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SPECIAL ISSUE
GENOMICS AND CRIMINAL JUSTICE

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The week before this issue was published, an article in the Independent on Sunday quotes that 'police files hold the DNA of more than 50,000 children who have committed no offence. And that's only the tip of the iceberg - Britain now has the largest DNA database in the world'.[1] The article, which includes references to Mairi Levitt & Floris Tomasini's paper Bar-coded children (published in this special issue), highlights some of the growing concerns relating to the use of DNA by the police. As media and parliamentary discussion continues about who should be included on the National DNA Database, independent research into the use of genomic technologies by the criminal justice services is of increasing importance. In addition to the Levitt & Tomasini paper, many of the articles in this special issue focus directly on this subject. In my own extended editorial essay I compare and contrast the utility of such databases with concerns about privacy and data misuse. Jane Kaye then explores the issue of police access to confidential genetic data, while Michael Townsley and his colleagues present findings that demonstrate the strong utility of these databases in solving crime. Next a series of papers explore the wider application of genome-based technologies in the criminal justice setting, exploring issues such as racial profiling, behavioural genetics and genetic addiction.

Moving beyond this topic, into the wider field of genomics and criminal justice, Helen Codd provides an interesting analysis of attempts by prisoners to access artificial insemination treatments, whilst Hazel Biggs and Robin MacKenzie explore the legal problems faced by untrained carers when caring for someone who is close to death – whether as the result of a genetic disorder or otherwise. As the debates continue in the UK, Europe and the USA about euthanasia, assisted suicide and the right to die, end of life issues are increasingly important when considered in the light of many hereditary conditions that can lead to a debilitating death. The breadth of topics included demonstrate that genomic technologies have ramifications within the criminal justice system that effect us all, from the beginning of life through to the end of life.

When proposing a special or thematic issue for a journal, especially one that is to be filled by an open call for papers, there are a number of concerns. Firstly, will the editors of the journal like your idea? Secondly, will there be sufficient interest in your idea that you will have enough papers to produce the issue. Thirdly, will there be sufficient interest in your idea anyone will want to read it?

To my relief and satisfaction, the editors of this journal did like my proposal. We received a number of high quality papers, from a range of distinguished authors, and – with thanks to a panel of peer reviewers and the ever-patient and efficient editorial staff of the journal – the issue is now complete.

The answer to my third concern remains to be seen. I hope you will feel that we did a good job.

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Guest Editor

[1] Marie Woolf and Sophie Goodchild , Surveillance society: The DNA files, *The Independent on Sunday*, 07 May 2006

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To Clear or To Convict? The Role of Genomics in Criminal Justice[1]

ANTHONY MARK CUTTER

> *JUDGE SLATER: Look, I have signed hundreds of search warrants for Captain Brass, but ... this affidavit lacks probable cause. Prints on quarters, an admixture of DNA...*
>
> *GRISSOM: DNA, if given a warrant, will clear or convict...*
>
> *JUDGE SLATER: ... are not enough for me to invade the Klinefelds' right to privacy*
>
> CSI: Crime Scene Investigators, Assume Nothing (part 1)[2]

Introduction

Although the title 'genomics and criminal justice' opens a relatively wide field of inquiry, this paper is primarily concerned with the use of genomic technologies by the criminal justice service(s), with a particular focus on the use of DNA and DNA databases. The vehicle for this exploration will, for the most part, be the National DNA Database of England & Wales.

The above exchange between a Judge and a law enforcement official, though taken from fiction, highlights the two key issues raised by the use of DNA and DNA databases in the criminal justice setting that will be considered in this paper. Firstly, we see the portrayal of DNA as a powerful tool that will serve as the lynch pin of the investigator's case; secondly, we see the Judge's concern for the 'privacy' of the suspects. In this context, these two concepts – the utility of DNA and the privacy of the individual – are conflicting. These competing interests are mediated by a governance process of law and policy – represented in the above exchange by the need to satisfy the test of 'probable cause' before a warrant can be issued. By exploring the interaction between these conflicting notions of utility verses privacy, it is hoped that a theoretical framework of principles for governing the use of DNA by the criminal justice service can be extrapolated. Are concerns about privacy warranted, if the utility of the data is so strong?

Utopia verses Dystopia

In 1943 the physicist Erwin Schrödinger began to explore the workings of the living organism from what he described as a 'naïve physicist's approach'.[3] Through applying his knowledge of physics, chemistry and quantum physics he postulated that the molecules of the body must contain the script or design for the human body, which must necessarily be responsible for the functioning of the structure of the organism. Further to this he suggested these molecules must somehow be involved in the heredity process studied by geneticists. In essence, he predicted the existence of DNA and challenged his colleagues in the biological sciences to find it.

