

## BRAINS, EQUAL BUT DIFFERENT?

By Marion Verweij

*One way to come to a greater understanding about the two sexes is to know more about the physiological differences, including how our brains are wired. This helps us understand better what happens naturally in us and what we are prone to as men and women. In issue 4, 2003 of Feminenza Magazine, Gerda van Schaik wrote about some of the marked variations in the physiology of the genders, which shed some light on the behaviour and focus of men and women. I shall be exploring the nature of the development of the brain, which may explain much about how men and women approach things and give further food for thought...*

Men and women are different and Science is now proving this to be irrefutably true, especially now that the technology exists to map the brain and its functions. Research has shown that the differences between the female and male brain begin as early as the formation of the foetus at six weeks within the womb. It is only a single chromosome that makes the difference between males who are XY and females who are XX. However in that tiny difference the Y chromosome only carries 25 genes compared to X which has 1,000 to 1,500 genes. We have so much in common, so many similarities and yet this tiny piece of genetic material makes all the difference in the world.

It is the Y chromosome that instructs the foetal tissue to become testes and sends testosterone around the body saying 'this is male'. This hormone also affects the developing brain, influencing both its size and wiring. In the last few years scientists have come to believe that this also affects behaviour and attitudes. For a long time it has been argued that nurture not nature explains the gender differences, but the evidence is overturning this. For example the Y chromosome spurs the brain to grow extra dopamine neurons. These nerve cells are involved in dopamine release, reward and motivation. They are also involved in the pleasure of addiction and novelty seeking, which are especially prevalent in the teenage years.

Research by Ruben Gur at the Brain Behaviour Laboratory at the University of Pennsylvania has shown that generally males have slightly larger brains than females, but that females have 15 to 20 percent more grey matter than males. In children, girls usually score slightly higher in intelligence tests but later on the boys catch up as their spatial awareness abilities develop and so the genders score equally well in later life. The female brain is more densely packed with

neurons and dendrites, providing concentrated processing power – and more thought-linking capability.

The male brain has more white matter and cerebrospinal fluid. This not only cushions the brain more in case of the head being knocked about – a throwback from the days of men being hunter-gatherers – it also helps distribute processes throughout the brain. White matter also carries fibres that inhibit "information spread" in the cortex. This allows the single-mindedness that spatial problems require, especially difficult ones. The harder a spatial task, Professor Gur finds, the more circumscribed the right-sided brain activation in males is, but not in females. The white matter advantage of males, he believes, suppresses activation of other areas that could interfere. This enhanced concentration in males gives them the potential to work on one thing at a time, without being distracted and allowing them to become more specialised and focused.

The white matter in women's brains is concentrated in the corpus callosum, which links the brain's hemispheres, and thus they tend to use the whole of the brain rather than specialist areas. It also enables the right side of the brain to pitch in on language tasks. The more difficult the verbal task, the more global the neural participation required – a response that's stronger in females. Brain scans show that by using both sides of the brain women are able to work on more than one thing at a time, even when they are unrelated.

Women have another advantage: they have a faster blood flow to the brain, which offsets the cognitive effects of ageing. According to Professor Gur, men lose more brain tissue with age, especially in the left frontal cortex, the part of the brain that thinks about consequences and provides self-control. Men can lose the ability to consider long-term consequences and this is thought to be one of the reasons why the midlife crisis is often more difficult for them.

The female brain tends to be better at what is called 'intuitive thinking' or 'people reading'. Females are often more able to detect the feelings and thoughts of others, inferring intentions, absorbing contextual clues and responding in emotionally appropriate ways. They are able to empathise and tune in to others, more readily, seeing alternate sides of an argument. Such empathy fosters communication and primes women for developing relationships.

Men are often better at focusing on minute detail, and operate most easily with a certain detachment. They construct rule-based analyses of the natural world, inanimate objects and events, which mean that they can often stand back from problems in order to be able to provide solutions.

A few years ago a group of psychologists carried out an experiment with a group of men and women. They were all shown a picture of a man and woman on a park bench having some kind of emotional process such as an argument, sulking or flirting. When asked to describe what they saw, men tended to do exactly that, describe simply what they saw. Women on the other hand described what they saw, but also added details about the emotional process between the man and woman, the feelings they were exchanging and how they were physically relating to each other. Further research revealed that in men's brains the emotional centre is connected to the 'fight or flight' centres so that if they feel a strong emotion they want to run away from it or to fight it which can lead to violence. The emotional centre in women is connected to the cerebral cortex, which thinks and translates language, so their natural response to an emotion is to think about it, to try and interpret it and to want to talk about it.

