

**METHODS OF INVESTIGATE
THE BRAIN**

WENDI SHEN

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Introduction:

The direct observation of the fully integrated functioning of living human brains will probably always be impossible, although many rapidly evolving technological advances are bringing us closer to this goal. In recent years, much progress has been made in understanding how the brain works. In order to understand the brain better, many techniques and methods have been invented and used for investigating the brain.

Objectives:

The objectives of this essay are to know and understand more methods of investigating the brain, and evaluate these methods, so that we can choose and control them well.

Summary:

This essay describes some methods which are used to investigate and study the brain. These methods are evaluated. By reading the evaluations, we can make better choices when we need them.

Contents:

1. CT scanner
2. MRI
3. Lesion studies
4. Stimulation techniques

Word account: 801 words

1. **CT scanner**--It is a special kind of X-ray machine. Instead of sending out a single X-ray through your body as with ordinary X-rays, several beams are sent simultaneously from different angles. The X-rays from the beams are detected after they have passed through the body and their strength is measured. (from website) A computer can use this information to work out the relative density of the tissues examined. Each set of measurements made by the scanner is, in effect, a cross-section through the body.

This method is used to produce virtual images, which means a surgeon would see images inside during an operation. Dr Sarah Burnett (a authoritative doctor) said that:

'The CT scanner was originally designed to take pictures of the brain. Now it is much more advanced and is used for taking pictures of virtually any part of the body.'

The scanner is particularly good at testing for bleeding in the brain, for aneurysms (when the wall of an artery swells up), brain tumours and brain damage. It can also find tumours and abscesses throughout the body and is used to assess types of lung disease.'

Evaluation: + It is a useful technique for surgeons when they do operations.

- Some patients may experience side effects due to allergic reactions to the liquid dye injected into the veins.(It is important to let the X-ray doctors or technicians know if you have any allergies, asthma or kidney trouble, prior to having the X-ray dye injected.)(This information comes from website)

2.MRI(magnetic resonance imagine)--It is a technique for measuring brain structure and function based on the detection of magnetic. It is based on the principle that certain atoms, such as hydrogen. Generally speaking, atoms are random and they are in different directions, but when they are placed in a magnetic field, they line up in parallel. (1990.PP.125) Because the wobble of atoms are not symmetrically, so if the radio waves are beamed across the atoms at right angles to the magnetic field, they will cause the spinning nuclei to wobble synchronously with one another. The movements of atoms will be analyzed by computer and reconstructed as an image of the brain.

Actually, the images from MRI look very similar to those from CT scans (I introduced it before).MRI can show the things that surrounding cells, while CT scans just can show the density of cells. MRI is still largely experimental, and it is very useful in detecting brain tumours and cancers. Many people consider that MRI will replace CT scan in the next decades, although it is more expensive. It provides precise spatial information, and shows changes

over shorter periods of time. But the disadvantage of it is it has only moderately good temporal resolution of the order of several seconds. This means that we cannot track the time course of cognitive processes.(2002.PP.46)

3.Lesion studies---It is one of the oldest research method used physiological psychologists involves examining behavioral effects of damage to certain parts of the brain.(from website). This method is to investigate the damage of the brain, by comparing the behavior of the patients who are suffered from some brain problems with the behavior of the normal people, then find the functions of the brain.

This is method is mainly by doing some experiments which used animals or experiments of the patients who have suffered brain damage in accidents and have some kind of brain pathology, such as a tumour or an epileptogenic. By damaging a part structure of the animal's brain (whose brain structure is similar to human), experimenters can investigate the function of this part in the brain.

Evaluation: + It was a useful to investigate the function of the brain in early studies. And it laid the foundations for research on brain function.

— The major disadvantage of this method is it was difficult or impossible to make small, precisely defined ablation, and that the operation left scar tissue which produced abnormal electrical activity.(1978.PP.82)

4. Stimulation techniques—It is involved in the short circuiting of complex and inaccessible pathways from receptor organs to their target brain structures, by artificial stimulation of those structures.(1978.PP.87) It is an another way to study brain and how the brain and behavior effect on each other. By stimulating brain structures and pathways, we can get specific functions of the brain, such as eating (which is found to elicit eating when food is present may elicit grooming or some other behavior when food is absent.)

Evaluation:+ The behavior of a freely moving animal can be observed without the complications introduced, and it has profound effects on many functions.

— Interruption can be biased by neglecting the interaction between the effects of the brain stimulation and of environmental stimuli present.(1978.PP.87)

Reference

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