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Nearly twenty years later, James Watson and Francis Crick were awarded the Nobel Prize in Physiology or Medicine[4] for their discovery – first published in a letter to *Nature* on the 25 April 1953[5] – of the double-helix structure of DNA. In 1983, thirty years after Watson & Crick's paper was published and forty years after Erwin Schrödinger's prediction, a 15 year old schoolgirl was raped and murdered in the English town of Narborough in the county of Leicestershire. Three years later a second schoolgirl was found murdered and sexually assaulted. At the time, it was not unusual to test samples found at a crime scene for blood type, but the notion of a DNA fingerprint had only recently been discovered, and had never been applied in the context of a criminal investigation.[6] The police officers investigating the murders were convinced that the two crimes were connected (because of the matched blood-type and the *modus operandi* of the crime). They arrested a suspect who gave an apparently false confession to the second murder, while denying involvement in the first. In an effort to link the suspect to both murders, the Police took the unusual step of approaching Professor Sir Alec Jeffreys at Leicester University, who had developed the scientific process of 'DNA fingerprinting' the previous year.[7] The results of the tests carried out by Professor Jefferys exonerated the suspect, and provided police with a 'DNA fingerprint' of the actual murder. In the absence of any existing database of DNA samples, the Police conducted an 'intelligence led screening' of over 5,000 men in the local area. Eventually, this process led to the arrest of a local baker named Colin Pitchfork, his DNA profile was matched with the semen from both murders and in 1988 he was sentenced to life for the crimes.[8] The purpose of this ad hoc history lesson is to place DNA and its forensic use in its historical context. Neither DNA, nor its forensic uses are new ideas.

The advent of new scientific or technological developments is often met with conflicting reactions. The same is true for developments that could be seen to be new applications of an older technology. As the science of DNA and DNA databases continues to develop, with its forensic applications continuing to rise, it would seem that it attracts both champions and critics. This phenomenon has been observed in many contexts and is not always useful. As Gordijn observes, with reference to developments in nanotechnology, *'[t]he dominance of utopian dreams and apocalyptic nightmares in the debate on future perspectives of [new technology] holds the risk of unnecessary backlashes. These radical views are the product of one-sided perspectives.'*[9] Although, this extract refers specifically to debates surrounding nano-technology, the tendency to pit utopia against dystopia is common in the framing of debates surrounding new technologies. These visions of the future traditionally demonstrate either a great promise, or a great danger from a new technology. They may be based on science fact, such as published scientific data, or, they may be projections of future developments - truly a vision as opposed to a reality. Many of the key narratives in these proposed futures may be drawn from science fiction or have become the subject of science fiction. How then do we distinguish scientific truth from fiction? In the case of forensic uses of DNA, the popularity of 'forensic science fiction' shows such as CSI: Crime Scene Investigators and its various spin-off and competing shows, appears to be proliferating an apparently positive utopian view of the value of these technologies, leading to what has been termed the 'CSI effect.'

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When this concept of a 'CSI effect,' already popular in the media, was presented to the American Association for the Advancement of Science (AAAS) during a symposium in February 2005, it prompted a further flurry of testimonials in the media. The presenter Dr. Max Houck suggested '*the CSI effect is basically the perception of the near-infallibility of forensic science in response to the TV show. […] This TV show comes on and everyone starts watching it - including the cops and prosecutors - and submissions to forensic laboratories go through the roof'*.[10]
In addition to this increase in the workload of forensic science labs, the so-called 'CSI effect' has had a number of other tangible impacts. Another participant at the symposium, Dr Patricia McFeeley observed that '*survivors are often dissatisfied with the investigation into the death of a loved one, demanding more forensic evidence. […] The perception is that the medical examiner isn't doing all the things they see on TV. They expect toxicology results to be instantaneous, instead of taking months, which is the reality…They want everything to be tested at a crime scene when it is not warranted by the facts or by the fiscal realities of the lab*'.[11] This apparent perception of the power of forensic science generally, and DNA based evidence specifically, has also reportedly had an impact on the way that juries deliberate. This is evident in the statement of a reporter that because of '*[the CSI effect] juries from coast to coast expecting fancy forensic evidence that will seal a defendant's guilt or innocence.*'[12]
The suggestion is that the utopian view of forensic science portrayed through popular media is causing juries difficulty when deciding on guilt. In the UK and the USA, for a jury to return a guilty verdict in a criminal trial the prosecution must have proved guilt 'beyond reasonable doubt'.[13] In contrast, in the UK, the test for guilt or liability in a *civil* court (such as a claim for negligence or breach of contract) is the less stringent 'balance of probabilities test'.[14] There have been many examples reported in the media[15] of decisions that are attributed to this CSI effect causing juries to be reliant on the 'juggernaut of infallible evidence'[16] that is presumed to be held by forensic science. One reported example is the murder trial of Robert Blake, in which jurors, after returning a 'not guilty' verdict, are said to have asked '*why didn't they try to get some DNA, or hair or something, off the jacket?… It would, above all, eliminate the need to figure out whether the prosecution had proven its case 'beyond a reasonable doubt*'.[17]

