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J. M. GLOSMAN ON THE ROLE OF FUNCTIONAL ASYMMETRY IN THE DEVELOPMENT AND DYNAMICS OF COGNITIVE AND SPEECH DISORDERS

J. M. GLOSMAN SOBRE EL PAPEL DE LA ASIMETRÍA FUNCIONAL EN EL DESARROLLO Y DINÁMICA DE LOS TRASTORNOS COGNITIVOS Y DEL HABLA

J. M. GLOSMAN SOBRE O PAPEL DA ASSIMETRIA FUNCIONAL NO DESENVOLVIMENTO E DINÂMICA DOS TRANSTORNOS COGNITIVOS E DA FALA

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Palavras-chave: Janna Glozman, assimetria cerebral funcional, lateralidade cruzada, neurodiagnóstico, psicodiagnóstico, pesquisa complexa, gagueira, logopsicoterapia.

A B S T R A C T

The work is devoted to the works of Janna Glozman, a student of A.R. Luria and mentor of a huge number of Russian scientists. In the luggage of her research, the most important place was occupied by work on studying the role of functional asymmetry of the brain and lateral preferences in the occurrence of certain diseases and attempts to identify the effectiveness of certain methods of correction for the treatment of these diseases. She paid special attention to the phenomenon of crosslaterality and the connection of this phenomenon with speech disorders, in particular, stuttering. Its contribution to the theory of the role of functional asymmetry in the development and dynamics of cognitive and speech disorders, to practical work with children with disabilities, and to the analysis of the effectiveness of family logopsychotherapy groups in the development and dynamics of cognitive and speech disorders in stutterers are considered.

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R E S U M E N

La obra está dedicada a las obras de Janna Glozman, alumna de A.R. Luria y mentora de un gran número de científicos rusos. En el bagaje de su investigación, el lugar más importante lo ocupó el trabajo sobre el estudio del papel de la asimetría funcional del cerebro y las preferencias laterales en la aparición de determinadas enfermedades y los intentos de identificar la eficacia de determinados métodos de corrección para el tratamiento de estas. enfermedades. Prestó especial atención al fenómeno de la translateralidad y a la conexión de este fenómeno con los trastornos del habla, en particular la tartamudez. Su contribución a la teoría del papel de la asimetría funcional en el desarrollo y la dinámica de los trastornos cognitivos y del habla, al trabajo práctico con niños con discapacidad y al análisis de la efectividad de los grupos de logopsicoterapia familiar en el desarrollo y la dinámica de los trastornos cognitivos y del habla. Se consideran los trastornos en los tartamudos.

R E S U M O

A obra é dedicada às obras de Janna Glozman, aluna de A.R. Luria e mentor de um grande número de cientistas russos. Na bagagem de suas pesquisas, o lugar mais importante foi ocupado por trabalhos de estudo do papel da assimetria funcional do cérebro e das preferências laterais na ocorrência de certas doenças e tentativas de identificar a eficácia de certos métodos de correção para o tratamento destas. doenças. Ela prestou especial atenção ao fenômeno da crosslateralidade e à ligação desse fenômeno com os distúrbios da fala, em particular a gagueira. Sua contribuição para a teoria do papel da assimetria funcional no desenvolvimento e dinâmica dos distúrbios cognitivos e de fala, para o trabalho prático com crianças com deficiência e para a análise da eficácia dos grupos de logopsicoterapia familiar no desenvolvimento e na dinâmica cognitiva e da fala distúrbios em gagos são considerados.

This article is dedicated to the bright and grateful memory of Janna Glozman, a world-famous scientist, well-known neuropsychologist, successor of A.R. Luria and L.S. Vygotsky, a wonderful mentor of many students, postgraduates and staff of Moscow State University. M.V. Lomonosov and the Centers of Neuropsychology in Russia and a number of countries, a man with a big kind and wise heart.

