

Secrets of the Sexes –

BBC UK – What is revealed by taking the “Sex ID” online survey?

'Brain sex'

If you're a man, you may be more in touch with your feminine side than you ever guessed, and if you're woman you may occasionally think more like the lads.

That's the surprising news from scientists who think there are 'male brains' and 'female brains'. Study findings show that although men tend to have male brains and women tend to have female brains, it isn't always so.

Most scientists think there's no real difference between men and women when it comes to total intelligence (commonly called IQ), but there is growing evidence that men and women's brains are wired differently. This theory may explain the finding that, on average, men are at better at some things and women are better at others.

For example, studies have found that women tend to be better at **empathizing** and men are generally better at **systemizing**. In other words, men are often more adept at discovering the rules that govern a system. They like to get deeply involved in activities such as car repair, computing or building up an extensive music collection.

Women, on the other hand, are thought to be better at guessing other people's emotions and responding appropriately. They would be more likely to comfort you in a time of crisis.

But men and women don't always fit neatly into their respective groups. A University of Cambridge study found that 17% of men have a 'female' empathizing brain and 17% of women have a 'male' systemizing brain.

Empathizing and systemizing

You may be surprised to learn that there are 412 different human emotions. But if you're a woman this may be obvious.

Women are said to be better at distinguishing between the fleeting expressions that cross our faces every day. According to Professor Simon Baron-Cohen at the Autism Research Centre, Cambridge University, this is because empathy comes naturally to women while men are wired to understand how things work.

Men are typically systemizes. That is they're better at investigating how a system works. They like to get deeply involved in activities such as car repair, computing or building up an extensive music collection.

On average women are empathizers. They are better at accurately guessing other people's emotions and responding appropriately. They would be more likely to comfort you in a time of crisis.

The **Sex ID** test asked questions about people's enjoyment of reading maps, caring for other people, talking about politics and how truthful they are to their friends. People's answers reveal whether they have a female 'empathizing brain' or a male 'systemizing brain'. Baron-Cohen has shaped his theory by using similar tests.

Baron-Cohen isn't saying that one sex can do things that the other cannot. He's saying that on average there are significant differences between the sexes – one tends to be more empathic and the other more systematic.

However, many men and women have a brain that differs from their sex. Baron-Cohen's laboratory has found that about 17% of men have a female 'empathizing brain' and 17% of women have a male 'systemizing brain'.

A significant number of people have a 'balanced brain' which is equally good (or bad) at both empathizing and systemizing.

Studies of human behavior support Baron-Cohen's theory. For example, it has been found that baby girls look longer at faces, particularly people's eyes while boys are more likely to look at inanimate objects.

Some scientists believe that there may be an evolutionary explanation of empathizing and systemizing.

In prehistoric times, a man's vision may have been more narrowly focused and he would have to have been good at judging space and distance in order to be a good hunter. These skills could be related to the ability to

focus on the laws governing a system. Women, on the other hand, spent more time foraging for food and watching over their children. These jobs would require wide vision and the ability to differentiate nuances of tone – skills that would help them sense another person's emotions. It may sound crude and there's no scientific proof, but it's plausible.

Systemizing and autism

Baron-Cohen believes that an 'extreme male brain', one that is very good at systemizing but very poor at empathizing, may lead to the condition known as autism, which affects more men than women.

Exposure to abnormally high levels of testosterone has been linked to autism. This is what Baron-Cohen terms "the extreme male brain theory of autism". Autistics also had very low **digit ratios** (suggesting high levels of testosterone).

The Sex ID test is not detailed enough to diagnose autism, only detailed examination by a qualified doctor can do that. If you're concerned, contact your GP.

Empathy and verbal abilities

In the Sex ID survey we also tested people's verbal fluency by asking them to list as many words possible that related to the terms 'grey' and 'happy'. Women have regularly scored higher than men in scientific studies using similar tasks.

There is no evidence of vocabulary sizes differing between men and women, but women have demonstrated the ability to recall more related words under a time constraint.

Women's verbal skills appear to begin early in life. Studies of children's behavior have found that girls speak earlier, have larger vocabularies and are better at spelling and reading.

Research has also shown that young girls are less likely than boys to use dominant, imperative language "Stop it," "Don't do that," instead preferring to say "Would you mind not doing that?"

Baron-Cohen suggests that because women tend to be better empathizers, the language they use is more emotive. For example, if a woman disagrees with someone, she would often soften the blow by saying "You're right, but maybe it could be...". Whereas a man's response is more likely to be "I'm sorry but you're wrong," or even more direct "You're wrong."

Spatial ability

It's probably fair to say that we don't spend much time thinking about the way we view the world around us.

But some scientists conduct detailed studies of how accurately we judge space – our spatial abilities – with paper and pencil tests. The **Sex ID** test included similar tests – the angles, 3D shapes and spot the difference tasks.

Studies show that, on average, men are better than women at mentally rotating pictures of three dimensional objects (the 3D shapes task) or judging the slope of a line (the angles task).

But scientists note that women outperform men at other tasks. For example, women are more likely to spot which of a group of objects has been moved to a new position (the spot the difference task).

It's not fully known why men and women perform differently on spatial tasks.

Studies have concluded that men tend to pay more attention to the way their surroundings are laid out, which may explain why they generally score better on tasks like 3D shapes and angles. Researchers have also found that, on average, men are better at finding compass orientations and rely on mental images of three dimensional spaces to find their way.

Women were more likely to notice landmarks, which could be linked to their higher scores on the spot the difference task. Research has shown that women are more likely to use memorized routes and landmarks to stay on track.

Dr Marcia Collaer, a behavioral neuroscientist at Middlebury College in Vermont, says that the link between the angles task and navigation ability is not backed up with empirical evidence, but it is worth considering.

