



ACADEMICIA
An International
Multidisciplinary
Research Journal
 (Double Blind Refereed & Peer Reviewed Journal)



DOI: 10.5958/2249-7137.2021.00094.X

**PSYCHOLOGICAL ASPECTS OF LEFT-HANDEDNESS: CONCEPT,
 CAUSES, AND PECULIARITIES**

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ABSTRACT

Left-handed is a characteristic of individual typological features of a person. At the present stage of society, solving a number of psychological problems in the traditional educational process, it is important to investigate psycho physiological peculiarities and specificity of causes of the laterality pattern's formation in junior schoolchildren. Children with a left-sided profile are not a homogeneous group. Among the causes of left-handedness are the following: heredity or genetic left-handedness (as an individual congenital characteristic), pathological or compensatory (as a result of the compensation mechanism), forced or acquired (as a result of injury to the right hand or retraining). Recent studies describe how left-handers differ greatly from right-handed schoolchildren in their mental development, world's perception, prevailing thinking strategies and specificity of emotional-affective expression. The reasons for this are manifold. However, the key factor is the inextricable and intimate connection of the left-handedness and the hemispheric dominance that leads to a specific functional organization, of the brain work. This means that the left-handed brain works and complies by some other rules in comparison with right-handed people. As a result they have some educational peculiarities and difficulties. In most cases, these children have difficulties in mastering oral and written language skills, numeracy and mathematical operations. A characteristic feature of left-handers is the insufficient and specific development of visual perception, which normally creates the basis for mastering reading and writing. Unfortunately children with left handedness do not receive adequate assistance in school, since education and upbringing are focused on right handed people. It is also shown that «traditional» retraining in early childhood can lead to distress, which has a negative impact on the children. Therefore, it is necessary to include in the educational process special methods and techniques. Thus it will be a favorable condition for

their harmonious personal and intellectual development and effective mastering of various modules of the school curriculum. This article presents a theoretical model analysis of the causes and consequences of the development of sinistrality, briefly considered the psychological characteristics of left-handed children.

KEYWORDS: *Functional Asymmetry Of The Brain, Laterality Profile, Sinistrality, Left-Handedness, Left-Handed Schoolchildren.*

INTRODUCTION

Throughout the history of the development of mankind, people who differ from those around them in some individual characteristics have always caused and are causing surprise and interest. One of these individual typological features of a person is the profile of the lateral organization – a certain combination of functional asymmetry of the cerebral hemispheres (mental, motor, sensory), characteristic of a given person. Based on this, it is customary to distinguish: right-sided (with a predominance of the left hemisphere or left-hemisphere), left-sided (right hemispheric) and mixed (equal hemisphere) profile. The lateral profile reflects the distribution of hemispheric functions, while both hemispheres are not autonomous, there are, of course, complex interrelationships between them.

Main part

It is interesting to note that the society has developed an ambiguous attitude towards people with a left-sided profile (left-handed people), or towards left-handed people, for the most part wary and sometimes negative (Vergunov, Nikolaeva 2017). So, in many cultures and languages, the very word “left” means something dubious, false, wrong. For example, the word “left” in Old English meant “weak”, since among the majority of right-handed people who actively prefer to use their left hand, there was a minority, respectively, they were “weaker”. One way or another, some people to this day consider left-handedness a deviation, while others – a manifestation of genius.

Many practicing educators believe that such children need a special approach when teaching in primary school. There is evidence that left-handed children most often have impaired reading and writing, impairments or deficiencies in the development of visual-spatial perception, visual memory, and impaired visual-motor coordination (Bezrukikh 1995; Nikolaeva 2005; Semenovich 2009). The consequence of this are difficulties in distinguishing, memorizing and writing complex configurations of letters and numbers, drawing geometrical figures, as well as mirror writing, pronounced handwriting disorders, tremors, etc. MM Bezrukikh says that left-handedness in itself is not a developmental defect, but often acts as one of the reasons for the emergence of difficulties (especially at the initial stage of training, when there is an active formation of motor skills). For left-handed training to be effective, it is necessary to know the mechanisms and causes of the problems that arise (Bezrukikh 2008).

