How would you describe someone “hard-wired for empathy”? What are they like?

Empathising is all about being able to tune into somebody else’s emotions and thoughts. Step one is recognising what their thoughts and feelings might be and step two is having an appropriate emotional response to their mental or emotional state. It is not simply a case of recognising, for example, that someone is in pain. It is also about wanting to do something about it. You can see that there might be individual differences in how easily people can empathise. As it turns out women seem to do it more easily, more spontaneously, than men.

And what is a systemising person like?

They are good at analysing or building systems - anything from a library catalogue to a musical composition. They intuitively figure out how things work or the laws that govern the behaviour of a system. A simple example of a system is a light dimmer switch. When you rotate the dimmer switch the light gets brighter or dimmer, depending on which way you rotate it. Systemising involves focusing on very precise and small variables.

Your theory sounds a bit like a scientific version of the classic gender line: women are soft and caring, men are hard and mechanical.

That’s a simplification. The theory isn’t saying one sex can do these things and the other sex cannot. That’s far too black and white. It’s saying there are statistically significant differences between how, on average, the sexes are spontaneously attracted to the domain of emotion on the one hand and to the domain of systems on the other.

Does being empathic have to be at the expense of being systematic? Some people are good at both. How do the two domains interact?

That’s a bit of a puzzle. It looks like there is a relationship between these two dimensions. For example, it may be that as you get better at one you get worse at the other, but since some people are either very good at both or very poor at both, this suggests they may be independent. This is really raising questions for future research.

How is this reflected in the structure of the brain or brain chemistry?

In the past decade, functional neuro-imaging has suggested that there are three very important brain regions associated with empathising: the amygdala, the left medial frontal cortex and the superior temporal sulcus. These areas are associated with monitoring what other people are doing: looking at their faces, trying to compute their intentions or their mental states, trying to recognise their emotional expressions. What has been more difficult to do in brain scanning is to monitor whether the subject is also having an appropriate emotional response to the person they are observing - which is key to empathising.

Has anyone looked at what happens in the brain when someone is systemising?

Not yet. It’s a completely new concept. What people have done is look at specific systems, such as spatial ability - being able to read maps, for example. But we need to look at a whole range of different kinds of systems, from the mechanical to the abstract.
Have you got evidence from physiology or neuroscience to support your theory?

My theory at the moment is built on a psychological, or psychometric, definition. Psychometric testing gives you a quantitative approach. You can ask: on average how did most people score on this psychological test?

To what extent does the disparity between the sexes come down to biology or culture?

I don't think anyone would dispute that experience, the environment and culture play a significant role in shaping these differences between men and women. But our study of newborn babies has shown that biology must also play an important part. We found that before they were 24 hours old, girls looked longer at a human face than boys did, and boys looked longer at an inanimate mechanical mobile than girls did. That does not necessarily demonstrate true empathising or systemising, it simply shows which of the two domains - faces or mechanical objects - is grabbing their attention more easily. It may be that on average, the sexes are attracted by different kinds of motion: human faces move differently to mechanical mobiles.

In another study we followed babies whose mothers had had amniocentesis, so we could test the prenatal testosterone levels in the amniotic fluid, which is produced by the fetus. Then at 12 months old we tested these babies for how much eye contact they made. The biochemist who tested the testosterone and the psychologist who tested the eye contact were blind to each other's data. What we found was that the more fetal testosterone a baby produced before birth, the less eye contact they made at 12 months. We saw the children again at 18 months and measured their vocabulary development, and we found that the higher the level of prenatal testosterone, the smaller their vocabulary at 18 months. Generally, girls seem to be talking earlier and developing vocabulary faster, though we found that prenatal testosterone is also having an effect within each sex.

If your theory is correct, you should be finding people with extreme female brains, as well as with extreme male brains. Why haven't you?

I think we will. I believe they haven't come to light because the extreme female brain may not lead to any clinical condition, unlike the extreme male brain. Being superior at empathising needn't lead to distress or disability. If you've got problems in systemising you can always get help quite easily. You can get technical support in your office if you don't understand your computer.

So does society stigmatise systemisers? Do we have something against the male brain?

It stigmatises people with a disability in empathy. If you've got difficulties in, say, mathematics your teachers will just say, why don't you drop those subjects. You are not treated as disabled in some way. People with empathy problems have a much harder time.

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