Thus we are faced with the possibility that in the minds of potential jurors forensic evidence, specifically DNA evidence, is the key indicator of guilt 'beyond reasonable doubt'. The reality of the impact of the 'CSI effect' on the criminal justice system remains to be seen. A recent review article, in the Yale Law Journal, explores the possible social and psychological effects that television shows such as CSI has on jurors. It concludes '*the* CSI *effect has become an accepted reality by virtue of its repeated invocation by the media. Although no existing empirical research shows that it actually occurs, on a basic level it accords with the intuitions of participants in the trial process.*'[18] Additionally, we might consider that regardless of the motivation for a juror's decision, an acquittal or conviction by a jury of one's peers is a simple function of the administration of justice. In contemplating the media articles that attribute various convictions and acquittals to the CSI, it is difficult not to remember the adage known as the *Blackstone Ratio* that it is '*better that ten guilty persons escape than that one innocent suffer*'.[19] For if the jurors remain unconvinced by the evidence before them, when burden of proof is one of 'beyond reasonable doubt', they have no option but to return a not guilty verdict.

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Regardless of the weight that the presence (or absence) of DNA evidence might carry in the court room, the fact remains that DNA evidence appears to be a powerful aid to those investigating crime. Professor Sir Alec Jeffreys, the architect of DNA fingerprinting, is reported to have said '*it does not solve crimes. It establishes whether sample X comes from person Y, it is up to the court to interpret that in the context of other evidence in a criminal case*,'[20] which upholds the idea of DNA as an *aid* in investigations, rather than a conclusion. Arguably, the evolution from 'intelligence led screening' and matching individual samples against individual suspects in custody towards a more developed database system seems only logical, so as to provide the greatest possible range of samples to be matched against the greatest possible range of people. In 1995 the establishment of the National DNA Database (NDNAD) in the England and Wales was a world first (at present there is a separate database for Scotland & Northern Ireland, although they submit profiles to the NDNAD). Both locally and globally, databases that store genetic or genomic data are created for many purposes – including medical research and criminal investigation, and contain varying amounts and types of data, meaning that every database or biobank is different. Some are children of legislation, created specifically by statutes that specify the exact parameters of the database in question. Others are created independently of statute or statutory instrument, and must interact with existing laws and regulatory frameworks. The latter form of databases or biobanks may require the development of new or amended regulations after the fact.[21]

The NDNAD is not a 'child of legislation', in that there is no specific 'National DNA Database Act' which established the database, and defined what details may be stored in it or how it may be used. Instead, the database was created as a result of The Criminal Justice and Public Order Act 1994[22], which, through amendment of the Police and Criminal Evidence Act 1984[23] established the conditions that would allow the database to be created. Essentially this was achieved by relaxing the rules relating to the collection, retention and use of 'non-intimate samples'[24] and, to a lesser extent, 'intimate samples'.[25] Such samples, would often (though not exclusively), be used for DNA profiling. Various acts of parliament[26] have further expanded the powers of the police in relation to such samples. This has had the (intended) effect of increasing the size of the NDNAD, and thus presumably increasing its power as an investigative tool (providing a still larger group of persons to compare to a still larger group of samples). The Office of Science & Technology observes, '*the progressive widening of police powers to take samples from suspects together with the permitted retention of samples and profiles, irrespective of whether an individual is acquitted or not charged, has resulted in a big expansion of the Database*'.[27] It is this recent amendment, to allow the retention of samples from anyone arrested for a 'recordable offence', regardless of whether or not they have been charged, which appears to have caused the most controversy. One of the most highly cited reports which details the various problems and concerns raised by the National DNA Database, is that produced by GeneWatch UK in January 2005.[28] In addition to a review of the current scientific and legal status of the NDNAD, the report considers the issue of the protection of Human Rights and civil liberties, of which privacy and issues related to privacy appear to be the most important. Interestingly, a large section of the report considers the potential developments in the field of forensic DNA testing and considers potential future uses of the NDNAD.[29] Many of these 'future' concerns relate to the genetic privacy of the individuals whose data is stored on the database and to the

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overall use of the data for purposes other than that originally intended. The report's executive summary states:

> *'The current DNA data used for identification purposes contains very limited information about a person's genes. However, this may change in the future with plans to use new technology to exploit the information in DNA samples. Some advocates have argued that this technology will be able to predict the characteristics of a suspect from the DNA evidence at the scene of a crime, generating a description along the lines of 'a tall man, with red hair, blue eyes, who's probably overweight'. Researchers are also looking at predicting ethnicity and health status. Some even believe it will be possible to predict a person's personality or behaviour. However, there are serious scientific problems with most of these approaches. Not only is some of the research fundamentally flawed, much of it is unlikely to produce particularly useful or accurate predictions. There is also a danger that the information will be used selectively to reinforce existing prejudices, for example about race or skin colour. Nevertheless, a few genetic tests can reveal important information about some people's health. If use of this new technology were expanded to stored samples from known individuals on the database, the increase in police access to genetic information could pose an even greater threat to privacy.'*