Modern cavemen

Scientists try to come up with logical explanations for these puzzling results.

One theory is that modern humans are still very similar to their prehistoric ancestors. In early times men spent lots of time hunting in unfamiliar territory where landmarks were less useful. Women, on the other hand, spent more time close to home foraging for food and they may have relied more on landmarks to find their way around.

Testosterone and spatial ability

It's also thought that the male sex hormone **testosterone** plays a role in spatial ability. One finding that supports this theory is that women with above average levels of testosterone in their body perform better at mental rotation tasks than women with average levels of testosterone.

Most scientists think there's no real difference between men and women when it comes to total intelligence (commonly called IQ). It's just possible that **our brains** have evolved separately to meet the demands of our environment.

Testosterone

It's thought that testosterone plays an important role in the way we think and behave. Many of the questions in the **Sex ID** experiment were related to theories about testosterone.

The role of testosterone

Testosterone is a male sex hormone required for sperm production, the development of male reproductive organs and the emergence of secondary male sexual characteristics such as facial hair, a deeper voice and muscles.

In men testosterone is produced in the testes and adrenal glands.

Testosterone is also produced in women's ovaries and adrenal glands. Little is known about the exact role of testosterone in women, but scientists believe it helps maintain muscle and bone strength and contributes to sex drive or libido.

On average, men produce between 4 and 10mg of the hormone per day and overall they have about 20 times more testosterone than women.

Testosterone and digit ratio

In the Sex ID test we asked people about their index and ring finger measurements. Some scientists believe that the ratio of index finger length to ring finger length indicates how much testosterone we were exposed to in our mother's womb.

Higher testosterone exposure is thought to lead to a longer ring finger. This is determined as early as 14 weeks into a pregnancy.

On average, women's index and ring fingers are almost equal in length because they are exposed to less testosterone. In men, the ring finger tends to be longer because they have higher testosterone levels. In general, women exposed to more testosterone have more 'masculine hands' – i.e. longer ring fingers.

Testosterone and birth order

When the Sex ID test was an **online psychology experiment**, we asked people about their siblings in order to investigate the theory that pre-natal testosterone exposure changes systematically every time a woman gives birth to a male child. The scientists who designed the survey will compare the number of older brothers a test taker has with their finger measurements to see if there is any correlation.

Testosterone and assertiveness

In the Sex ID ultimatum task people were asked to decide how they would split £50 between themselves and a stranger. Scientists want to find out if there is a relationship between testosterone levels and assertiveness.

It is assumed that people with higher testosterone levels would drive a harder bargain and be less compromising. Research into the effects of testosterone and competitive behavior suggests that testosterone increases competitiveness and risk taking.

Interestingly, some studies show that testosterone levels in women change according to the status of their occupations.

Handedness

Don't be surprised if you can't remember deciding whether to be left- or right-handed. Hand preference is thought to begin in your mother's womb and stay with you for life.

And what comes naturally to us is important information for scientists. Handedness may be a clue into our behavior and the way our bodies work.

Our brains are contra lateral, meaning that the left hemisphere controls the movement of the right side of our body and the right hemisphere controls the left side of our body. A left-handed person will therefore be right brain dominant while a right-handed person will be left brain dominant.

Studies have suggested that a 'lefty' may be more talented in areas thought to be controlled by the right side of the brain – spatial awareness, math and architecture. Right-handers may have better verbal abilities because the left hemisphere of the brain is generally more efficient in processing verbal information. However, this theory is highly controversial and it is by no means set in stone. Other studies have shown that left-handers perform just as well in functions controlled by the left side of the brain.

Better in a fight?

What is known is that about 10–14% of the world population is left-handed and men are twice as likely to be left-handed as women.

Left-handers have long been persecuted but some scientists believe that they have at least one advantage over right-handers. They may be more likely to come out on top in hand-to-hand combat or sports like cricket or baseball.

This may be because there are fewer left-handers, so when a right handed person (who is used to fighting mainly right-handers) encounters a left-hander, he is overwhelmed by the unfamiliar experience.

Or it may be that hormones play a part. There is a theory that, on average, left-handed people are exposed to higher levels of the male sex hormone **testosterone** in the womb. High levels of testosterone are linked with more assertive behavior.

It's possible that handedness is hereditary. The British Royal family has a large number of left-handers, including Princes Charles and William. Other famous lefties include: Napoleon, Gandhi, Bill Clinton, Picasso, Leonardo Da Vinci, Judy Garland, Paul McCartney, Charlie Chaplin, Robert DeNiro, Maradona and John McEnroe.

Facial attractiveness

It only takes a fraction of a second for us to decide whether we find someone attractive and you'd be amazed what we may discover in that time.

Scientists at the University of Aberdeen and St Andrews University have found that masculinity and femininity are important factors when we're checking someone out.

The faces in our **Sex ID** survey were manipulated in various ways to find out exactly what people look for in a potential partner.

Masculinity and femininity

Studies have shown that men tend to prefer feminine faces. But women tend to vary in what they find attractive. Some women prefer masculine men while some women prefer feminine men.

This appears to be partly due to hormonal factors. Women demonstrate stronger preferences for masculine men during the fertile phase of the menstrual cycle than at other times. It is also partly due to a woman's own attractiveness. The more attractive a woman rates herself, the stronger her preference for masculine men.

Some of the faces seen in the test were manipulated to appear more masculine (e.g. a square jaw and pronounced brow) while others had been manipulated to be feminine (e.g. large eyes and full lips).

Scientists hope to learn more about our preferences for masculine and feminine faces by studying people's responses to the Sex ID questions and their performance on the faces task.