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Relationship between High Risk Group of Schizophrenia and Dyslexia

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Abstract: The research on the physiological basis of schizophrenia and dyslexia is a very attractive topic at present, and there are many important findings. These findings help to understand the structure of the brain and the function of the brain in the process of reading, as well as the genetic possibility of reading damage, and also help to identify and correct dyslexia. What factors affect the formation of schizophrenic dyslexia need to be further studied.

1. Introduction

Dyslexia is simply a kind of reading and spelling disorder caused by the uncoordinated processing of visual and auditory information by the brain. Special attention should be paid to distinguish it from that kind of dyslexia caused by mental retardation. On the contrary, many patients have extremely high IQ, even genius type. Like Leonardo da Vinci, Edison, Einstein and Kennedy, they were all regarded as “stupid children” with extremely poor grades when they were children. Finally, scientists found that they were typical examples of dyslexia. Its characteristics are mainly reflected in literacy and reading, and its reasons are complex and multifaceted, but it can be corrected scientifically in childhood. Most people are very lucky to learn to read and write, but there are still 20% of people with dyslexia. If you are the 20% of the people, you will know what it feels like: often you need to guess the meaning of many words and articles; you will look at the words upside down or upside down, and it is easy to skip lines or miss words; you must point at each word with your fingers to read; when writing, you will try to simplify the words or scribble the font as much as possible In short, you do everything you can to avoid embarrassing situations, such as pretending to open a book to read or writing on paper with a pen.

A high proportion of those who have low performance in mathematics learning are due to the inability to read and understand the application questions. Therefore, in the face of school learning, as in the face of an impossible task, every day is a difficult challenge. Dyslexia is the main type of learning disabilities, accounting for more than 70% of all children diagnosed with learning disabilities. According to research, 10% to 30% of children in English speaking countries have dyslexia. About 3% - 5% of the children who learn Chinese have dyslexia.

2. Classification of Dyslexia

Dyslexia includes central dyslexia and peripheral dyslexia. Central dyslexia refers to dyslexia

caused by impaired reading center, such as left brain injury with dyslexia, while peripheral dyslexia is a specific sensory processing disorder caused by impaired visual analyzer. Neglect dyslexia belongs to peripheral dyslexia. Neglect dyslexia shows that patients often ignore the left side of the text or the left part of the letters of words when reading the text. The types of errors usually include omission, replacement, addition, etc. Studies have shown that the occurrence of neglect dyslexia is related to the severity of neglect. The incidence of neglect dyslexia is about 37.5%, which is an important factor affecting the social function of patients.

3. The Manifestation of Dyslexia

Neglect dyslexia is a common cognitive impairment in patients with neglect. Our results suggest that in Chinese character reading, the left side of a word and the left side of a word have a higher error rate, which is mainly manifested as omission errors. Neglect dyslexia shows obvious word length effect and semantic effect. However, the phonological priming effect and semantic transparency effect of the left side are not obvious. The study of neglect dyslexia of words shows that substitution errors are the main type of errors, followed by omission errors. However, the result of this experiment is opposite, that is, missing errors are far more than replacement errors, which may be related to the characteristics of Chinese characters. Roman characters are phonetic characters, and words are composed of letter strings. The lack of letters may not be able to pronounce correctly, resulting in more replacement errors; while Chinese characters are pictophonetic characters, lacking or replacing radicals can still pronounce characters, so more errors are missed. The experimental results show that the error rate increases with the increase of text length. This may be related to the length effect of online bisection in patients with neglect, that is, with the increase of line length, the right deviation of line bisection increases.

According to the language specificity theory of dyslexia, dyslexia originates from the processing defects at the linguistic level. There are obstacles in the representation and processing of speech information of dyslexia, and their other cognitive and information processing abilities are intact. The non-verbal specificity theory of dyslexia holds that the normal development of sensory perception is a prerequisite for the development of advanced cognitive language and speech. Dyslexia is caused by deeper and more basic visual and auditory impairment, and its fundamental reason lies in the impairment or imperfect development of non-verbal auditory and visual abilities. The core of such theories is that dyslexia has no language specificity and is not limited to the linguistic level. Each of the two theories has its own experimental evidence, but there is still no agreement. The neural basis and genetic mechanism of dyslexia has always been the concern of researchers, especially in recent years, with the rapid development of cognitive neuroscience, researchers pay more attention to this problem. The research on the physiological basis of developmental dyslexia can not only reveal the physiological mechanism of developmental dyslexia in theory, but also provide evidence for the universality and particularity of language processing, and create opportunities for seeking effective treatment methods in practice.

