WHAT WE LEARN FROM TWINS The mirror of your soul

DATE  3-Jan-98

Familiar question: Are we shaped by our genes, or by what life does to us? Possible new answer: It isn’t as simple as that makes it sound BARBARA HERBERT, a former council worker living in southern England, discovered after the death of the woman she had thought was her mother that in fact she had been adopted. Among her assumed mother’s papers, she found a name and address in Finland. When that produced no answer, she contacted the local newspaper in Finland. A reporter dug up the story. Her real mother had been sent to England, two months pregnant, in 1939. She had given birth, been sent back to Finland, and committed suicide at the age of 24.

Mrs Herbert had a feeling the story was not over. She seemed to recall somebody saying, “There was another one.” So she contacted Hammersmith Hospital, where she was born; and, sure enough, there had been twins. The Registrar-General refused to help her contact her twin. She took the Registrar-General to court, and won. That is how she found her sister.

They met at King’s Cross station in London. “We just said ‘Hi’ and walked off together, leaving our husbands standing there,” says Mrs Herbert. “It seemed so natural.” Mrs Herbert is a bit fatter than her sister, but she can think of no other important difference between them. Their intelligence quotients (IQs) were one point apart. They were tested again a year later; they scored ten points higher, but still only one point apart.

Mrs Herbert and her sister Daphne are gold dust to geneticists. Unlike fraternal twins, who are the product of separate eggs fertilised by different sperm, identical twins are natural clones, produced when a fertilised egg splits in two shortly after conception. Such twins, when separated after birth, are thus a scientific experiment designed jointly by nature and by society. They have the same genes but have been brought up in different environments.

These curiosities are getting rarer. Until the 1960s, twins offered for adoption in the West were often separated at birth, on the argument that two babies would be too much for one mother. That no longer happens. Since only one birth in 300 produces identical twins, and separated pairs are increasingly hard to find, people like Barbara Herbert and her sister are much sought after by scientists eager to study the relative importance of nature and nurture.

These studies provide some of the best clues to the question of how we become who we are—a question which fascinates people in different ways. Ordinary people wonder about the source of their failings and virtues, and would like to know whether they can make their children better, cleverer and happier than they themselves have been. Scientists are gripped, and still largely baffled, by how the human brain and personality are formed. And, in politics, the nature-nurture question lies at the centre of the argument about
“social intervention”. If our intelligence and our personalities are written into our genes, there is not much that governments can do to improve us.

Since the study of twins generally seems to support the nature side of the argument, it is triumphantly saluted by hereditarians as evidence for their case. “Twins have been used to prove a point, and the point is that we don’t become. We are.” So writes Lawrence Wright in his new book, “Twins: Genes, Environment and the Mystery of Human Identity”. The environmentalists, on the other hand, condemn most studies of twins as methodologically flawed and even dishonest. Actually, what such studies show may be more interesting and mysterious than either side yet realises.

It was Francis Galton, Charles Darwin’s cousin, who in the late 19th century first thought of using twins to investigate the differences between people. Galton, who coined the term “eugenics”, correctly suggested that twins who looked alike came from one egg, and that those who did not came from different eggs. From that, he worked out a way of using twins to estimate the impact of genes. Look, he suggested, at the similarities between identical twins and those between ordinary ones (who genetically are no more similar than any children of the same parents). Those characteristics which identical twins share more than other twins will, he reasoned, be more caused by the genes the pair brought into the world.

This process, and the study of separated identical twins, are the two main ways of using twins to study the effects of nature and nurture. Galton carried out the first systematic study of twins. The results convinced him of the pre-eminence of genes in human make-up.

**Eugenics in disgrace**

The idea of eugenics captivated people on both the left and the right of politics in the first half of the 20th century. Fabian social reformers such as Sidney and Beatrice Webb were delighted to think that they would be able to breed a better working class. Josef Mengele, on the other hand, wanted to breed a better race for Hitler.

As Robert Jay Lifton recounts in “The Nazi Doctors”, Mengele was obsessed with twins. When a new group of prisoners arrived in the concentration camp at Auschwitz, Mengele would run out to meet them shouting, “Twins out!” Twins lived in a separate block, and were allowed to keep their clothes and their hair. Mengele gave them sweets, and called them his little friends. He weighed them, measured them and logged the colour of their hair and their eyes. And he gave them diseases, to see how long they took to die.