Functional asymmetry, lateral preferences and cognitive disorders

The problems of functional asymmetry of the brain and lateral preferences continue to be relevant in science, which is found both in the presence of specialized journals in Russian and English (in Russia, the journal "Asymmetry", in the USA - "Laterality"), and in the abundance of articles related to this problem. So the search on the e-library platform for the query "brain asymmetry" from 2018 to 2023, gives a result of 3828 works, and for the query "left-handedness" - 486 works for the same period. Over the past two centuries, this problem either became one of the first in human research, or went to the periphery of research interests for a number of reasons: until the middle of the 19th century, most scientists were sure that the brain is symmetrical, and any asymmetry is a consequence of pathological processes. , but further research has changed these ideas (Nikolaeva et al., 1993; Nikolaeva, Efimova, Vergunov, 2020). Significant results of studying the functional asymmetry of the brain, lateral preferences and asymmetric behavior in the population of animals (even primitive ones) have shown that the difference between humans and animals is associated not with the presence of asymmetry as such, but with the type of lateral preferences: in humans they are determined at the species level, then as even in the species closest in evolutionary development - only on the individual (Nikolaeva, 2020).

One of the prognostic factors in the assessment of lateral preferences is the phenomenon of cross-laterality - a discrepancy between the side of preferences in the sensory and motor areas. 2 types of cross-laterality can be identified: intramodal (within separate motor operations of the hand or foot, or divergence of dominance in hearing and vision in sensory modality) and intermodal (senso-motor) - between the hand and eye, hand and ear, eye and foot, or foot and ear (Glozman, 2018).

A number of facts suggest that cross-laterality is associated with slower maturation of brain structures. For example, a study of patients with parkinsonism showed that cross-laterality, as a manifestation of incomplete or atypical functional asymmetry, is associated with the neurodynamic component of cognitive functions, and is also reflected in the semantization index (the ability to categorize) in an associative test. Intermodal cross-laterality more than intramodal influences the slowing down of speech processes, categorization processes, and mnestic functions in patients with parkinsonism (Danilova et al., 2016; Glozman, 2018, 2019).

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I. Cross-laterality and cognitive development of children

On the problem of the influence of cross-laterality on the cognitive development of children J. Glozman first addressed the work (Glozman, 1987). Further research was continued by her and under her leadership by the staff of the Center. A.R. Luria in Moscow (Glozman et al. 2021).

The reason for addressing this topic is that one of the promising lines in the study of the problem of functional interhemispheric asymmetry is research on its formation in the process of normal and abnormal human ontogenesis. Many behavioral, electrophysiological, and anatomical studies of children in the first months of life have demonstrated the existence of a certain structural and functional asymmetry of the hemispheres already at the time of birth (Polyakov, Kolesnikova, 2006). In 90% of infants in the first week of life, the amplitude of evoked potentials (EP) in the left hemisphere was markedly greater than in the right hemisphere at the sounds of human speech, while during non-verbal sounds in all infants the amplitude of the EP was higher in the right hemisphere (Molfese et al. , 1975). However, there is reason to agree with S. Witelson (1970) and H. Hecaen (1976) that this is nothing more than a prerequisite for the further formation and development of hemispheric asymmetry. The lateralization of brain functions gradually develops in ontogeny up to approximately 14–16 years of age, reaching a maximum by adulthood, and then gradually begins to level out with a decrease in the role of the right hemisphere with aging (Palchik, 2002). In other words, “functional asymmetry of the hemispheres is not a state, but a process that is realized throughout life and is determined by the characteristics of mental development” (Polyakov, Kolesnikova, 2006, p. 324).

Many authors believe that left-handedness negatively affects the further mental development of the child (Stroganova et al., 2004;), reducing the plasticity of the brain and the possibility of a vicariate (when in young children with brain lesions, the function of the dead nerve cells of the left hemisphere is taken over by the preserved cells of the right hemisphere). The opposite and more common point of view argues that the delay in the lateralization of functions disrupts the emotional and cognitive development of the child and may be the basis for difficulties at school, especially for the formation of dysgraphia (Soboleva, Vinnikova, 2016; Glozman, 2017).

Modern researchers distinguish between manual, tactile, auditory and visual asymmetries, which creates many options for the lateralization of functions or patterns (individual profiles) of asymmetries that have gender, environmental and age differences, species-specific and individual-specific characteristics. However, in many works, the leading role in the process of lateralization is given to manual asymmetry (Shterental et al., 1993, 1995).

In recent decades, there has been a paradigm shift in the study of functional brain asymmetry (FBA), from the theory of total dominance of the left hemisphere to the hypothesis of partial dominance and interaction of the hemispheres (Polyakov, 2003). “The very process of lateralization of higher mental functions (HMF) in ontogenesis is non-linear, it is distinguished by a change in the dominance of one or the other hemisphere and a gradual transition from duplication of functions to their interhemispheric specialization” (Polyakov, 2003, p. 322).

