

Nature via Nurture. Genes, Experience and What Makes us Human. Matt Ridley. London Fourth Estate. 2003.

Before she achieved her iconic status as the wide-eyed, narrow-brained anchor of CNN news Connie Chung used to “interview” celebrities. On one occasion she subjected Marlon Brando to a typically probing interrogation: “ what childhood influences made you an actor? ” she asked.

Interestingly Marlon replied via a discussion of identical twins. He pointed out that identical twins separated at birth might use the same hair tonic and vacation at the same beach. As he warmed to his theme Connie Chung pretended to drop off to sleep, as if she were sitting through a demonstration of aircraft evacuation procedures, not realising that Marlon was answering her question in the most precise way possible. He was pointing out that as long as the heritability of a trait is not zero none of us has any way to tell whether our traits are the product of genetic or environmental factors.

Another way to put this is to say that in a world of clones all the difference we observed between mature people would be the product of environmental influence. This is why twin studies (identical twins separated at birth and reared apart) are so useful: identical twins are clones. On the flip side of the coin, if the environments in which people developed were identical all the difference between mature individuals would be due to genetic factors. This is why it is interesting to see how children reared under similar socio-economic and family circumstances differ in their personalities. In the laboratory world of fruit flies, mice and rabbits it is possible to tinker quite precisely with these factors, introducing slight variation into the genome or the environment and seeing what happens as creatures develop first as embryos and then into infancy and adulthood. In the case of humans, of course, we cannot do this, dissecting embryos’ brains and bodies or altering their physical or social environments in possibly harmful ways are beyond the moral pale. But Marlon Brando, although not a molecular geneticist, surely pointed the way to a crucial resource for the correct understanding of human nature. We need to make use of those natural experiments which are given to us, together with the study of genetics and embryology in other species.

Interestingly, twin studies are not the only such natural experiments. There are quite a few instances where social life provides us with cases of populations exposed to extremely similar environments, in which case we could look to see whether the variation between individuals has a genetic basis. Unfortunately some of these “natural” experiments are quite horrible. Children reared in Romanian orphanages were uniformly neglected to the point of shocking abuse. Nonetheless their subsequent development under similar adoption regimes would be a preliminary way to investigate whether there is any genetic component which insulates infants from the worst effects of neglect.

Ridley reports one such experiment as the culmination of his argument that the nature-nurture debate, as traditionally conceived, has been made obsolete by recent discoveries about actual mechanisms of development. In 1972 442 boys in the New Zealand city of

Dunedin were selected for a longitudinal study. All were white and the families homogenous in respect of class, wealth and other factors. Sad to say, between the ages of three and eleven, 8 percent were severely mistreated and about 28 per cent maltreated. As one might predict many of those maltreated turned out to be violent and anti social themselves. Why? Clearly maltreatment was a causal factor but there was a lot of variation within the maltreated group. The factor which differentiated the sub group who went on to be violent and anti social was the presence of a gene, monoamine oxidase A and its correlated promoter genes further along the chromosome. (The role of promoters is to make a gene more or less active by producing ‘transcription factors’, proteins that switch a gene on or off). Those with high activity MAOA genes were virtually immune to the effect of maltreatment while those with low activity MAOA were four times more likely to become violent or antisocial. In effect the gene functioned to insulate the luckier boys against one of the consequences of their brutal environment.

The MAOA gene is on the X chromosome, which girls have two of, making them less vulnerable to its effects when it is low active. But 12 percent of the girls in the associated study had low active MAOA genes on both chromosomes and these girls had a higher incidence of behavioural problems *following maltreatment*. It is a sad fact that one can take the incidence of maltreatment to be a constant in these studies.

To understand why the gene works this way you will need to read Matt Ridley’s latest report from the front line on the emerging field of what might be called developmental molecular behavioural genetics. It is a minor masterpiece of exposition, even better than his recent *Genome* and more important since he is addressing himself to the topic of development, which he correctly identifies as the key to the debate between “nature and nurture”. In the last ten years that debate has been fought between evolutionary psychologists and social scientists who regard their opponents as crude genetic reductionists who don’t understand the role of the social milieu in shaping a person’s behaviour and experience. In some ways this is an easy charge to make. Evolutionary psychology has given us some non-breakthroughs such as men are attracted to young women, step -parents are more likely to abuse their step children than their natural children, rape is common, and so on. It is easy to lampoon such findings as stating the obvious but in fact the lampooners usually end up saying something equally vapid such as “the environment plays an important role in development”.

In fact the nature nurture debate between evolutionary psychologists and their opponents is conducted in terms which haven’t changed since the seventeenth century. Is the mind a blank slate or is it necessarily pre-wired to develop in specific ways? Those who correctly think the latter have often put their argument in an unfortunate way, claiming that the role of genes is to prespecify the result of development. This is known as the blueprint model of genetic encoding and gives evolutionary psychology its sometimes deserved bad name. Richard Dawkins likes to blame journalists for the popularity of the idea that there is a gene or gene complex for every specific trait but in fact geneticists who provide the journalists with EZ 2 READ press releases are equally at fault. One reason this simplistic view prevails (except among geneticists) is that research is expensive and so scientists have to promise breakthrough cures for diseases like cancer, schizophrenia and

Alzheimers. As part of the process they concentrate on rare cases in which specific disorders result from small and specific genetic deletions or additions. This encourages the blueprint idea that there is a gene complex for specific traits when in fact most traits will be the result of an incredibly complicated cascade of events influenced by innumerable gene-environment interactions.

What these arguments lack is an understanding of the way genes work in development, as opposed to a set of data correlating genes with developmental outcomes, and the unhelpful inference that the genes, the environment or a bit of both were responsible. It is Matt Ridley's achievement to have made the role of genes understandable by judicious use of examples and a superb exposition of the actual developmental process. He claims to have rendered the nature-nurture debate (at least the seventeenth/twentieth century one) obsolete and I think he actually has. Facts can do that to a debate.