideas) measured by Torrance-type tests (TTCT) or Guilford-type tests. Advantages are often observed in verbal tasks (e.g., alternative use of meanings, synonym/antonym generation, story composition) and non-verbal tasks (Torrance figure tests). The effect is more pronounced in individuals with high and balanced language proficiency (balanced bilinguals/multilinguals) compared to those who only have one language dominant. However, these advantages are more pronounced in heritage bilinguals who acquired their languages simultaneously or sequentially in childhood. Research on the relationship between these constructs has primarily been conducted with student samples (Fürst, Grin, 2021), while findings in child populations have been inconsistent (Boon, 2021).

A. Kharkhurin (2010) developed Multilingual Creative Cognition Model, which integrates key indicators of multilingual creative cognitive ability, such as language proficiency (level of language proficiency); cross-linguistic interaction (interference, transference); metalinguistic awareness; cross-cultural experience. The interaction of these factors in the cognitive system of a multilingual individual is assumed to create the basis for the specific advantages in creativity: semantic and conceptual flexibility.

In a slightly different perspective, Ghonsooly and Showqi (2012) showed that learning a second language positively influences creativity indicators such as fluency, flexibility, originality, and elaboration. The results of this study are of particular interest because they focus on second language learning in a non-immigrant context, involving respondents with intermediate second language proficiency as opposed to balanced bilinguals.

Thus, the obtained scientific results could explain the connection between multilingualism and creativity (for example, selective attention and inhibition); the actualization of concepts mediated by language (Kharkhurin, 2010); code-switching skills (Kharkhurin, Wei, 2015) and others.

### **Research Problems in Executive Functions and Creativity in the Multilingual Context**

Key research issues include the impact of executive functions on creative abilities and their mediating role in relation to intelligence and creativity, bilingualism/multilingualism, multicultural experience and creativity (Sampedro, Peña, 2019; Soleimani, Yousefi, Ghazanfarianpour, 2021).

The review pays special attention to the studies that use Structural Equation Modeling (SEM). Thus, SEM results indicated that in children aged 8-13, the effect of crystal-

lized intelligence on creativity was mediated by shifting ability (Krumm, Filippetti, Gutierrez, 2018). In a sample of university students ( $M = 21,8$  years), there are manifold relations between cognition, creativity, multilingualism, and multicultural experience: multilingualism and multicultural experience were positively associated with creativity, even when controlling for cognitive abilities (divergent thinking and intelligence) (Fürst, Grin, 2023).

Since findings in child populations show inconsistent relationships, additional studies are needed. A promising direction is to focus on studies involving children (Crenshaw, Miller, 2022; Ferreria, 2024; Fürst, Grin, 2023; Rogers et al., 2023, etc.).

The dominant theory of bilingualism by E. Bialystok links the benefits of multilingualism with the development of cognitive regulation. In science, a number of other models of executive functions are proposed: either with the inclusion of one leading function — the inhibitory control model, the working memory model, the attentional control model, the cognitive control model by E. Miller and J. Cohen, or a set of jointly functioning functions — the model by A. Miyake, N.P. Friedman; the model by M.D. Lezak; the self-regulation model by R. Barkley; the problem-solving model; the «control cascade» model by M.T. Banich et al. (Vilenskaya, 2016).

In modern science, there is variability in the conceptualization and understanding of the components of executive functions; however, most authors identify inhibitory control, working memory (both verbal and non-verbal), cognitive flexibility, and attentional control as core components. Inhibitory control blocks and suppresses irrelevant verbal and non-verbal information. Cognitive flexibility ensures the plasticity of cognitive activity in accordance with the demands of a task and the individual's priorities. Working memory maintains and manipulates verbal and non-verbal information within the linguistic context of the target language. Attentional control serves to maintain current goals in an active state, facilitate relevant cognitive operations, suppress interference, and, when necessary, switch to a different set of operations (Bialystok, Craik, 2022).

