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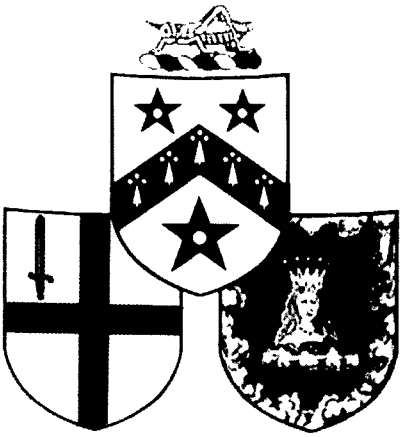

CONFLICT AND CONSENSUS IN THE AGE OF THE NEW GENETICS

Lecture 3

MAD, BAD OR SAD?

by

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CONFLICT AND CONSENSUS IN THE AGE OF THE NEW GENETICS: MAD, BAD OR SAD

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Hilary:

Mad, bad, sad. Categories like this are never fixed; they are subject to intense cultural negotiation with considerable social and legal implications. Where in the past religion provided a moral framing, one continuing narrative since the 19th century and McNaghten – the legal rules as to whether an adult accused of a crime could be held responsible for their action or not guilty by virtue of insanity - has been that of a steady medicalisation of behaviour. But biomedicine not the only scientific discourse committed to renegotiating the categories. The successful battle of the last three decades to refine the concept of responsibility in spouse or partner murder has been spearheaded by feminist criminological and legal social research. Biomedicine has had rather little to say in this process by which judges and public alike now recognise that blind rage is not a universal response but is more characteristic of men, and that justice requires that the slow burn of women partners on the receiving end of violence is recognised as similarly modifying responsibility.

Unquestionably this cultural re-negotiation of bad and mad women was underpinned by the women's movement which swept through the last quarter of the 20Th century. This immense movement fostered a new willingness in culture and society to look again at categories which falsely universalised difference. Dealing with false universalisms is the stuff both of the social sciences and of genetics - for both (unlike, say, last month's theme of evolutionary psychology) are concerned with difference, though from very different standpoints. For example we know that class, 'race' and gender are structurally reflected in the statistics of bad mad and sad, but just what such statistics mean is a good deal more difficult to interpret. Is the young Rasta man psychotic or is his behaviour simply being misinterpreted by a eurocentric professional with little knowledge or acceptance of cultural diversity? Or does being on the receiving end of steady unremitting racism simply drive people mad? Or, as some would suggest, are all of these partial truths.

More positively careful social research has pointed to the importance of social support in protecting young mothers from depression. Another action study offered pregnant women with a history of underweight babies round the clock support (not instruction) from midwives, with the result that not only were women happier but their babies were actually bigger. As low birth weight babies are associated with high medical costs these results are good news not only for non-Cartesians but for medical planners too. For that matter working with the families of patients with schizophrenia so as to help them learn more supportive ways of being around their affected family members can protect against relapse.

Thus although our brief today is to look at the claims of behavioural genetics to explain why we do what we do, our purpose it to set the genetics discussion into a context where it is recognised that it is not the only game in town. Column inches in the media represent high cultural visibility but are not the whole story. Today behavioural genetics is making huge claims – to explain and to predict behaviour. It works to remove very old ideas of both individual destiny and individual morality. 'The fault, dear Brutus, lies not in our stars but in our genes'. The Medical Research Council's popular exhibition of their genome research was called, without apparent irony, 'Genes are Us'. In this we are invited to see the whole person as reduced to just our genes.

In the US lawyers play a much more significant cultural (and as we watch the Bush/Gore saga even electoral) role than in the UK. So in the highly litigious culture of the US it is not surprising that lawyers have already sought a genetic defence to reduce a murderer's responsibility for his actions . There is of course the much publicised case of the Domino Pizza Parlour killer, Stephen Mobley, whose lawyers requested a DNA test to see if he carried a specific gene 'for' aggression, maintaining that aggression ran in the family, as Mobley had an aggressive businessman father. But aggression is context dependent. Aggression in the military, in business dealings, in surgical interventions, are all seen as good. Aggression in the family, in the classroom or in the street are not.