Modern FBA research focuses on the study of cross or cross laterality, i.e. the presence of a certain number of left-sided lateral (both sensory and motor) signs, along with right-sided lateral preferences in children and vice versa, right-sided preferences for the arm, leg, eye or ear in left-handers (Kolesnikova et al. 2005; Danilova et al., 2016; Dobrin et al., 2018; Glozman, 2018, 2019). Some authors call this phenomenon "hidden leftism" (Eremeeva, 2001).

Many studies provide observations on the relationship between the accumulation of bilateral traits and problems of health and mental functioning of children and adults, for example, arterial hypertension, in which the deterioration of interhemispheric interactions is associated with a violation of the circadian rhythm of blood pressure levels (Polyakov, 2013), or with Parkinson's disease, which revealed a correlation of cross-laterality with a decrease in daily and motor activity and with a slowdown in motor, cognitive and intellectual processes (manifestations of symptoms of bradykinesia, bradilalia, bradyphrenia and bradymnesia in Luria’s tests) (Danilova et al., 2016; Glozman, 2018, 2019), or with stuttering (Dobrin, Karpova, Nikolayeva, 2019).

The problem of the relationship between cross-laterality and deviations in mental development in children of different ages is practically unexplored, although in child neuropsychology there are often indications of correlations between mental retardation and divergence of dominance in the hand and eye (Glozman, 2017, 2019; Shevchenko, Glozman, 2015).

J. Glozman suggested that it is most correct to study the problem of the relationship between cross-laterality and deviations in mental development in children, highlighting two main types of cross-laterality: intramodal (within only motor or sensory modality) and intermodal (differences in sensory and motor modalities: between dominances arm/leg and eye/ear).

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This was the task of a study conducted in 2020 at the A.R. Luria. The sample consisted of 200 children aged 5-10 years, of which 180 children had a left-hemispheric profile of the lateral organization - PLO (right-handed) and 20 were left-handed in PLO. Accordingly, the sample was divided into 4 groups:

1. A group of children 5-6 years old (60 people, including 10 girls and 50 boys)
2. A group of children 7-8 years old (60 people, 12 girls and 48 boys)
3. 3. A group of children 9-10 years old (60 people, 14 girls and 46 boys)
4. 4. A group of lefties 5-9 years old (20 people, 6 girls and 14 boys)

The predominance of boys is characteristic of the gender distribution of children with developmental disabilities.

The profile of the lateral organization in all children was determined using a standard set of 10 samples (Glozman, Soboleva, 2020; Glozman, Soboleva, Titova, 2019): which hand the child takes a pencil, spoon, comb, toothbrush, to which eye he brings a telescope, with which ear he listens to the phone, on which leg he jumps, hits the ball, climbs onto a chair, which thumb is on top when squeezing his fingers into the “lock”. With preschoolers, these tests were carried out in the form of playing with a magic pencil, which turned into either a toothbrush, or a telephone, or a spyglass. The dominance of right-sided or left-sided signs in at least 7 out of 10 samples determined right-handedness or left-handedness, respectively, and the type of discrepancy in the remaining three samples indicated the type of crosslaterality. As a result, 3 subgroups were distinguished in each group: the first subgroup - children with no crosslaterality, the second subgroup - children with intramodal crosslaterality, the third subgroup - children with intermodal crosslaterality.

All children underwent a complete neuropsychological examination in 7 mental areas (neurodynamics, general characteristics of the personality and behavior of the child, praxis, gnosis, speech, memory and intelligence) using the Luriea’s methods adapted for each age group with qualitative (types of errors) and quantitative (scoring) evaluation of results (Glozman, Soboleva, 2020; Glozman, Soboleva, Titova, 2019). Based on the scoring in each subgroup, it was possible to identify children with normative development (the total score of penalty points for performing neuropsychological tests in all mental areas did not exceed three); children with a mild degree of mental retardation (total score from 3.1 to 4.9), with an average degree (total score from 5 to 6.9) and severe mental retardation (total score above 7). We also analyzed the total scores for the performance of neuropsychological tests in each of the 7 indicated mental areas in order to determine which of the areas is more intact / defective in each of the studied groups of children.

All children went to the Research Center for Child Neuropsychology named after A.R. neuropsychological correction of identified problems in development, and neuropsychological examination was carried out twice: before and after a 10-week course of neurocorrection to determine the dynamics in the state of mental functions in the studied groups of children.