Empirical studies have shown that bilinguals have superior executive functions, compared to monolinguals (Grundy, 2020; Ware, Kirkovski, Lum, 2020), manifesting themselves in the conscious control of goal-directed behavior (Tao, Zhu, Liu, 2023). Research demonstrates consistent bilingual advantages across key cognitive domains, attributable to neuroadaptive processes from language control. Specifically, bilinguals exhibit superior inhibitory control when resolving linguistic conflicts through habitual suppression of non-target languages (Bialystok, Craik, 2022). This constant interlinguistic switching concurrently enhances cognitive flexibility — the ability to shift between mental frameworks (Gunnerud et al., 2020). Empirical evidence further reveals heightened attentional efficiency, manifesting as faster visual change detection during visuo-spatial memory tasks (Kerrigan et al., 2017). Such advantages stem from optimized deployment of attentional resources, where daily practice in filtering competing stim-

uli reduces processing costs relative to monolinguals (Bialystok, Craik, 2022). Meta-analytic findings position inhibitory control as the most robust bilingual advantage in children, with effect magnitudes mirroring attentional control benefits (Bialystok, 2017). Longitudinal data confirms these behavioral adaptations show greater prominence and developmental significance in pediatric populations, serving as predictors of neurocognitive trajectories (Yurtsever, Anderson, Grundy, 2023).

Social-linguistic modulation further occurs through language entropy — a metric quantifying complexity in multilingual social contexts. Empirical evidence demonstrates that entropy amplification stems from integrative language-system modifications, correlating significantly with enhanced cognitive control performance (Gullifer, Titone, 2020; Khotinets et al., 2024). Neurocognitive investigations reveal overlapping neural substrates for linguistic control, inhibitory functions, and task switching, underscoring language-cognition interdependencies. Nevertheless, disparities persist regarding structural and functional differences in creativity-related executive control regions between monolinguals and bilinguals, with no consistent neuroanatomical evidence currently available (García-Pentón et al., 2016).

### **Critical Discussion: Unresolved Problems and Future Directions**

Along with the obtained results, some conceptual and methodological issues remain open.

Firstly, the scientific community widely discusses the issues of various theoretical constructs on the problems of multilingualism, which have led to the development of insufficiently clear theories and hypotheses that are difficult to falsify. To achieve the stated goals, first of all, clear developments of the scientific apparatus, substantive content and understanding of the main categories are needed. There is need for research on big data, using a wide range of standardized tests, taking into account differences between respondents (socioeconomic status, ethnicity, age, polylingual experience, interactive context, cultural differences, cultural and educational environment, etc.).

It should be noted that many studies conflate the effects of multilingualism and multiculturalism, which prevents proper control for cultural diversity. In psychological science, two approaches to understanding culture are distinguished: the etic (the pragmatic aspect of studying culture) and the emic (the syntagmatic aspect of studying culture). The etic approach aims to study similarities and differences in individual functioning across different ethnocultural groups, and the relationships between psychological and sociocultural, ecological, and biological variables (Berry, 2019). Cross-cultural psychology, which follows the etic approach, focuses on differences between cultures, thereby allowing for the control of cultural diversity in the study of behavioral, cognitive, and emotional manifestations among representatives of different ethnocultural groups. The emic approach seeks to study the cultural codes of a specific eth-

nocultural community. Cultural psychology, utilizing the emic approach, is primarily focused on cognitive processes, the specificity of understanding cultural meanings, the cultural significance of language and thought, and cultural representations from within the culture.

Secondly, many studies tend to focus on balanced bilinguals without addressing other types of bilingualism, trilingualism, and multilingualism. Multilingual abilities are not necessarily limited to a heritage and a host language but can extend to the acquisition of additional languages in various contexts (Fürst, Grin, 2021, 2023). Bilingualism has been little studied in the educational situation of foreign language learning, where bilinguals could both achieve non-native language fluency and develop their creative abilities in the educational process. Moreover, the relationship between bilingualism and creativity is often analyzed using samples that consist entirely of migrants. It should be noted that understanding the links between multilingualism and creativity needs a wider range of interactive situations and of respondent selection criteria (Gasquoine 2016). Since there is a significant number of studies, demonstrating the fact that multicultural experience is associated with creativity, it needs systematic research control.

Thirdly, when conducting research, internal and external validity must be taken into account in order to be able to compare the results of the studies by different authors and obtain generalized data (Pasarn-Lav n et al., 2023). Most often, creativity is measured using the same tests: divergent thinking tasks, their content validity is not sufficiently consistent with the essence of the phenomenon under study.

Fourthly, science lacks a clear understanding of the cause-and-effect relationships between multilingualism and creativity and their direction. In particular, does the development of the ability to decode cultural and linguistic codes occur due to the formation of creative abilities or does the development of speech in different languages lead to the development of creative thinking and native speakers' creativity.