Thus it seems that these fears are contemplating a vision of a future where forensic databases, such as NDNAD, develop powers that are concerned with decoding genetic genomic material, rather than comparing and contrasting samples. These 'genome focused' applications each have many potential uses and potential perils. As Onay explains, there is an inherent danger in placing too much faith in the thesis of genetic determinism – particularly as regards personality or behaviour – within a criminal justice setting. He comments that '*jurisprudential reactions to research into genetic criminality have been based on misinformation and consequently have exaggerated the ramifications of this research for the criminal justice system*'.[30] Concerns about the possible misuse of this data are thus perhaps located within this confusion that Onay highlights. Is it really a concern that if (in the future) the police had the ability to screen for genetic indicators of personality, they might assume these to be definitive indicators of guilt or innocence? Or at least a propensity towards a certain kind of behaviour. Nevertheless, as Franz Joseph Gall noted in relation to his creation of phrenology as a (now debunked) science to determine behaviour, '*it is only this struggle against the propensities which gives rise to virtue, to vice, and moral responsibility. What would that self denial, so much recommended, amount to, if it did not suppose a combat with ourselves ? and then, the more we multiply and fortify the preservatives, the more man gains in free agency and moral liberty*'.[31] Perhaps then, any concern about the use of such information must be related to its misuse (the use for purposes other than the genuine detection and deterrence of crime), or perhaps more accurately to its misinterpretation.

In addition to comments on privacy, the Genewatch report suggests that:

> *'Other national databases are being planned and developed, including the National Identity Register to support the use of ID cards, and the new NHS Electronic Care Record Service, which may contain some genetic data in the future. It is not clear under what*

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> *circumstances the police will be allowed access to this information. Nor is it clear whether any of these databases will be linked, possibly allowing other Government bodies to find out who is on the NDNAD. Expanding and/or linking these databases would give the state unprecedented abilities to monitor the UK population, greatly increasing the threats to our privacy. There are concerns that this access could all too easily be abused, taking the UK closer towards an oppressive 'police state.'*[32]

It has already been suggested that it is common to see debates on new (or improved) technologies polarized around opposing utopian or dystopian visions of the future. Interestingly, the same potential advances might be used to support opposing arguments. For example, the proposed future occurrence of DNA evidence at the scene of a crime, generating a description along the lines of 'a tall man, with red hair, blue eyes, who's probably overweight', could potentially be a useful tool in the identification of suspects where a DNA sample is found at a crime scene that does not match an existing profile in the database. However, when considering the reality of the technology in question, Haga suggests that

> *'[i]n comparison to the quantitative preciseness and accuracy of the 13-marker core STR DNA identification profile, AIMs and genetic markers associated with ancestry and physical or behavioral traits appear to be far less reliable for identification purposes. Regardless of the validity of this technology or whether it will be useful to forensic investigators, expanded genome profiling will pose major challenges in its use.'*[33]

It seems that when contemplating the application of new (or improved) technologies, we are being asked to perform a number of balancing acts. The first is to balance the various utopian and dystopian visions to establish a grasp on the reality of the science as it is today, and to arrive at a balanced vision of the science that may be tomorrow. I would suggest that it is the consideration together of science fact alongside 'science potentia' (as distinct from science fiction), that is the most important starting point to any governance analysis of a new technology. Thus whilst utopian and dystopian visions of the future can often have the effect of polarising debates, in the early stages of the debate their presence is perhaps vital to allowing the framing of the debate and therefore facilitating this balancing process.

Does size matter?

As research continues into the potential viability and impact of expanded uses of DNA by the Criminal Justice, the fact remains that – for now – the role of DNA fingerprinting and the DNA database is still that it 'establishes whether sample X comes from person Y'. It is the police who solve crimes, and the courts who convict. The NDNAD is the largest DNA database for criminal justice purposes in the world, with a reported 3.45 million (representing about 5.2% of the UK population) profiles and 263,923 crime scene sample profiles as of the end of December 2005.[34] Notwithstanding any potential - positive or negative - skew of conviction rates for 'CSI Effect', the utility of this database seems apparent. The National DNA Database Annual Report 2004–2005 contains a large amount of data which points to the efficacy and utility of the NDNAD.[35] The table reproduced below (Table 1) indicates the number of matches of crime scene samples, to suspect(s)' DNA profiles.