Conversations with our criminal defence lawyer son suggest that if lawyers thought a genetic defence would work in a British court they too would try it, their job being to run the strongest defence for their clients, not to make law. So far in the less litigious (though alas as under-funded public services fail, the UK increasingly turns to litigation to secure compensation) DNA has entered the legal system solely through DNA fingerprinting and has generally been seen as helpful in pinning down criminal responsibility. It has also been helpful in improving the immigration service where it has forced racist immigration officers into admitting the truth of parents' claims that their children are indeed theirs. Women claiming the paternity of their babies against denying fathers have also found DNA testing a powerful ally. However admitting behavioural genetics into the legal system has potentially explosive implications threatening central ideas about the intentionality of the perpetrator. If genes are indeed 'us' just what happens to our notion of 'I'? Yet perhaps the sense that each of us is an 'I' that we have - what psychologists call a theory of mind - is central to how we understand ourselves. Indeed those without, or with a very weak theory of mind, such as children with autism, present immense educational and care challenges. So what are the claims of behaviour genetics in these vexed areas?

Steven:

Over the past 150 years the discipline now calling itself behaviour genetics has attempted to explore a genetic base for almost every conceivable aspect of how humans think and act. Today genes are said to account for everything from intellectual ability, religiosity and compulsive shopping, tendency to mid-life divorce and even preferences for having ones back scrubbed in the bath. Most attention has been paid however to what might be seen as 'deviant' or socially undesirable behaviour – including psychiatric distress, 'personality disorders,' alcoholism, criminal and violent behaviour. We can't possibly cover the entire range in this single lecture, and so we have chosen just one example, that of 'aggression.' But before talking specifically about this case, we should discuss the general methods that are available for such behaviour genetic analysis.

The first – and as we will see, it is far from straightforward – is to define the phenotype under discussion. Even with supposedly relatively clear-cut diseases, this is not always simple (eg Alzheimer's disease, schizophrenia) . How about behaviours? Think of the huge difficulty in agreeing on a definition of intelligence ("what IQ tests measure"). When does drinking become defined as a medical condition - alcoholism?

Before the days of molecular genetics – and indeed even today – the next step is to explore the distribution of the phenotype in the population. Does the condition seem to "run in families?" This was how Francis Galton, back in the 19th century, studied what he called "Hereditary Genius." But of course, families share common environments as well as common genes, and for something to be inherited, it does not have to be genetic. So a family study can be refined into a pedigree analysis, a family tree indicated which members of the family show the condition (examples). This can sometimes work clearly, where a disease is the result of a single gene malfunction, but the picture is often much more confused. One is

reduced to studying *concordances* – the chance that if one family member is affected, then another more or less closely related will be (eg schizophrenia data).

This is where the twin studies come in. Monozygotic (identical) twins share all their genes as well as a common environment, dizygotic twins are no more closely related than ordinary brothers or sisters, but also are supposed to share a common environment. So if MZ twins resemble one another more closely for any particular trait compared with DZ twins (technically, the *intraclass correlation*), it ought to be possible to attribute this to the effect of genes. Of course it isn't quite so simple. MZs are often treated more similarly by their parents than DZs, and these subtle environmental differences are hard to unpick. So another approach is to study twins who have been separated close to birth and reared apart – perhaps adopted. There are few such cases and often the exact history of the twins is shrouded in mystery. Nonetheless the method has been used, especially in some now notorious IQ studies (Burt, Bouchard).

These classical genetic methods enable a figure called *heritability* to be calculated – technically a measure of the contribution of genes and environment to the degree of variance of a trait within a population. This is a much misunderstood figure, which provides such bizarre estimates as the heritability of views about the death penalty or royalty, political tendency, and having one's back scrubbed, and many modern geneticists tend to dismiss the calculation as meaningless, though it is still bandied about by some, especially in the context of IQ (*The Bell Curve*, etc). (expand on problems of heritability estimates).

Instead of population estimates like heritability, which tell one nothing about any specific genes that might be involved, molecular genetics offers an alternative approach. Remember that genes lie on chromosomes, and that during sexual reproduction, genes (alleles) which are located close together on the chromosome tend to get transmitted together to the offspring – a phenomenon called *linkage*. Suppose one then studies a group of relatives in whom some have the trait of interest and some do not. One can then explore their chromosomes (from a simple tissue sample like a mouth swab) for genes of known function (so called marker genes), and ask if these are more common in the members of the family who show the trait than those who do not. For instance, Dean Hamer in the US, asking the question of whether there were genes which predisposed towards male homosexuality, studied families in which some brothers were and some were not gay, and claimed that gay men shared a 'marker gene' located on the tip of the X-chromosome, transmitted of course, from their mothers. Like so many of these studies, despite the publicity surrounding Hamer's claim, it has not been replicated subsequently. Of course linkage to a marker gene does not mean that, even if replicated, this is really the gene involved, merely that the putative gene is located very close to the marker on the chromosome so that they segregate together during reproduction.