An analysis of scientific literature over the past decade (Vergunov, Nikolaeva 2017) indicates that this phenomenon is being actively studied, the results of these studies make it possible to change the stereotypical perception of left-handed people, and modern methods of teaching them are gradually being developed (Shorokh-Troitskaya 2002). A variety of reasons for

left-handedness, an increase in the number of left-handed children among children, the massive nature of problems in teaching written speech has become the reason for increased attention of both teachers and a number of researchers (Hayrapetyants 2003; Bezrukikh 2008; Bragina, Dobrokhotova 1988; Nikolaeva 2005 ; Semenovich 2009, etc.).

So, on the one hand, the phenomenon under study itself is still poorly understood. So far there is no unambiguous answer to many questions about left-handedness: the reasons, the specificity of the psychological and physiological characteristics of left-handed people, the ratio of indicators of motor and sensory asymmetry, questions regarding methods of their assessment, interpretation of results, etc.

On the other hand, all researchers agree that the number of left-handed children among schoolchildren is constantly increasing from year to year. It is interesting to note that, according to the latest statistics, almost as many left-handers are born as right-handers (apparently, both are needed evolutionarily), somewhere 40 to 60%. But in adulthood, only about 11% of them remain (Beglova 2018). Depending on the region, the number of left-handed people on the planet ranges from 15–17%. Despite the relatively large percentage, the world is still created for right-handed people, and left-handers have to adjust.

Conception

Left-handed or right-handed thinking based only on manual asymmetry is an imprecise indicator of cerebral lateralization. It is also important to distinguish between the very concepts of "left-handedness" and "left-handedness". Left-handedness is determined by the predominant possession of the left hand, while the left-handed profile (left-handedness) is a complex characteristic reflecting the predominance of the activity of the right hemisphere, or complete dominance of the left side.

If a child draws, eats and works with his left hand, because it is easier and more convenient for him, we can confidently say that he is left-handed. At the same time, whether he is an absolute left-handed person can be judged only after identifying his leading leg, leading eye and ear. In addition, there is also "hidden left-handedness", when a person does almost everything with his right hand, but he himself, without noticing, performs some of the movements with his left. Or a child may be left-handed, but not completely left-handed (Bezrukikh 2008; Nikolaeva 2005, etc.). It is worth noting that there are very few absolute left-handers (who have leading all paired organs on the left side of the body). Most often, you can observe various combinations (possession of the left hand is combined with the left leg, but with the right eye and right ear). There are a lot of similar combinations.

It would seem that the organization of brain activity in left-handers should be the same as in right-handers, but in a mirror image. But this is fundamentally wrong! The left-hander is built and develops according to completely different laws. In the future, we will focus mainly on left-handedness, but other types of manifestations of left-handedness cannot be ignored, since they can also affect the success of children's education.

Causes

The study of the characteristics of left-handed people is complicated by the fact that all of them are not at all a homogeneous group. There are various reasons for left-handedness, on which the

development of certain qualities in a child may depend. So, the predominance of the left or right side of the body can be due to several reasons. The first reason is the inheritance of a trait (Nikolaeva 2017). Provided that both parents are right-handed, the probability of having a left-handed child is 2%, if one of the parents is left-handed – 17%, if both parents are left-handed – 46%. Already now in genetics, about 40 loci are distinguished, which mediate the development of left-handedness in humans. For example, the PCSK6 gene, one of the loci of which enhances the severity of asymmetry, without a definite direction to the left or right, and the LRRTM1 gene shifts the hand to the left (Nikolaeva 2017). In this case, left-handedness, inherited, is not a pathology, it is one of the individual variants of the norm. Genetic left-handers usually do not have pronounced problems with learning, adaptation.