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Table 1: Crime Scene – Suspect Matches[36]

	1998/99	1999/2000	2001/02	2002/03	2003/04	2004/05
DNA Matches	21.239	23,021	30,894	49,913	45,269	40,169

To help interpret this data, the Annual Report explains that:

> *'matches between a crime scene and a subject are useful in identifying possible suspects for the offence. Since May 2001, 195,779 crime scene profiles have been matched with 157,096 separate individuals. For 126,883 of the crime scene profiles, a single suspect was reported. For the remainder, a list of potential suspects was produced. The identification of more than one potential suspect as the source of the DNA at some scenes is largely due to the significant proportion of crime scene sample profiles that are partial…The number of crimes with DNA matches rose from 23,021 in 1999-2000 to a peak of 49,913 in 2002/2003 (a 74% increase) before falling to 45,269 in 2003/2004 and then to 40,169 in 2004/2005. The fall in DNA matches after 2002/2003 broadly correlates with the fall in the total number of recorded crimes over the same time frame (i.e. fewer crimes, fewer crime scenes being visited, and fewer crime scene sample DNA profiles being loaded, leading to fewer matches).'*[37]

To place these figures in further context, the table below (Table 2) – reproduced from home office figures published by the Office of Science & Technology[38] – purports to demonstrate the impact of DNA on crime detection. The first column represents the overall percentage of crime detected, whilst the second column represents the percentage of crimes detected where DNA crime scene samples are loaded on the Database (the term detected, is taken to mean solved in this context).

Table 2: Crime Detections

Crime Category	National Crime Detection Rate	DNA Detection Rate
All recorded crime	26	40
Domestic Burglary	16	41
Non-domestic Burglary	11	50
Theft of Vehicle	15	24
Theft from Vehicle	8	63
Theft from vehicle	14	51

The implication is that, crimes are more readily solved if there is DNA evidence. The House of Commons Science & Technology Committee comment that '*DNA evidence now represents a vital instrument for facilitating investigations and securing convictions. We believe that the recent expansion of the database would make a review of the impact of the NDNAD on the detection and deterrence of crime timely.*'[39] It would seem that it is necessary to establish the realities of this impact, and take care that current figures are not creating a 'real life' CSI: Effect.

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Assuming the results of such an investigation were positive, and showed that the NDNAD was indeed leading to an improvement in the detection and deterrence of crime, then logic would suggest that a larger database would have a larger impact on the detection and deterrence of crime.

Moreover, there are other uses to which the NDNAD, and others like it, fall under the auspices of the criminal justice service, but do not relate directly to the detection and deterrence of crime. Consider for example, the events of September 11th 2001, December 26th 2004 and July 7th 2005. The terrorist attack on the World Trade Centre in New York, the Boxing Day Tsunami in the South Pacific and the terrorist attacks on the London transport system have all proved a particular challenge for the criminal justice services in relation to their use of various forensic technologies, not simply for the need to identify the remains of suicide bombers in the aftermath of terrorist attacks, but also because of the need to identify the countless left dead in the wake of such attacks and natural disasters. Before the end of the day on September 11th 2001, the US company Genecodes was asked to take the lead in developing a system to assist in the identification of 20,000 human remains, linking them to samples collected from family members and personal items. This would later lead to the development of the Mass-Fatality Identification System [M-FISys].[40] It is possible that the existence of a large-scale database of some kind might have assisted in the identification of the deceased more readily. Newspaper reports from the time of the Boxing Day Tsunami and the 7th of July London bombings[41] point to DNA as being the 'gold standard' for identification, but highlight the difficulties, and limited usefulness, of DNA profiling in 'disaster' situations where there is a lack of infrastructure. The indication would be that whilst DNA testing is hard to perform without a laboratory, fingerprinting and dental records can be compared by simpler means, although DNA remains the gold standard.

Not Guilty verses Not Retained

We have seen a gradual expansion of police powers relating to the collection, retention and use of DNA and related samples. As Kaye observes, this increase in powers appears directly related to this perception of the utility of the science:

> *'As forensic techniques continue to improve, reports on the success of the police in using DNA analysis for solving past and present criminal cases are becoming an everyday occurrence in the media. The importance of DNA analysis as a police investigative tool is also increasingly evident in the 'fight against terrorism' which has resulted in increased police powers. There are two avenues by which police can collect and obtain access to DNA samples. The first is through the Police and Criminal Evidence Act 1984 (PACE) and its amending legislation,[42] that allows the police to forcibly collect samples in some situations. The second is through an access order granted by the court, which allows access to samples from existing collections held by other parties.'*[43]

One such expansion, under s84 of the Criminal Justice and Police Act 2001, effective as of May 2001, allowed for the retention of samples of those who had been acquitted of the crime of which they had been accused when the sample was first taken. In this situation, 'the fingerprints or samples may be retained after they have fulfilled the