Lets now see how these approaches have been applied to "aggression" and so-called "anti-social behaviour." Perhaps you've seen the television programmes with researchers claiming to show that there are regions of the brain, or particular neurotransmitters in the brain, which are different in particularly aggressive men – so called psychopaths. But as Hilary has pointed out, defining just what one means by aggression is highly context-dependent (how about aggressive surgeons or aggressive businessmen – often terms of praise).

The now classic study was carried by a group of US researchers in the Netherlands, headed by the Dutchman Han Brunner, in 1993. Using the methods I've described, the researchers located a rather dispersed family in which they found 8 men, across three generations, living in different parts of the country, who showed 'abnormal behavioural phenotypes' including 'aggressive outbursts, arson, attempted rape and exhibitionism.' These 8 men (not all of whom were seen personally by the researchers, I believe) each were found to have a mutation in a particular gene – one associated with a particular neurotransmitter in the brain

– monoamine oxidase A (this is the neurotransmitter that is the site of action of a number of antidepressant drugs, incidentally). Brunner was careful to refer to 'abnormal behaviour' rather than 'aggression,' but the publicity surrounding the publication made the link with aggression clear.

To my knowledge the Brunner study has not been replicated, but the hypothesis that MAOA might have something to do with 'aggression' was explored enthusiastically by molecular geneticists. As is so often the case in these studies the next step was therefore to create a so-called 'animal model' – a mouse in which the MAOA gene had been 'knocked out' – deleted. How would such animals behave? Well mice that had both copies of the gene deleted died, but those with just one copy knocked out lived at least for a while. Their behaviour was grossly abnormal. According to the researchers, the mouse pups showed 'trembling, difficulty in righting and fearfulness...frantic running and falling over... (disturbed) sleep...propensity to bite the experimenter...hunched posture.' You might think that so abnormal a pattern of behaviour and indeed early death would disqualify drawing any conclusions from the study, but not so. The researchers (Cases et al,1995) concluded that their results support 'the idea that the particularly aggressive behaviour of the few known human males lacking MAOA... is a more direct consequence of MAOA activity.'

Genes for aggression? Well in my view such evidence – and this is about all we have - scarcely justifies the claim. This is not to say that there is nothing about all our brains which is different when we are angry and aggressive than when we are calm and tranquil – far from it; our brains and hormones and many other aspects of our physiology differ sharply and measurably under such circumstances. Such changes are called *state markers* – they are only present when one is in a particular 'state of mind' or emotion. But there may indeed be something about the brains and genes of people who are habitually violent and aggressive which differs from those of non-violent, gentle people. Such differences would be present even when the 'state marker' was not – and are hence called *trait markers.* We simply don't know if any such exist, though it would not surprise me if they did. But we need to ask whether even if there were such trait markers, and we could discover them, would such a difference help explain violence and aggression in our society, and what we should do about it? Would the suggestion be genetic engineering, designer drugs, or what?

With which, I hand back to Hilary

I want to return to two questions. First the 'I' question, for it is this sense we have of both me and you, which sits at the heart of moral reasoning. What would the ability to isolate traits do to the cultural understanding of responsibility? Despite both the power of the biomedical discourse and of the social and legal sciences to challenge legal and moral categories of responsibility, which in their turn generate new law and new judgements, unquestionably changing and holding onto new categories of the bad, the sad and the mad is not an easy process. For good and less good reasons we hold hard onto a fairly raw belief in responsibility. Nowhere do we see this more than in the cultural response to most foul crime when suddenly there is an intense desire to hold perpetrators accountable. Loathesome crime generates loathing for the perpetrator, leading not only to the difficulty of securing a fair trial but also of weakening our hard won categories which modify concepts of legal responsibility. The media in all its multifaceted character both reflects and amplifies such loathing and leads to demands for more and more punitive accountability.

Let me take difficult and troubling case to conclude on. Despite the depth and length of our cultural and moral consensus that the responsibility of a child for a crime is not the same as that of an adult for an identical crime, there was a huge public pressure that the child killers of Jamie Bulger should be treated like adults in an adult court. For some, it was not just that this political and judicial failure of nerve led to Britain's predictable disgrace in the

international court, but that the trial itself delayed the process through which the killers could begin to confront and take responsibility for their terrible deed in terms that they could understand. What is even worse is that the ruling of the international court which was against the British legal process, not *for* the perpetrators, inexorably feels as if it a*gainst* the victim's family. Thus I want to suggest that whatever happens as a result of DNA-diagnosed traits, we should not engage in a moral panic , the new genetics will not set us free from the hard task of working out how to think about appropriate concepts of responsibility for different people.

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