Fifthly, there is a need to use neuroimaging methods in neurocognitive research (Wang, Sakata, Moriguchi, 2021). It should be taken into account that the transition from behavioral studies to neuroimaging will not be able to solve the problems posed, especially when brain changes are interpreted without taking into account the behavior and activity of subjects with different language status. Although differences in the brain structure are observed between bilinguals and monolinguals, there is currently no consistent evidence that certain brain blocks, associated with creativity and cog-

nitive regulation, demonstrate bi-, multilingual differences in research results (García-Pentón et al., 2016). In this regard, it is necessary to formulate more specific theories and hypotheses regarding the behavioral and neural relationships between multilingualism and creativity. Transdisciplinary laboratory studies with clear hypotheses are needed to reliably interpret the obtained results in different multilingual contexts. It is noted that longitudinal neurocognitive studies are needed to obtain a comprehensive understanding of how the development of creativity is incorporated into educational settings of foreign language learning to achieve academic results (Tzachrista, Gkintoni, Halkiopoulou, 2023).

Today, with the advent of innovative neuroimaging methods, it is possible to address a number of critical questions related to A.R. Luria's concept of the three functional units of the brain: the first unit (regulation of arousal and tone), the second unit (reception, processing, and storage of information), and the third unit (programming, regulation, and verification of activity). Specifically, these questions include: which specific structures in the anterior and posterior regions of the brain are responsible for implementing the studied processes at each linguistic level; what roles the left and right hemispheres play in this; and which phenomena in neurolinguistics can be explained and systematized using the opposition between paradihmatics and syntagmatics (Panikratova et al., 2022).

## Conclusions and Transdisciplinary Implications

The analysis of the problem in modern science shows a clear need for the post-non-classical, transdisciplinary approach with the aim to integrate neuro- and cognitive sciences, socio- and psycholinguistics, educational psychology and pedagogy in order to build a holistic model of the relationship between multilingualism and creativity. For this purpose, it is necessary to build models with the inclusion of mediation and moderation links between multilingualism and creativity. We assume that the structural and functional blocks of the brain can act as moderators and mediators: activity regulation (functions of the first block of the brain), processing and storing information (functions of the second block of the brain), and programming, regulation and control (functions of the third block of the brain). The practical significance is the use of the obtained data in effective neuro-educational technologies that stimulate cognitive functions in students with different language status, ensuring the development of their creative abilities in the educational process.

## Краткое изложение содержания статьи на русском языке

### Введение

Постановка и поиск новых путей решения проблемы развития творческих способностей детей с разным языковым статусом (монолингвизм/билингвизм/трилингвизм/полилингвизм) и разными лингвистическими

способностями с позиций постнеклассической науки усиливает импульс в становлении прорывных идей, использовании новых методологических стратегий и разработок в широком междисциплинарном русле: от философско-методологических проблем постнеклассической рациональности до конкретных прикладных разработок в области неройкогнитивной науки, психологии развития, когнитивной психологии, педагогической психологии. Постнеклассическая наука характе-

ризуется становлением трандисциплинарности и полипарадигмальности, что актуализирует разработку интегративных моделей развития. Эти модели строятся на взаимодействии разных наук: психологии, педагогики, нейрокогнитивных наук, лингвистики и культурологии, что ведет к содержательному обогащению системы знаний в целом (Гусельцева, 2020).

### Методологические основы исследования

Настоящее исследование строится на системном критическом анализе международных и российских научных работ в сфере нейронауки, психологии и лингвистики, включающем тематическую классификацию эмпирических данных, сравнительную оценку методологических подходов, а также интегративный синтез нейрокогнитивных, психолингвистических и психолого-педагогических конструктов.

### Направления исследований связи многоязычия с креативностью

Результаты исследований связи многоязычия с креативностью можно условно разделить на два направления (Fürst, Grin, 2021, 2023; van Dijk et al., 2019; Kharkhurin, 2010; Kharkhurin, Wei, 2015; Kerrigan et al. 2017; Ikizer, Ramírez-Esparza, 2018; Leikin, Tovli, Woldo 2020; Shishova, 2020; Gunnerud et al., 2020).

