



# In two minds

**Many men like fixing cars. Lots of women like talking to friends. Simon Baron-Cohen puts forward a new theory that sheds light on the nature/nurture debate.**

**I RECENTLY PROPOSED A THEORY** that suggests the female brain is predominantly hard-wired for empathy, and the male brain is predominantly hard-wired for understanding and building systems. I call it the empathising-systemising (E-S) theory.

By empathising, I mean the drive to identify another person's thoughts and emotions, and to respond to these with a suitably appropriate emotion themselves. By systemising I mean the drive to analyse and explore a system; to extract underlying rules that govern its behaviour; as well as the drive to construct systems. Systems can be as varied as a computer, a musical instrument, or a maths equation.

According to E-S theory, a person has a particular 'brain type'. This doesn't suggest individuals fall into only one of the two categories, but rather that empathising is stronger than systemising for some individuals. This is called a brain of type 'E', but we can also call it the 'female brain', because more females than males show this profile. Other individuals are better at systemising than empathising, with a corresponding brain of type 'S', also called the 'male brain', because more males show this profile. Yet others are balanced between the two, with a 'balanced brain', or a brain of type B.

The evidence in support of this theory is drawn from decades of research. For example, given a range of toys to play with, more girls than boys will play with dolls, enacting social and emotional themes. Girls, as young as 12 months old, respond more empathically to the distress of other people, showing more comforting behaviour.

This echoes what you find in adulthood: women show more comforting behaviour than do men. Women are also more sensitive to facial expressions, picking up subtle nuances from tone of voice or facial expression, or judging a person's character. Even by 12 months of age, girls make more eye contact than boys. A study I conducted with my colleagues at Cambridge University showed that, even at birth, girls look longer at a face, and boys look longer at a suspended mechanical mobile.

Other research has shown that boys, from toddlerhood onwards, tend to be more interested in cars, guns, building blocks, and constructional toys — all systems. The same sort of pattern is seen in the adult work place. Some occupations are almost entirely male: metal-working, weapon-making, crafting musical instruments, or the construction industries, such as boat-building — even maths, physics, and engineering. The focus of these occupations is on constructing systems.

Some psychological tests also show the male advantage in systemising. For example, in the 'mental rotation test', you're shown

two shapes, and asked if one is a rotation or a mirror image of the other. Males are quicker and more accurate on this test. Reading maps has been used as another test of systemising. Men and boys can learn a route in fewer trials, just from looking at a map.

There is ample research to show broad average differences between male and female behaviour, but the fundamental question remains: is it the result of nature, nurture, or both? There's no doubt culture plays some role in determining if you develop an E (female) brain or S (male) brain. But the research also indicates biology also plays a significant role.

When women were prescribed a synthetic female hormone (diethylstilbestrol), in an attempt to prevent repeated spontaneous miscarriages, boys born to them were likely to show more empathising behaviours, such as caring for dolls. If a female rat is injected at birth with testosterone, she displays faster, more accurate

maze learning, compared to normal female rats. We

have also found that toddlers who have lower foetal testosterone levels show higher rates of eye contact and more empathy. And we have found that the higher the levels of a child's foetal testosterone, the stronger their interest is in systems — all of which supports the E-S theory.

There's still undoubtedly a lot for us to learn, but the research is clearly pointing us in a particular direction in regards to the influence of biology and sex on an individual's brain type.

I have sometimes been asked if my theory risks stereotyping the two sexes. In fact, I think it does the opposite. Results from the E-S theory tell us that the sexes differ only on average. When it comes to individuals, one cannot predict a person's brain type just on the basis of their sex. The conclusion we can draw is that one should take individuals on their own merits, rather than prejudging them on the basis of their sex.

The E-S theory can help us explain why individuals are typical or atypical for their sex, and may even explain why children develop autism and Asperger Syndrome, which has been proposed to be an extreme version of the typical male brain. Children with these conditions display difficulties empathising alongside normal or even talented systemising.

What the theory also tells us is we need to rethink the way we address sex differences, and we need to take into account biology as well as culture when determining why we are the way we are. ■

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