In most cases, from the eighth week in the fetus, the motor zones of both hemispheres of the brain function, which respectively control the left and right hand, already at this stage the "dominant" hemisphere is revealed. At this stage of development, the fetus in the womb begins to move with the right hand, at the 15th week it sucks the finger of the same hand, at the 38th week it begins to turn its head to the right (Hayrapetyants 2003; Bragina 1988; Semenovich 2009).

The second reason is when left-handedness is the result of stress that the fetus receives during the prenatal period, or a consequence of birth trauma to the brain. In the future, this may entail an increased risk of neuropsychic disorders. Due to the compensation mechanisms, the right hemisphere assumes additional functions of the left one. This results in pathological or compensatory left-handedness.

Since there is no consensus about the reasons for the formation of left-handedness, there are various theories. We will not describe all of them here – this is a topic for a separate article, but we will highlight one of them as an example. So, according to the theory of Geshwind (1980), the development of left-handedness in the fetus during intrauterine development is influenced by the high content of testosterone, which inhibits the development of the left hemisphere, and the development of the right, on the contrary, stimulates.

Researchers note that twins, premature babies, babies who received low scores on the Apgar scale are more often left-handed at birth, and if we consider gender, then according to statistics, it is found that there are 10 levs per 12 male left-handers. ¬she-women (Shanina 2000).

The third reason for the development of left-handedness is a consequence of dysfunction of the right hand (forced or acquired left-handedness). The choice of the left hand is associated, say, with an injury to the right hand, a fracture, but it may also be the result of imitation of relatives or friends (social left-handedness).

And the fourth reason is "retraining" in the learning process. Handness is one of the most important neurobiological properties; it cannot be changed at will, since any intervention, especially at an early age, leads to unpredictable results, which may not appear immediately, but after several years (Ayropetyants 2003).

If a child is retrained at the age when motor processes are decisive in the child's mental development, this leads to inhibition of mental functions. The consequence of this process may be the appearance in the child of a feeling of inferiority, an inferiority complex, inability to communicate with people, neurosis (restless sleep, tics, obsessive movements, stuttering), etc.

Today, many researchers (Hayrapetyants 2003; Bezrukikh 1995; Beridze 2004; Nikolayeva 2005; Chuprikov 2008) have convincingly proved that retraining a left-handed child is traumatic for his psyche. Nowadays, all teachers know that not only it is not necessary to remake nature, but also that it is necessary to apply an individual approach to left-handed children and use other teaching methods that are more natural and therefore more effective for them. According to some reports, left-handers experience difficulties in adapting to learning (especially in writing); the percentage of left-handers among children with learning problems is at least 2.5 times higher than among right-handers.

A study by Yu. Kleiberg and AL Sirotyuk, who studied the learning success of primary school students, showed that the most successful in learning are equal hemisphere and children with a dominant left hemisphere. The success rate of learning in the equipotential hemisphere was 77%, with the leading left hemisphere – 75%. Children with a dominant right hemisphere were less successful – 42.9% (Kleiberg 2001).

As noted earlier, the category of "left-handed" children is not homogeneous. The stereotypes existing in society (especially among teachers and parents) make it difficult to see a real child with his completely individual characteristics. Of course, there are still no clear answers to many questions about left-handedness, but it can be noted that the phenomenon of left-handedness in itself cannot be the cause of any deviations in development or a decrease in mental / physical abilities.

Features:

As a rule, each hemisphere of the brain has its own functions, but they are in constant interaction with each other, representing an integral system. Many authors believe that the left hemisphere specializes in semantic perception and speech reproduction (counting, writing), logical, analytical perception, abstract thinking. The right one is responsible for spatial-visual functions, intuition, visual-figurative, situational thinking. The right one is associated with the sensitive sphere, and the left one – with the motor and speech. The right hemisphere regulates the work of the left half of the body, and the left hemisphere regulates the right. Of course, there is no such clear division between the hemispheres, and researchers are increasingly confirming the inconclusiveness of ideas about the autonomous work of each hemisphere while providing different types of activity. Only in paired work is the asymmetry of the functions of the cerebral hemispheres manifested.