The Nazis’ enthusiasm for genetics did the subject no good at all. The left forgot it had ever had any interest in the matter. So did most academics. For a time it became fashionable, instead, to assume that people are chiefly the result of their environment, what they experience after they have been born. This rival view fitted neatly into the social-engineering optimism of most of the world’s post-1945 governments.
The posthumous scandal over the work of Cyril Burt seemed to confirm this change of mind. Burt was the main proponent of hereditarian ideas in Britain. His evidence came from studies of separated identical twins. After his death in 1971, it was claimed that much of this evidence had been fabricated. His defenders’ attempts to rescue his reputation have been less than conclusive. At best, he was a sloppy scientist; at worst, a fraud.

Still, despite its embarrassments, the hereditarian school began to reassert itself. In 1969 the *Harvard Educational Review* published an article by Arthur Jensen called “How much can we boost IQ and scholastic achievement?” Mr Jensen’s answer: Not much, because IQ is highly hereditary; so money spent on pre-school programmes for poor children is wasted. As Adrian Wooldridge, of *The Economist*, puts it in his book “Measuring the Mind”: “The hereditarians felt that the environmentalists had turned into a decadent establishment, smugly self-satisfied but intellectually sloppy.”

**Hereditarians ascendant**

The new hereditarians were assailed, in print and in person; but they were not squashed. Their research won support from, and gave support to, conservative politicians keen to roll back the costly welfare policies of the post-1945 years. “The Bell Curve”, by Charles Murray and Richard Herrnstein, published in 1994, is a powerful expression of this alliance. It argues that, since IQ is largely inherited, and people marry people like themselves, the difference between the intelligence of races and classes is liable to grow steadily wider.

The study of twins provided much of the ammunition for the hereditarian counter-attack. Some of it emerged from the first large-scale post-Burt study of separated identical twins, run by Thomas Bouchard, a professor at the University of Minnesota. Mr Bouchard saw an article on a pair of reunited identical twins, and decided to make a study of them. It was fun, says Mr Bouchard. Much research work by psychologists involves grumpy students, doing it for the money. The twins, delighted to be reunited, were a pleasure to work with. Mr Bouchard now has a register of 8,000 pairs of twins, some identical, some not, some separated, most reared together.

Another American scientist, Robert Plomin, has been working with 25,000 pairs of identical and non-identical twins in Sweden. Mr Plomin has also set up a study working with 10,000 pairs of identical and non-identical twins in Britain. He now works at the Social, Genetic and Developmental Psychiatry Research Centre at Britain’s Institute of Psychiatry.

Over the past couple of decades there has been a clear shift in science’s view of the hereditarian argument. These days, no respectable scientist denies the role of genes in forming our brains and characters. The question over which argument continues to rage is just how big that role is.
Studies of twins have examined a range of physical and psychological traits to try to estimate how large a contribution genes make. Some of the work looks at illnesses such as cancer, schizophrenia and alcoholism. Finding the cause of these could help in learning how to cure or contain them. If, for instance, schizophrenia is something you can inherit, then it may be susceptible to gene therapy.

Some of the studies are curiosities. David Lykken, a colleague of Mr Bouchard’s, has inquired into the origins of happiness. He concludes that happiness bears almost no relation to wealth, professional standing or marital status, and is 80% inherited. Some other studies have made sceptics’ eyebrows rise because they appear to show that political conservatism and religious fundamentalism have a genetic basis.

But the most contentious work of all is on IQ. Mr Bouchard’s studies suggest that the level of one’s intelligence is, in the jargon, “69-78% heritable”—heritability being the proportion of the difference between people that is acquired through the genes, not life itself. Burt’s disputed figure is within that range.

Some critics, such as Marcus Feldman, a professor of population genetics at Stanford University, says the work on twins is tainted by politics. The Minnesota research is financed by the Pioneer Fund, a foundation set up in 1937 to help research into heredity and eugenics, including racial differences. The fund has financed work by such controversial figures as Philippe Rushton on the relative size of the genitals and brains of different races. It is accused of, but strongly denies, racist motives.

Mr Lykken has played into the critics’ hands by arguing that women should be licensed to have children and that children produced by unlicensed breeders should be compulsorily adopted. Mr Bouchard defends Mr Lykken’s intellectual freedom. He says he is uneasy about the source of his cash, but insists that the Pioneer Fund has never tried to influence what he does.

What matters in the end, assuming that most of the people involved in this work do it in a properly detached way, is what they find out. It is striking that studies of twins regularly come up with higher levels of heritability than do other sorts of studies. Mr Bouchard’s estimate runs up to 78%. That compares with studies of adopted children, and of first-and second-degree relations, which produce figures as low as 30%, and at the highest 50%. A task force of the American Psychological Association, trawling through all the available studies, including those on non-twins, has come up with an average of 50%.