4. The Relationship between Dyslexia and Brain

The structure and function of the brain is very complex and highly coordinated. Exploring the mystery of the brain is a long-term dream of human beings. With the development of science and technology, researchers have gradually developed several methods to measure brain structure and function. One is electrical stimulation. If a occipital lobe in the posterior brain is stimulated, the individual will perceive the flash. Similarly, stimulation of other areas will trigger perception corresponding to this area, such as stimulation of motor area will trigger motor response. The other is pathological observation, that is to measure the function of Fu organs by observing the obstacles

caused by stroke, disease or injury. Damage to the left occipital lobe can lead to partial right visual field blindness, and researchers have long found that damage to specific areas of the left hemisphere can lead to the loss of speech and language understanding, and damage to the frontal lobe can lead to impulsive behavior.

It is found that the bilateral brain of dyslexia is highly symmetrical, while in normal individuals, the brain structure is usually asymmetric. In the whole population, the left brain is larger than the right brain in 65010 people, and the right brain is larger than the left brain in 11010 people. The specificity of brain structure in dyslexia may be the result of abnormal development of nerves before birth. Other evidence comes from studies of patients with brain injury. These studies found that patients with left brain injury tend to show poor speech decoding skills, but orthography and semantic judgment are intact, indicating that these patients rely more on right brain processing in reading. Half field experiments on normal readers showed that speech processing was mainly the function of the left brain. The research on the brain structure of dyslexia also comes from brain imaging experiments. Researchers use positron emission tomography and functional magnetic resonance imaging to examine the brain asymmetry of dyslexia, especially the asymmetry of the posterior hemisphere. In normal readers, the left temporal lobe and the posterior brain area are usually dominant, while in dyslexics, there is a high degree of symmetry or opposite asymmetry in the posterior brain. The latent period of dyslexia group was long, but not significant. Compared with neurophysiological and neuroimaging studies, the dyslexic group had less brain asymmetry. It can be seen that many studies have found that there are differences in brain unilateralization between dyslexics and normal readers, especially in temporal lobe. Neurophysiological studies have long found that the temporal lobe has a great relationship with human speech processing, and a very consistent finding in behavioral studies of developmental dyslexia is speech processing disorder. It may be more important to study how these neurophysiological deficits affect the development of reading. Another problem is how the neuroanatomical and functional abnormalities of dyslexia are formed.

The researchers also used functional visceral imaging to examine cortical dysfunctions in developmental dyslexia. This technique studies cortical activation patterns (such as glucose utilization, blood flow and oxygen content) induced by various cognitive tasks. The goal is to determine which visceral regions are activated in reading, and whether individuals with dyslexia are activated in the same way as normal readers in reading, language and speech decoding. Functional imaging studies have shown that the blood flow of temporal lobe and parietal F region in dyslexic people decreases during speech task and single word reading. The researchers associated this abnormality with the severity of dyslexia and calculated the correlation between reading skills and regional cerebral blood flow in a series of reading tasks and visual fixation tasks between dyslexia group and normal readers. In this region, there was a positive correlation between local blood flow and reading performance in the control group, which indicated that the left angular gyrus was involved in reading, on the other hand, the high activation of this region might promote the reading of normal readers; on the contrary, there was a negative correlation between dyslexia and reading performance, which indicated that dyslexia had functional impairment in this region, The overactivation of this region will damage the reading ability of the dyslexic, and the acquired dyslexia and the developmental dyslexia have the same visceral location. The neurology literature shows that the left temporal lobe and inferior nape lobe are the most likely regions associated with dyslexia.

5. The Relationship between Schizophrenia and Dyslexia

As early as 1884, Jackon proposed that the completion of a cognitive task requires the joint

participation of networks formed by different brain regions. Complete neural anatomy and neural connections are the necessary conditions to complete the corresponding cognitive function. In this network, the destruction of any node and connecting fiber can lead to cognitive impairment. Gaffan and Hornak (1997) used surgical method to destroy the subcortical nerve fibers connecting frontal lobe and parietal lobe in monkeys, and monkeys showed symptoms of neglect. They found that even small focal lesions in this pathway can cause neglect. The role of subcortical nerve fiber injury in the mechanism of neglect was proposed for the first time. Similar results have been confirmed in other rodents. The neural mechanism may be related to the destruction of subcortical nerve fibers in TPJ area. The relationship between mental illness and nerve fiber injury in temporal and parietal lobes, frontal and parietal lobes. In patients with schizophrenia, the damage of the superior frontal parietal lobe junction (SLF) is enough to lead to schizophrenia. In recent years, there have been individual reports on the relationship between the occurrence of neglect and white matter nerve fibers by using neuroimaging DTI technology. In recent years, with the development of functional imaging research, it is possible to reveal cognitive dysfunction from the brain network level, which also provides a new research idea for the mechanism of schizophrenia. A large number of cognitive psychological studies suggest that there is a close relationship between schizophrenia and dyslexia. At the same time, based on the existing research foundation of attention brain network, the ventral attention network of patients with neglect is destroyed, while the left dorsal attention network is abnormally activated. With the improvement of neglect symptoms, the activation of the left dorsal attention network decreases. It is found that the ventral and dorsal attention networks of normal subjects can be detected by resting state MRI.

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