In a left-handed person, interhemispheric interactions are formed much later than in a right-handed person; both hemispheres are more autonomous in their work. Perhaps that is why left-handers show, on the one hand, great creative abilities (unsettled connections can theoretically contribute to non-standard thinking), and on the other hand, a slower (compared to right-handers) formation of the skills of activity that requires interaction of both hemispheres ...

If we talk about the personal characteristics of left-handed children, then they are emotional, dreamy, with vivid fantasies and imagination, rely on intuition, follow feeling more than reason, and slowly learn norms of behavior. Left-handed children are more timid, behave calmly, wait to be addressed, they themselves do not enter the conversation first. They are very impressionable, emotionally sensitive, vulnerable, touchy, have a negative attitude to what prevents them from concentrating, do not like to be distracted, they have reduced efficiency and increased fatigue.

They are impatient, intemperate, there is a reduced level of subjective control. In life, this is manifested as follows: a left-hander starts up with a half-turn, easily falls into a rage. The activity is spontaneous, relying on a lucky break. It is difficult for them to work in large groups with strictly regulated conditions and subordination. They prefer individual work where they can show their own initiative and intuition, creativity and imagination.

Phenomena such as a decrease in adaptive capabilities, increased excitability, anxiety, neurosis-like disorders can often be observed in children with forced left-handedness. Asynchronous development of mental functions can be considered characteristic of a left-handed child, as the development of emotional-volitional functions is ahead of the curve, while psychomotor and spatial perceptions lag behind.

Speaking about the features of speech, it can be noted that oral speech is emotional, expressive, rich in intonations, accompanied by gestures, there is no particular harmony in it, pauses, unnecessary words and sounds are possible. In the beginning, letters can be written (read) the other way around (mirrored), skip letters, not end words, not put dots, and clumsy handwriting.

It should be recalled that left-handedness in itself is not a risk factor in learning to write, but only in connection with certain deviations or developmental disorders.

Lefties use a special information processing strategy, an analytical style of cognition, which is manifested in a slow comprehension of connections between parts of the whole (reduction of differentiation). They are characterized by detailed component-wise work or work with details; on the basis of such an analysis, a holistic view of the object of activity is built.

In most left-handers, there is a lack of development of visual-spatial perception, visual memory and visual-motor coordination, which undoubtedly leads to difficulties in school, as it is an essential component of the child's overall functional development. And the question is not so much that the child holds a pen in the other hand, it is much more important whether he has formed interhemispheric connections, oculomotor connections (hand – eye), as well as connections with the auditory analyzer (eye – ear – hand) ...

The increase in the number of left-handed first-graders actualizes the need to carry out special work to adapt them to school, where the educational process is focused on writing the right hand (Nikolaeva 2005). Teaching left-handers or schoolchildren who demonstrate the left side of the preference should contain elements of adaptation and include specially organized and developmental activities.

CONCLUSIONS

Knowing the causes and psychological characteristics of left-handed children, a teacher should select methods of teaching educational material, taking into account the creative and creative abilities of right-hemispheric students. And along with the classical teaching methods, use, for example, problematic and heuristic ones, creating conditions for the inclusion of emotions and intuitive thinking in the work.

It is better to explain the new theoretical material on practical tasks, actively using the intonation capabilities of speech and accompanying visual reinforcement. It is easier for a left-handed student to solve an example or problem not from a textbook, but in the form of a riddle task or other creative tasks.

Achieving success in teaching such children is possible only with a unified tactics of behavior of the teacher and parents, who consider left-handedness not as a deviation from the norm, but as an individual option, a manifestation of individuality within the normal range. It is necessary to create favorable conditions for children who already find it difficult to exist in a "right-handed" society, never express a negative attitude towards left-handedness, but, on the contrary, use the characteristics of such a child to instill in children in the classroom respect for the individual characteristics of each a person, tolerance in relation to the manifestation of properties that are not characteristic of the majority.

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