



TITLE

WHAT HAS THE BRAIN TO DO WITH LANGUAGE?

KEY IDEA

Certain areas of the brain are more active, when language is used.

CONSPECTUS

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2. Key idea: Certain areas of the brain are more active, when language is used
3. Reasons: What science has to say about language and the brain
 - 3.1. The old view
 - 3.2. The modern view
4. Consequences: The brain processes sign language mostly like a spoken language
5. Conclusion: Brain studies prove that sign languages are natural languages just like spoken languages

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OBJECTIVES

You can **recognize** correct statements about sign language processing in the human brain.
You can **match** Wernicke's and Broca's areas with the effects of damage to the respective area.
You can **recognize** whether statements about language processing are true for deaf or for hearing people

FULL TEXT

1. Introduction: The brain consists of two halves

The brain consists of two halves, a left one and a right one. We call these halves "**hemispheres**". The left hemisphere is more logical and analytical. For example, this hemisphere has more to do with language and mathematics. The right hemisphere has more to do with creativity and emotions, also with movement and three-dimensional space. The brain thinks best, when it uses both halves together.

2. Key idea: Certain areas of the brain are more active, when language is used

It is important that you do not imagine the parts of the brain that are more active when language is used as areas with sharp borders. The brain consists of networks that work together. The left hemisphere of the brain is usually dominant for language, but it works together with the right hemisphere. This is true for both spoken language and sign language.

3. Reasons: What science has to say about language and the brain

3.1. The old view

In old times, scientists could only find out how the brain works from the outside: the scientists diagnosed different impairments of the brain. Then the scientists observed what did not work right because of the impairment. They found out that there are two areas of the brain that are important for language:

The first area is called "**Broca's area**". If this part of the brain is hurt, a person has trouble with speaking. People who have a problem with this part of the brain do not produce complete sentences. They have to search for the correct words. They also change sounds within the words. But they understand speech well and they are aware of their problems. There are also deaf people



who have this disease. If a deaf person has this brain disease, their sign language is not correct and they hesitate a lot when they are signing.

The second area is called "**Wernicke's area**". This part of the brain is connected to how people understand language. People who have a problem with this part of the brain can speak, but they do not understand what they are saying. They often use words which do not exist. They have also problems with reading and writing.

These two areas are named after the scientists who discovered them.

3.2 The modern view

Today, we are not limited to observing people's behaviour. We are not limited to examining the brain after the patient has died. With modern technology, scientists can "look inside" the living brain. We can check which parts of the brain are active. So we know now that many other parts of the brain are linked to language, not just Broca's and Wernicke's areas.

4. Consequences: The brain processes sign language mostly like a spoken language

There are many scientists working on the subject of deaf people and language. We know now that sign language is processed in the same brain areas as spoken language.

The left hemisphere of the brain processes language for both sign languages and spoken languages. But in sign languages, the right hemisphere is more active than for spoken language. This is because the right hemisphere also processes information about space.

We know that there are other differences between the brains of deaf and hearing people: for example, there are differences in the brains of people who acquired a sign language first. They were tested and the areas of their brains that control movement worked differently.

We also know how deaf and hearing people process gestures. For the hearing people, only the parts of the brain that process movements were active. For the deaf people, all language centres were active. More language centres were active for signs than for gestures. This is because deaf people's brains are trained to perceive movement as something to do with language.

5. Conclusion: Brain studies prove that sign languages are natural languages just like spoken languages

The brain does not make a difference between signing and speaking. The brain recognizes both as language. Brain studies prove that sign languages are natural languages just like spoken languages. They evolved on their own without conscious planning.