Первое направление включает в себя относительно косвенные доказательства о связи двуязычия/многоязычия с определенными когнитивными способностями, которые могут иметь отношение к креативности. Такие способности, как правило, включают когнитивную регуляцию: общий ментальный контроль и когнитивную гибкость, в большей степени выраженные у билингвов (Bialystok, Craik, 2022; Bialystok, 2017; Хотинец, Медведева, 2021; Bialystok, Craik, Luk 2012). Другие исследования, показывают, что эти способности могут иметь отношение к творчеству, включающему металингвистическую осведомленность и, как следствие, метапознание и общее интеллектуальное развитие (Marsh, Hill 2009). Несмотря на относительно большое количество исследований, связь между многоязычием и креативностью почти никогда не рассматривается в качестве основного исследовательского вопроса, отсюда косвенный характер результатов исследования.

Второе направление включает исследования, в которых связи между многоязычием и креативностью уделяется особое внимание. Полученные результаты демонстрируют статистически значимую положительную корреляцию между многоязычием (особенно сбалансированным билингвизмом/мультилингвизмом) и показателями дивергентного мышления (беглость, гибкость, оригинальность идей), измеряемыми тестами типа Торренса (ТТСТ) или Гилфорда. Преимущества часто наблюдаются в вербальных задачах (например,

альтернативное использование значений, генерация синонимов/антонимов, сочинение историй) и в невербальных (фигурные тесты Торренса). Эффект более выражен у индивидов с высоким и сбалансированным владением языками (balanced bilinguals/multilinguals) по сравнению с теми, у кого один язык лишь доминирует. Вместе с тем преимущества фиксируется в большей мере у эритажных билингвов с одновременным или последовательным усвоением языков в детстве. Исследования связи между этими конструктами в основном прослеживаются в студенческих выборках (Fürst, Grin, 2021), в детских популяциях установлены неоднозначные результаты (Boaton et al., 2021).

### Проблемы исследования исполнительных функций и креативности в контексте многоязычия

Ключевыми в исследованиях являются вопросы влияния executive functions на креативные способности и их посреднической роли в отношении интеллекта и творческих способностей, двуязычия/многоязычия, мультикультурного опыта и креативности (Sampedro, Peña, 2019; Soleimani, Yousefi, Ghazanfarianpour, 2021; Crenshaw, Miller, 2022; Zhao et al., 2023; Khotinets, Shishova, 2023; Rogers et al., 2023; Ferreria, 2024; Arán Filippetti, Krumm, 2020; Zabelina, Andrews-Hanna, Friedman, 2019; Berry, 2019; Braver, West, 2008).

По результатам эмпирических исследований отмечаются преимущества executive functions у билингвов в сравнении с монолингвами (Grundy, 2020; Ware, Kirkovski, Lum, 2020), проявляющиеся в сознательном контроле целенаправленного поведения (Tao, Zhu, Liu, 2023). В обзорах особое внимание уделяется исследованиям, в которых применяется моделирование структурными уравнениями (SEM). Современные исследования (Gullifer, Titone, 2020) вводят понятие «языковой энтропии» для описания многогранности социальных контекстов, в которых функционирует билингв. Показано, что когнитивные преимущества билингвизма проявляются ярче всего в условиях высокой энтропии, которая возникает при активном взаимодействии и взаимопроникновении языковых систем. Именно этот процесс, а не просто знание двух языков, способствует развитию исполнительных функций (Gullifer, Titone, 2020, Хотинец и др., 2024).

В настоящее время в мировой науке проводятся все больше нейрокогнитивных исследований, посвященных изучению особенностей в архитектонике мозга между билингвами и монолингвами (Bialystok, 2017; Vinerte, Sabourin, 2019; Grundy, Anderson, Bialystok, 2017).

### Обсуждение

Наряду с полученными результатами некоторые концептуальные и методологические вопросы остаются открытыми.

Одной из ключевых проблем в изучении многоязычия остается терминологическая и методологическая разрозненность. Накопление слабо верифицируемых гипотез и размытых теоретических конструктов диктует необходимость фундаментальной работы по упорядочению научного аппарата. Приоритетной задачей становится проведение масштабных исследований на репрезентативных выборках с использованием стандартизированного инструментария. Критически важным является учет комплекса факторов: от социоэкономического статуса и возраста до особенностей языкового опыта и культурного окружения респондентов.

Следует отметить, что во многих исследованиях смешиваются эффекты многоязычия и мультикультурализма, что не позволяет должным образом контролировать культурное разнообразие.