Another striking fact is that having extra X chromosome is thought to be why females are far less subject than males to mental disorders from autism to schizophrenia. In his book, 'The Essential Difference: The Truth About the Male and Female Brain', Professor Simon Baron-Cohen the Director of Autism Research Centre in Cambridge, argues that 'autism is a magnifying mirror of maleness'. Autism overwhelmingly strikes males; the ratio is ten to one for Asperger's Syndrome (a common form of Autism). His work supports a view that neuroscientists have flirted with for years: 'early in development, the male hormone testosterone slows the growth of the brain's left hemisphere and accelerates growth of the right'.

On the other hand women are prone to different types of problems. For example, research collated on BrainPlace.com, has shown that women have a far larger limbic system, which are nerve pathways and networks, common to all mammals and is involved in such functions as emotion, instinct, motivation and behaviour. This gives females several advantages and disadvantages. Due to the larger limbic system, women are more in touch with their instincts and feelings and are generally better able to express their feelings than men. They can also read and connect more readily with the feelings of others and they also have a more acute sense of smell. But it also leaves a female more susceptible to depression, especially at times of significant hormonal changes such as the onset of puberty, before menses, after the birth of a child and at menopause.

According to research carried out by Kenneth Kendler, Director of the Virginia Institute for Psychiatric and Behavioural Genetics, over the course of their lives, 21.3 percent of women and 12.7 percent of men experience at least one

bout of major depression. It takes a lower level of stress to precipitate depression in a female than it does in the male. Women's bodies tend to respond to stress differently also, they pour out higher levels of stress hormones and fail to shut off production readily.

Psychologist Susan Nolen-Hoeksema at the University of Michigan has come to similar findings. She suggests the female brain's inclination towards depression can be compared to the male brain's inclination towards excesses of alcoholism, drug abuse and antisocial behaviour. Both are the way strong emotional stimuli can negatively activate the brains of the different genders.

The male brain's response to strong emotion of fight or flight, can mean they tend to bottle things up and seek external stimuli to escape problems, or are prone to having violent outbursts of anger. The female's response of trying to interpret feelings can cause her to turn inwards if the emotion is very strong. Talking with a friend or a Therapist can bring stress relief to both genders as it releases the pressure.

These brain differences show that men are more likely to become specialists, or to excel in professions where spatial awareness is needed, such as being an airline pilot, whereas women are generally better where communication skills play a large role, such as teaching, managing people, especially in positions where many dynamics are at play and they are constantly interrupted.

The differences between the male and female brain does indicate the importance of dividing tasks, not along the old hunter-gatherer/nurturer lines, but according to the natural strengths and abilities of each gender and person to meet the needs of our modern world. Male and female minds are innately drawn to different aspects of the world around them, processing experience in different ways and these are the fundamental differences that are important to appreciate and develop as the old gender roles disappear. It is however entirely possible, because of the huge flexibility of the brain and the human cognisance that men can be better than women in some of the traditional roles and vice versa. It is also possible to learn from each other the skills that we need and to learn to function more effectively together, valuing each other and drawing on each other's strengths.

Today, the challenge is to tackle some of the most serious problems the human race has ever faced on earth. Together we can by understanding and learning from each other, use this knowledge, not as a weapon against the opposite sex, but in the creation of a harmonious and combined way that hasn't been seen

before. The existence of difference means a chance to join forces and unite with greater strength and integrity in a common purpose.

Being different doesn't make one sex better than the other, or suggest that the sexes are unequal. It just means that men and women are not identical. Men generally are more able to tackle problems single-mindedly until they're solved. Women will be, to use that well-known phrase, *multi-tasking*. For example, they will be thinking about how other people are, whether they need to stop what they are doing and pick up some food, and wondering what to buy someone for a present. It is important to understand both our differences and our huge similarities; to acknowledge them and create partnerships where what comes out of the synergy between the two sexes is greater than the sum of the parts. We can say that tomorrow's partnerships are not so much to do with our 'other halves', but are to do with  $1 + 1$  equalling 3. This is the unique position we are in today. Never before have all our relationships, be they at work, home or with friends been so important for creating what is needed for these times. The strengths and inclinations of both genders are essential, as is what we can achieve together.