RESEARCH RESULTS

1. Age differences in crosslaterality

Analysis of the PLO study showed that in each of the 4 groups of children studied, the phenomenon of crosslaterality was detected in at least 74% of children. At the same time, there were no significant differences in this indicator between right-handers and left-handers. However, significant age differences were found: crosslaterality was twice as common in preschoolers as in schoolchildren. Consequently, in all groups of children, intramodal crosslaterality was observed more often than intermodal. However, this difference was most significant for the group of preschool children (46.6–26.6%) and for children with dominance of left-hand features in the lateral organization profile (LOP) (55–20%). A more detailed analysis of crosslaterality shows that in preschoolers, intramodal crosslaterality is almost equally represented in the motor and sensory areas, while in other groups of children, crosslaterality significantly predominated in the motor area, that is, between different tests for dominance in the arm and leg.

1. Crosslaterality and mental retardation

Next, an analysis was made of the relationship between the presence and type of crosslaterality and the mental development of children of different ages (Shterental et al., 1993, 1995). An initial review of the severity of HMF defects in three subgroups of children of different ages without crosslaterality, with intramodal crosslaterality and with intermodal

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crosslaterality revealed that the indicators of normative development in preschoolers do not show a connection with the presence of crosslaterality, and children with severe mental retardation were absent in the subgroup of preschoolers without crosslaterality. on the other hand, they were significantly represented in both types of crosslaterality, but especially pronounced (25% of all children in the subgroup) in intermodal crosslaterality. In children aged 7-8 years, a mild degree of mental retardation prevailed in all three subgroups. An analysis of the type of crosslaterality and the degree of mental retardation in younger schoolchildren shows that with age the mental retardation is partially compensated, but still draws attention to the fact that only in the subgroup of children with intermodal crosslaterality, gross mental retardation is observed in 10% of nine-year-old children who have not previously undergone neuropsychological correction.

Thus, in all age groups of children, the most negative results of neuropsychological examination were in the subgroup with intermodal crosslaterality, and this is especially pronounced in preschool children.

A qualitative analysis of defects showed that the serial organization of movements (kinetic praxis) and the spatial factor in praxis are not sufficiently formed in children of all three groups.

In the entire sample of right-handers with intramodal crosslaterality, the following was fixed: fluctuations in the overall level of performance. Kinesthetic difficulties were noted in preschoolers with intramodal crosslaterality. Emotional problems were typical for older students: anxiety and tension during examination.

In preschoolers with intermodal crosslaterality, difficulties in orienting in time were detected much more often than in other groups. All children with intermodal crosslaterality were characterized by regulatory problems: disinhibition and distractibility, as well as instability of brain activity (fluctuations and exhaustion) and echopraxia in the motor sphere. Schoolchildren with intermodal crosslaterality suffered not only stability, but also the level of brain activity.

In 7-8 and 9-year-old children with intermodal crosslaterality, the following are observed: micro- and macrography; unformed phonemic hearing.

Thus, both the prevalence and severity of neuropsychological symptoms were higher in subgroups of children with intermodal crosslaterality.

Crosslaterality and effectiveness of neuropsychological correction of mental retardation

A repeated neuropsychological examination showed that remedial classes have a positive effect on the overall level of mental development of all groups of children. This was manifested both in the quantitative results of the decrease in the total score of HPF disorders, and in the qualitative dynamics of the transition from the group with a more severe severity of mental retardation to a milder or even normative group.

Thus, in the group of children with intramodal crosslaterality, 85% of children reached the normative level, and 15% moved from a severe to a mild level of mental retardation (MMR) (2 children with a severe degree of mental retardation after correctional classes showed a slight degree of delay; out of 3 children with an average the degree of mental retardation in 2 children after the correction, the total score corresponds to the normative development; in 16 children who had a mild degree of mental retardation, after undergoing correctional classes, the total score for assessing mental development corresponds to the norm.

In the group of children with intermodal crosslaterality, 88% achieved the standard values, and 12% showed a mild degree of mental retardation (1 child with a severe degree of developmental delay before correction achieved a mild degree of developmental delay after correctional classes; 5 children with an average degree of delay gave normative indicators after correctional classes; 10 out of 11 children with a mild degree of retarded children achieved the indicators of normative development after undergoing a correctional complex).