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purposes for which they were taken but shall not be used by any person except for purposes related to the prevention or detection of crime, the investigation of an offence or the conduct of a prosecution'.[44] Prior to this point in time, such samples ought to have been destroyed upon acquittal, exoneration or failure to prosecute. The Criminal Justice Act 2003 further extended these powers 'to allow a non-intimate sample to be taken without consent', where 'the person is in police detention in consequence of his arrest for a recordable offence'.[45] In this context, a 'recordable offence' is defined as any offence 'punishable with imprisonment and any offence specified in the Schedule [to The National Police Records (Recordable Offences) Regulations 2000]'.[46] The interaction of this provision with the earlier amendment, means that anyone who is arrested (for a recordable offence) can have their DNA added to the NDNAD, and that sample may be kept and used in the same way as the sample belonging to a person who was charged, but not convicted. Thus the DNDAD has been expanded to include not just the DNA of convicted criminals and volunteers who have given written consent, but also those who might simply have been in the 'wrong place at the wrong time'. Interestingly, the House of Commons Select Committee on Science and Technology, identified a need for further independent research into 'public attitude towards retention of DNA samples (both from convicted criminals and others), and the evidence of benefits associated with this practice'. They also make comments on the need for greater ethical oversight of the database and stakeholder scrutiny of the database.[47] This suggests some potential discomfort with the idea of continuous retention of samples.

In a briefing paper published in June 2005, Genewatch suggested that

> *'few people have problems with the idea of the police comparing the DNA of a suspect with DNA left at the scene of a serious crime. However, concerns arise when DNA profiles and other information are stored permanently on a database, especially when the database includes large numbers of innocent people. The three main areas of concern about the NDNAD are: its impacts on people's privacy; the potential for misuse by governments; and whether it discriminates against certain groups of people.'*[48]

In response to these concerns, two (conjoined) judicial review cases *R v. Chief Constable of South Yorkshire Police ex parte LS (by his mother and litigation friend JB)* and *R v. Chief Constable of South Yorkshire Police (Respondent) ex parte Marper* reached the House of Lords in July 2004.[49] The central question in both cases was whether the amended provisions of 64(1A) were compatible with the European Convention on Human Rights - as incorporated into UK Law by the Human Rights Act 1998 - and in particular with the Convention rights contained in articles 8 (Article 8: Right To Respect For Private And Family Life)[50] and 14 (Prohibition Of Discrimination)[51]. The appeal of both parties was dismissed. Lord Steyn, delivering the main judgement, explored the nature of DNA and the NDNAD, and appeared content with their utility, recognising them as powerful tools. He stated in opening:

> *'It is of paramount importance that law enforcement agencies should take full advantage of the available techniques of modern technology and forensic science. Such real evidence has the inestimable value of cogency and objectivity. It is in large measure not affected by the subjective defects of other testimony. It enables the guilty to be*

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> *detected and the innocent to be rapidly eliminated from enquiries. Thus in the 1990s closed circuit television (CCTV) became a crime prevention strategy extensively adopted in British cities and towns. The images recorded facilitate the detection of crime and prosecution of offenders. Making due allowance for the possibility of threats to civil liberties, this phenomenon has had beneficial effects.'*

The use of fingerprint evidence in this country dates from as long ago as 1902. In due course other advances of forensic science followed. But the dramatic breakthrough was the use of DNA techniques since the 1980s. The benefits to the criminal justice system are enormous. For example, recent Home Office statistics show that while the annual detection rate of domestic burglary is only 14%, when DNA is successfully recovered from a crime scene this rises to 48%. It is, of course, true that such evidence is capable of being misused and that courts must be ever watchful to eliminate risks of human error creeping in. But as a matter of policy it is a high priority that police forces should expand the use of such evidence where possible and practicable.'[52]

Thus it seems that, Lord Steyn, in his opening arguments, before describing the legal deliberations relating to the European Convention, has performed the balancing of Utopian and Dystopian visions. He considers the apparent value of the database, contrasts it with other technological developments, and considers the concerns of data misuse. Later in the case, testimony from Liberty – that had been granted permission to intervene when the case(s) were heard in the Court of Appeal –further highlighted these concerns, indicating that 'the range of genetic information that may be derived from DNA *samples* is of a highly private nature' and suggested that '*the samples provided more information about the person who provided the samples than is needed for the identification of those involved in crime*'.[53] Lord Brown of Eaton-under-Heywood appeared to engage with the utopia/distopia analysis with even more vigour. He agreed with Lord Steyn's legal reasoning, but added by way of *obiter dicta*:

> *'Given the carefully defined and limited use to which the DNA database is permitted to be put—essentially the detection and prosecution of crime—I find it difficult to understand why anyone should object to the retention of their profile (and sample) on the database once it has lawfully been placed there. The only logical basis I can think of for such an objection is that it will serve to increase the risk of the person's detection in the event of his offending in future. But that could hardly be a legitimate objection, nor, indeed, is it advanced as such. Such objections as were suggested, however, seem to be entirely chimerical. First, the fear of an Orwellian future in which retained samples will be re-analysed by a mischievous State in the light of scientific advances and the results improperly used against the person's interest. If, of course, this were a valid objection it would apply no less to samples taken from the convicted as from the unconvicted and logically, therefore, it would involve the destruction of everyone's samples. But no such abuse is presently threatened and if and when it comes to be then will be the time to address it. Sufficient unto the day is the evil thereof.'*[54]