This disparity has led to questions about the reliability of twins studies. One problem is that separated identical twins do not actually provide a perfect nature-versus-nurture template. For a start, they do at one time share the same environment—in the womb. If, as some scientists now believe, those nine months are important in deciding how the brain is wired, this would help to explain why non-identical twins, who are no more genetically alike than any brother and sister, have IQ’s more like each other’s than ordinary siblings do. It would also undermine the claims of the separated-twins studies to offer conclusive proof of what genes do.
Moreover, separated identical twins are rarely separated at the moment of birth, and some of them are then reunited before they come under the scientists’ eye. If the first six months of a child’s life matter as much as most people think they do, then spending even that short time together could influence the result of a twins study. And, when grown-up twins are reunited, they will naturally pay special attention to what they have in common; they may, the professors explain, “mythologise” their relationship. The twins in the Minnesota study had an average of five months together before they were separated, and nearly two years together after their reunion before Mr Bouchard got hold of them.

A subtler concern—voiced by Mr Feldman, himself a father of identical twins—is that the dichotomy between genes and environment is a false one. His own twins, he says, share professions, ideas and friends; their environments, in other words, are much closer than those of most non-identical twins. Maybe Galton’s classic twins study was invalid: perhaps you cannot look at the similarities between identical twins, and those between non-identical ones, and conclude that the difference must necessarily be due to genes.

**Chickens, eggs and babies**

Mr Plomin, the student of those 35,000 pairs of twins, does not deny this. One of the ways in which genes work, he says, is through our tendency to select and design a particular environment. A baby, for instance, may be born happy; its happiness may make its mother show it more affection; that may reinforce its cheerfulness. Even though that virtuous circle may have originated with the child’s genetic tendency, it can be strengthened by what happens after the baby is born. If the child is taken away from its mother and dumped in a children’s home, it may not stay happy. Or, if a child with a tendency to be miserable gets an unswervingly affectionate mother, it may cheer up.

And, just as our genes can affect our environment, so our environment may shape the expression of our genes. Height, for instance, is now around 90% heritable in rich countries. In the past the figure was lower, because not everybody was well-nourished enough for their genes to express themselves properly. Heritability, in other words, is not a constant; it is affected by whether life is giving people’s natural tendencies a chance to flower properly.

Turn the results of the heritability studies on their heads, and there is further cause for reflection. If IQ is 50% or so heritable, then up to another 50% is determined by something other than genes. The same applies to many other parts of our make-up, the figures for which are roughly of the same order of magnitude. But some things seem to be markedly less genetic. Despite the talk of a “breast cancer gene”, for instance, this disease seems rarely to be the result of genetic programming. When one identical twin gets breast cancer, the other gets it in only 12% of cases.

Look, too, at sexual orientation. Some studies have suggested that homosexuality is around 50% heritable. Yet a recent study of Australian identical twins who had grown up
apart from each other appeared to show that homosexuality was only 20% heritable in men and 24% in women.

So where, if these figures are right, does homosexuality mainly come from? Not, apparently, from growing up in the same family. Across a whole range of measures, including the tendency to homosexuality, if you look at separated identical twins and identical twins who have been brought up together you will find that they are pretty much alike. Belonging to the same family does not, on this evidence, have much effect. This seems to be confirmed by an examination of adopted children, born of different parents, who have been brought up in the same family. Do they have much more in common with each other than they do with the kids next door? They do not.

**There’s something else**

But that is daft, most people will instinctively say. The experiences we had in our parents’ house were surely of vital importance in shaping our lives. The families we grew up in—and the families we ourselves are now creating—cannot be irrelevant to the character of the children they produce. Yet, if this scientific work is to be believed, belonging to the same family apparently has little effect on the way people turn out.

To some extent, of course, the explanation is that parents do not treat their various offspring in the same way. Mr Plomin cites a study which compares parents’ and children’s accounts of whether one child got the same treatment as his brother or sister. Not surprisingly, the children reported a greater level of difference than did the parents. Yet it is hard to believe that parents commonly treat identical twins so differently that one becomes a homosexual and one a heterosexual.

The bigger part of the explanation may be that except in special cases—the loving mother who manages to warm her genetically miserable child into real-life happiness—what our parents do is not decisively important to the way we grow up. That is the view of Sandra Scarr, a controversial professor of psychology at the University of Virginia. She offers the idea of “good enough” parenting. So long as a child has parents, and so long as they are not seriously brutal, she reckons, one set of parents is just as good as another.

If that is so, the really important variable may be chance. Perhaps it is the small, random event—the infant romance by the swings, the bullying in the corner of the playground—that shifts us imperceptibly towards widely different ends. Or maybe, for those who look at the universe in a different light, it is some higher power. Anyway, those who had feared that the scientists would soon have us neatly dissected on their laboratory tables can take new heart. How we become who we are seems as mysterious as ever. Thank God.