In the group of children with no crosslaterality, 75% of the children reached the standard values, 12.5% achieved a mild degree of mental retardation, and 12.5% did not show any clear dynamics delay in 2 subjects, the level of development of mental processes after correctional assistance became normative, in 1 child it decreased to a mild degree of delay; 4 children with a mild degree of delay were corrected after correction to the norm).

The best dynamics of neuropsychological correction in children with crosslaterality is explained from our point of view by the fact that the complex correction program, which necessarily includes the formation of interhemispheric interaction, affects the pathogenic mechanism of psychological functioning difficulties in these groups of children - the accumulation of ambilateral features and insufficient interhemispheric differentiation of functions.

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DISCUSSION

The study showed that cross-laterality, as well as the formation of the profile of the lateral organization in general, is a dynamic formation, that is, it gradually develops and changes in the course of the ontogenetic development of the child. Cross-laterality is significantly greater at preschool age than at school age, which may reflect the insufficient formation of interhemispheric differentiation and interhemispheric interaction at preschool age. In schoolchildren, cross-laterality is more represented in the motor sphere than in the sensory one. In all the children studied, cross-laterality is more often present within one modality (intramodal) than intermodal.

A comparative analysis of the data from the study of the profile of the lateral organization and a comprehensive neuropsychological study showed that the severity of the delay in the formation of mental functions correlates more with intermodal crosslaterality (for example, dominance of the right hand and left eye or ear). In this subgroup, in all age groups of children, the most negative results of neuropsychological examination were observed (the maximum total score and a greater number of neuropsychological defects), and this was especially pronounced in preschoolers.

A qualitative analysis of the structure of defects shows that in children without crosslaterality, neuropsychological examination mainly reveals secondary defects in the performance of tests associated with neurodynamic and regulatory problems, for example, slow understanding of intellectual tasks or "stupid" mistakes in writing. In intramodal and intermodal crosslaterality, neurodynamic and regulatory problems are combined with primary defects, for example, phonemic hearing or spatial perception.

Comprehensive neuropsychological correction, an essential component of which is the formation and training of interhemispheric interaction, has a beneficial effect on the mental functioning of children with both intramodal and intermodal crosslaterality.

Functional asymmetry and speech disorder in the form of stuttering

One of the areas of neuropsychology is the study of speech disorders in the form of stuttering, and in all her textbooks on neuropsychology and books on communication and health, Janna Glozman also deeply considered the issues of stuttering (logoneurosis) (Glozman, 1987, 2008, 2012, 2018).

Stuttering is a complex neurodisease associated with developmental characteristics. The etiology of stuttering is still not clear, but there is growing evidence that it arises as a result of the interaction of genetic, epigenetic factors acting in early development, environmental factors (primarily family). It is noted during critical periods when the child develops speech, cognitive interest, cognitive abilities, motor control and emotions, usually at 3-4 years (Chang et al., 2018).

Considering the psychophysiological and genetic causes of stuttering, the researchers note that the contribution of genetic factors to the explanation of the variance of the trait in stuttering is about 70-80%, i.e. genetic determinism in the pathogenesis of stuttering "outweighs" environmental determinism. Also, most studies agree with the theory of genetic predisposition of lateral differentiation of mental functions, therefore, it is of particular interest to analyze the correlations of lateral organization profiles in stutterers and their parents.

Studies of recent decades reveal the features of brain activity in stuttering, discuss the problems of the connection between reading and stuttering, the specifics of speech areas in this disorder, and describe the specifics of default networks and tractography.

Stuttering is considered a multidimensional disorder, the depth and scope of which go far beyond the overt speech symptoms. This perspective was illustrated decades ago by the iceberg analogy (Sheehan, 1958), where speech impairment is the tip of the iceberg, most of which is hidden from the eye of the observer. This analogy is still accepted theoretically and clinically (eg, Yairi and Seery, 2014). Thus, it is believed that measurements of overt stuttering do not necessarily reflect the impact of overall stuttering disorder on individual people who stutter (Yairi and Seery, 2011). For example, some stutterers show mild overt stuttering but experience it as a deep and disturbing experience. This can manifest itself in fear of specific words, general social/communicative avoidance behavior, feelings of loss of control, restlessness, and excessive effort related to speech and communication (Ingham and Cordes, 1997; Riley et al., 2004; Yairi and Seery, 2011). In contrast, other stutterers may exhibit more severe open stuttering but perceive it as a mild condition. This may be due, for example, to moderate emotional reactions or the absence of significant social difficulties (Yairi and Seery, 2011).