In this passage, Lord Brown of Eaton-under-Heywood directly addresses the 'police state' and the possible abuse – by whatever means- of the database by a 'mischievous state' that appear in what I have characterised dystopian literature.[55] However, he

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does not suggest that such developments are to be encouraged, equally he does not suggest they be ignored, simply that they are neither a real, nor present danger. Moreover, he later advocates further expansion of the database, following similar logic to the argument that a larger database would have a larger impact on the detection and deterrence of crime.[56] It is interesting that one of appellants in this case was a minor. A recent study by Levitt & Tomasini showed that '*the parents and children in this study supported the existence of a NDNAD and its use to solve crime. However, they had reservations about samples being taken for petty crime, were critical where there was a lack of parental involvement and felt that there are dangers of stigmatising young people for a one-off act*'.[57] The concept of stigmatisation links closely with the discussions of discrimination and privacy that were discussed in the case that was heard before the House of Lord's. Is this fear more closely tied to the way that the data might be used or misused in the future than to concerns about privacy? Again we return to the idea (as valued by the parents and children in the Levitt & Tomasini study) that the NDNAD is a useful tool, and but again there seems to be some underlying concern, or lack of trust, that the database will be used properly.

The Principles of Naivety and Community

As we explore the impact of the NDNAD, and by association other databases designed for the same purpose, we are faced with complex utopian visions of a criminal justice service armed with an all powerful database for the benefit of society, contrasted with the dystopian vision of a criminal justice service, armed with the identical, all powerful database intent on mischief to our detriment. As has been suggested, in the absence of clairvoyant abilities, we must navigate these conflicting visions of the future to arrive at that vision which we believe most likely to become reality. The nature of this balancing process can, and frequently does, result in the rationale polarisation of arguments (for better or for worse) around one of the poles of the debate – in favour or against a particular technology.

Chadwick and Berg have suggested, in relation to genetic database initiatives designed for research purposes, that

> *'Genetic database initiatives have given rise to considerable debate about their potential harms and benefits. The question arises as to whether existing ethical frameworks are sufficient to mediate between the competing interests at stake. One approach is to strengthen mechanisms for obtaining informed consent and for protecting confidentiality. However, there is increasing interest in other ethical frameworks, involving solidarity — participation in research for the common good — and the sharing of the benefits of research.'*[58]

Similarly Harris suggests a potential 'moral imperative' to contribute to research, resulting, in part, from the benefits – both explicit and implied – that we receive from living in a society that conducts scientific research[59]. Could such ideas be equally important when considering the principles and frameworks for databases designed for use by the criminal justice service?

If it is true, as per Lord Brown of Eaton-under-Heywood, that *'the more complete the database, the better the chance of detecting criminals, both those guilty of crimes past*

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and those whose crimes are yet to be committed. The better chance too of deterring from future crime those whose profiles are already on the database', can it not then be shown that all members of society would benefit from this reduction in crime. In creating such benefits does this not develop a moral imperative to donate your sample to such a database, so as to create the most powerful database possible? The danger with this line of reasoning is that in pursuit of our supposed utopian criminal justice system we might end up justifying measures that result in the despised dystopia.

Thus any proposed moral imperative to donate a sample to a DNA database designed for use by the criminal justice service must be subject to some safeguards of the participants' rights. Yet these notions, that are communitarian in nature, would always require the surrender of some right or privilege, in return for some community or societal benefit. Is it the case then that the risk of the misuse of data, or the persecution of unfortunate individuals on the basis of genetic information, is acceptable? My response is no, it is not. However, some reduction in the rights and privileges of the individual, as regards individual privacy, is acceptable in the pursuit of a more powerful database, designed to bring about the societal gain of a reduction of crime (or other benefits such as an ability to identify a hitherto unidentified corpse). Perhaps, in this context, it is necessary to consider the rights of the 'innocent' and not the individual as sacrosanct.

In response, I suggest the following model, which I have termed the 'Naïve Position' as the starting point for navigating the complex network of competing interests.

If it can be shown that (a) the innocent have nothing to fear; and
(b) that society has much to gain,

then the application of the technology in question is acceptable.

The careful application of this model once again requires the careful consideration and balancing of utopian ideals against dystopian concerns to identify the reality of the effect that the technology concerned will have on 'the innocent'. This in turn must then be balanced against overall societal benefits, and appropriate safeguards must then be put in place to facilitate both the protection of the innocent and the gain of society.