Во-вторых, многие исследования, как правило, сосредоточены на сбалансированных билингвах без обращения к другим видам билингвизма, трилингвизма и полилингвизма. Многоязычные способности не обязательно ограничиваются сочетанием эритажного языка и языка принимающей страны, необходимо учитывать возможности приобретения навыков владения более чем двумя языками (Fürst, Grin, 2021, 2023). Мало изучен билингвизм в образовательной ситуации обучения иностранным языкам, когда билингвы могли бы достичь не только беглости на неродном языке, но и развитие творческих способностей в образовательном процессе. Более того, связь двуязычия и креативности часто анализируется с использованием выборок, полностью состоящих из мигрантов. Отметим, что понимание связей между многоязычием и креативностью должно охватывать более широкий спектр интерактивных ситуаций и критериев выбора респондентов (Ghonsooly, Showqi, 2012). Поскольку существует значительное количество исследований, результаты которых демонстрируют факты о том, что многокультурный опыт связан креативностью, появляется необходимость систематически его контролировать в исследовательской деятельности (Gruszka, Tang, 2017; Karwowski, Lebeda, 2016).

В-третьих, при проведении исследований необходимо учитывать внутреннюю и внешнюю валидность, чтобы иметь возможность сравнивать результаты исследований разных авторов и получать обобщенные данные (Pasar n-Lav n et al., 2023). Чаще всего креативность измеряется с помощью одних и тех же тестов:

задачи на дивергентное мышление, содержательная валидность которых недостаточно согласуется с сущностью изучаемого феномена.

В-четвертых, в науке отсутствует четкое понимание о причинно-следственных связях между многоязычием и креативностью и их направленности. В частности, развитие способности к декодированию культурных кодов происходит за счет формирования творческих способностей или же развитие речи на разных языках ведет за собой развитие творческого мышления и креативности носителей языков (по Выготскому Л.С.).

В-пятых, появилась необходимость в использовании нейровизуализационных методов в нейрокогнитивных исследованиях (Wang, Sakata, Moriguchi, 2021; Паникратова и др., 2022). Ключевым методологическим вызовом остается вопрос о том, может ли переход от поведенческих исследований к нейровизуализационным методам преодолеть существующие противоречия в изучении взаимосвязи многоязычия и когнитивных функций. Особую сложность представляет интерпретация нейробиологических различий при отсутствии значимых поведенческих расхождений между индивидами с разным языковым статусом. Несмотря на обнаруживаемые структурные различия в организации мозга у билингвов и монолингвов, современные данные не подтверждают устойчивой связи между многоязычием и специфической активацией определенных блоков мозга, связанных с креативностью и когнитивным контролем (García-Pentón et al., 2016). В этой связи актуализируется потребность в разработке более дифференцированных теоретических моделей и формулировке проверяемых гипотез, раскрывающих природу связей мультилингвизма с функциями когнитивной регуляции и творческими способностями на поведенческом и нейронном уровнях. Перспективным направлением представляется организация трансдисциплинарных лабораторных исследований со строгим методологическим дизайном, с комплексным подходом к анализу различных контекстов, что позволит обеспечить более валидную интерпретацию получаемых данных. Отмечается, что необходимы лонгитюдные нейрокогнитивные исследования для получения всестороннего понимания того, как креативность включается в образовательные условия обучения иностранным языкам для достижения академических результатов (Tzachrista, Gkintoni, Halikiopoulou, 2023).

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### **Contribution of the authors**

Evgeniya O. Shishova developed the theoretical framework and performed the research and performed the analysis, drafted the manuscript, and aided in interpreting the results and worked on the manuscript.

Vera Yu. Khotinets was responsible for the study design, the development of the theoretical and methodological foundations, and scientific supervision.

All authors discussed the results and contributed to the final manuscript.

### **Вклад авторов**

Шишова Е.О. — разработала теоретическую основу, провела исследование и анализ результатов современных исследований, подготовила черновик рукописи, участвовала в интерпретации результатов и доработке текста.

Хотинец В.Ю. — разработала дизайн проекта, теоретико-методологические основы исследования, осуществляла научное руководство.

Все авторы обсуждали результаты и участвовали в подготовке окончательного варианта рукописи.

### **Conflict of interest**

The authors declare no conflict of interest.

### **Конфликт интересов**

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