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Russian psychologists and speech therapists (Belyakova, 2012) identify the following main characteristics of stutterers: increased impressionability and anxiety, timidity in communication, and a low level of adaptive capabilities of the body. J. Glozman also considered the problem of stuttering as a complex speech disorder and the need for an integrated approach to its correction.

In Russian speech therapy and psychology, the communicative nature of stuttering is especially emphasized and the psychological aspects of this speech disorder are deeply studied. Therefore, within the framework of clinical and psychological analysis, stuttering is considered as a logoneurosis, i.e. specific neurosis of speech. Modern approaches to the treatment of stuttering can be divided into three groups: 1) focused on reducing anxiety and cognitive processing (stuttering management), 2) focused on the formation of fluent speech, 3) complex rehabilitation of stutterers at the speech, personal and social levels of functioning.

An example of effective integrated work with stutterers is the method of group logopsychotherapy developed by Yu.B. Nekrasova in the 1960s for stuttering adults and adolescents and further improved (Nekrasova, 2006). This technique is based on the method of emotional-stress psychotherapy by the psychotherapist K.M. Dubrovsky, who, in order to relieve neuroses, turned to the patient's internal potential, mobilizing and strengthening the patient's will to health. This approach was close to the requirements of A.R. Luria, who, having introduced the concept of "internal picture of the disease" (IKB), spoke of the need to take into account the healthy potential of his personality when diagnosing each patient (Luria, 1973). Analyzing the complex psychological problems of stutterers, Yu.B. Nekrasova more than once turned to the works of Zh.M. J. Glozman (Nekrasova, 2006, p. 28), and also noted the need to involve parents and relatives of patients in the process of social rehabilitation. Since the late 1980s this technique is being developed by N.L. Karpova for stuttering children, adolescents and adults aged 7-45 with active involvement of their parents and relatives in logopsychotherapy (Karpova, 1997, 2003).

A new stage in scientific research, already in the system of family group logopsychotherapy, began together with. J. Glozman, when, under her leadership, A.A. Kiselnikov conducted a systemic inter- and multidisciplinary study of the brain mechanisms of stuttering, showing that this speech disorder is determined by many psychological variables (Kiselnikov, 2006). In 2015-2020 under the leadership and with the participation of J. Glozman, a number of studies of functional asymmetry and cross-laterality were carried out using the example of stuttering. Here we note once again that stuttering is a complex neurodisease associated with developmental features, the etiology of which is still not clear.

Considering the issues of assessing the effectiveness of recovery and research methods of speech communication in stuttering, J. Glozman proposed a new approach to using the method of studying motivation for verbal communication, previously developed in the methodology of logopsychotherapy, using the projective drawing “I and my speech”. A study of its application on different groups of subjects with speech and communication problems revealed new advantages of this method and showed that the improvement of communication capabilities is reflected not only at the external (speech) level, but also at the level of consciousness and internal representation of speech activity (Glozman, Karpova, Cheburashkin - Antipov, 2018, 2021).

The conducted psychological and neuropsychological studies of speech and personality changes in stutterers in the process of family group logopsychotherapy (2015-2020) confirmed the determinism of stuttering by many psychological variables, as well as the conclusions of neuropsychologists, psychophysiologists and neurophysiologists that it is the disintegration of left-right hemispheric interactions in the implementation of mental activity may be one of the mechanisms of stuttering. Neuropsychological diagnostics revealed that the most impaired functions in stutterers are praxis, memory and speech, and it is they that show the most pronounced dynamics after the course of family group logopsychotherapy. The conducted studies of the dynamics of the mental states of stutterers and speech and personality changes in the process of logopsychotherapy confirm the need for a personal approach in the rehabilitation process, since, as Yu.B. Nekrasova, "the effectiveness of the process of logopsychotherapy is determined by the continuum of sanogenic states" (Nekrasova, 1992, 2006).

The special contribution of J. Glozman note in the solution of the problem "Functional asymmetry and stuttering". The results of a comprehensive - psychological, neuropsychological and psychophysiological - study conducted in groups of stutterers in 2018-2020 showed the following: profile of lateral organization in stuttering from general population data? Is there a genetic similarity in the lateral organization profile between stutterers and their parents? Is the severity of neuropsychological symptoms in stuttering related to the profile of the lateral organization? Do the presence and type of crosslaterality affect the effectiveness of rehabilitation of patients with stuttering? All questions were answered positively.

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The results of the psychophysiological examination of stutterers before and after the course of logopsychotherapy also revealed the extent to which this psychotherapeutic approach to working with stutterers and their parents affects the change in the volume of working memory and the quality of inhibitory processes. A study of 18 subjects showed that in the process of logopsychotherapy, working memory significantly changes: its volume increases and working capacity increases, while changes in inhibitory processes are less pronounced and do not reach the level of significance. But in general, the positive dynamics confirms the effectiveness of the system of family group logopsychotherapy.

Thus, Glozman's deep interest in our research and for many years her creative involvement in the work of family logopsychotherapy groups made it possible to bring work with stutterers to a new level.

Summing up, we note: with the active involvement of J. Glozman herself in the process of family group logopsychotherapy in the course of research in 2015-2020, supported by the Russian Humanitarian Foundation and the Russian Foundation for Basic Research, new approaches and techniques were implemented in the work: then their parents: all the subjects also underwent a neuropsychological examination of cognitive, speech and neurodynamic functions using Luria's methods with a quantitative (point) assessment of the severity of defects (Glozman, 2012) before and after undergoing a course of logopsychotherapy; b) since 2015, neurocorrectional work has necessarily been carried out in groups; c) a new interpretation of the results of the traditionally used drawing test "Me and my speech" was given; d) an invitation to a collective monograph made it possible to take a fresh look at parent-child relationships in families of stutterers from the standpoint of A.R. Luria and R. Reitana (Karpova, Nikolaeva, 2020); e) in a pandemic situation, J. Glozman showed the possibilities of conducting neurodiagnostics online; f) the organization of complex psychological, neuro- and psychophysiological studies made it possible to once again confirm the effectiveness of family group logopsychotherapy methods (Karpova, Glozman, Danina et al., 2021), demonstrate the significance of integrated approaches in therapeutic practice and take a deeper look at the role of functional asymmetry in development and dynamics cognitive and speech disorders (Glozman, Nikolaeva, Karpova, Dobrin, 2022).

We can say that the contribution of J. Glozman is great in the theory and practice of family group logotherapy, and we will continue to use the new approaches and methods proposed by her with gratitude.

CONCLUSION

J. Glozman not only promoted to the whole world created by A.R. Luria the theory and practice of neuropsychology, but also continued them by developing textbooks on childhood neuropsychology (Glozman, 2008), neuropsychological examination (Glozman, 2012) and, especially considering the problems of speech pathology, turned to the topic of communication and personal health (Glozman, 1987, 2018). She contributed to the creation of a scientific and methodological complex at the Center for Child Neuropsychology. A.R. Luria.

The authors of the article were lucky not only to know Janna Glozman closely, but from 2014 to 2021 to work with her and under her leadership on scientific projects supported by the Russian Foundation for Basic Research. The result of this work was the collective monograph "The Role of Functional Asymmetry in the Development and Dynamics of Cognitive and Speech Disorders" (Glozman, Nikolaeva, Karpova, Dobrin, 2022). The monograph is devoted to the review and analysis of modern research on the role of functional asymmetry and lateral preferences in the development of cognitive and speech disorders, in particular stuttering. The data obtained by a team of authors during a comprehensive examination of participants in the groups of family logopsychotherapy and children with developmental problems in comparison with the norm groups are presented. The main results of studies conducted under the guidance and with the participation of J. Glozman, and her contribution to the consideration of the role of functional asymmetry in the development and dynamics of cognitive and speech disorders, we will present in this article.

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The results of studies of the role of functional asymmetry in the development and dynamics of cognitive and speech disorders, conducted under the guidance and with the participation of Zh.M. Glozman on the example of children with speech disorders and disabilities, as well as in different age groups of stutterers, allow us to talk about her personal contribution to the consideration of this problem:

1. In theoretical terms: about the role of functional asymmetry in the development and dynamics of cognitive and speech disorders…
2. In the practice of SIC in working with children with disabilities.
3. In the practice of family logopsychotherapy groups, the role of functional asymmetry in the development and dynamics of cognitive and speech disorders in stutterers was confirmed.

We were lucky to get to know each other and for several years to engage in joint research with J. Glozman, an outstanding scientist and neuropsychologist. She was not only a wonderful theoretician and practitioner who continued the work of Alexander Luria, but a teacher, a mentor, an organizer of science and a person of great vitality, wisdom and kindness.

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