Perhaps this becomes impossible to realise, as too many competing interests neutralize any possible benefit. Perhaps it is the case, with forensic DNA databases and other genomic technologies, that is not the principle of a technology, but the method of its application that causes problems. For example, there would likely be a marked benefit to be gained from a population wide genetic database for the criminal justice service (particularly in terms of its impact on detection and deterrence of crime), but that benefit is open to abuse. It is desirable that the criminal be apprehended, or better still that the potential criminal be deterred from offending. However, we remain unable to safeguard the innocent by ensuring such a database is used for no other purpose – either now or in the future – than 'to establish whether sample X comes from person Y'. In essence, we remain to unable to navigate between the competing visions of the future.

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[1] This paper is developed from 'Balancing Powers: Some Thoughts on Forensic DNA Databases', a public lecture presented by the author as part of the 'Deciphering DNA' event organised by the Wales Gene Park, Techniquest and the Progress Educational Trust on the 19th July 2005.

[2] This exchange is transcribed from CSI: Crime Scene Investigators, Season 4, Episode 1, Assume Nothing (Part 1).
A full transcription of the script is available online at: http://www.webphilia.com/~anthology/wnp.html.

[3] Erwin Schrödinger, What is Life? What is life? The Physical Aspect of the Living Cell, 1944

[4] Watson & Crick were awarded the The Nobel Prize in Physiology or Medicine 1962 "for their discoveries concerning the molecular structure of nucleic acids and its significance for information transfer in living material", they each received one third of the prize, sharing it with Maurice Wilkins. For more information see: http://nobelprize.org/medicine/laureates/1962/index.html.

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[13] For a statistical analysis of the concept of reasonable doubt, see:
A.R. Gardner-Medwin, What probability should a jury address? Significance 2:9-12 (2005)
In the UK, the Judicial Studies Board (JSB), suggests the following is sufficient instruction for the jury from the Judge: *'How does the prosecution succeed in proving the defendant's guilt? The answer is - by making you sure of it. Nothing less than that will do. If after considering all the evidence you are sure that the defendant is guilty, you must return a verdict of 'Guilty'. If you are not sure, your verdict must be 'Not Guilty'*. In addition, they highlight that: '*Normally, when directing a jury on the standard of proof, it is not necessary to use the phrase 'beyond reasonable doubt'. But where it has been used in the trial, e.g. by counsel in their speeches, it is desirable to give the following direction: 'The prosecution must make you sure of guilt, which is the same as proving the case beyond reasonable doubt': see R v Adey, unreported (97/5306/W2), where the Court of Appeal cautioned against any attempt at a more elaborate definition of 'being sure' or 'beyond reasonable doubt'. Similarly in R v Stephens (2002) The Times, 27 June the CACD said that it was unhelpful to seek to distinguish between being 'sure' and 'certain''*. For more detailed discussion of JSB Guidelines in Criminal Trials see: http://www.jsboard.co.uk/criminal_law/cbb/mf_02.htm#02.

[14] This is usually a simpler formula, of on a balance, the arbiter of fact (whether judge or jury) is satisfied that there is a greater than 50% chance that one proposition is true. See also, Miller v. Ministry of Pensions (1947) 2 All E.R. 372.

[15] For additional examples see: Willing, R CSI Effect' Has Juries Wanting More Evidence, USA Today, 8/5/2004 at: http://www.usatoday.com/news/nation/2004-08-05-csi-effect_x.htm.
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[22] Criminal Justice and Public Order Act 1994, s54 – s 59, available at: http://www.opsi.gov.uk/acts/acts1994/Ukpga_19940033_en_5.htm#mdiv54

[23] Specifically The Police and Criminal Evidence Act 1984 s64 and s65 were amended

[24] Under The Police and Criminal Evidence Act 1984 s65(3), as amended by the Criminal Justice & Public Order Act, 'non-intimate sample' means—

(a) a sample of hair other than pubic hair; (b) a sample taken from a nail or from under a nail; (c) a swab taken from any part of a person's body including the mouth but not any other body orifice; (d) saliva; (e) a footprint or a similar impression of any part of a person's body other than a part of his hand;

[25] 'intimate sample' means— (a) a sample of blood, semen or any other tissue fluid, urine or pubic hair; (b) a dental impression; (c) a swab taken from a person's body orifice other than the mouth; .

26 Criminal Evidence Act 1997; Criminal Justice and Police Act 2001; Criminal Justice and Police Act 2003 and the Serious Organised Crime and Police Act 2006.

[27] Office of Science & Technology, The National DNA Database, Postnote 258, February 2006, available at: http://www.forensic.gov.uk/forensic_t/inside/news/docs/postpn258.pdf.

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[37] ACPO, The National DNA Database Annual Report 2004 – 2005, p4 available online at: http://www.acpo.police.uk/asp/policies/Data/NDNAD_AR_04_051.pdf.

[38] Home Office figures 2005, reproduced from: Office of Science & Technology, The National DNA Database, Postnote 258, February 2006, available at: http://www.forensic.gov.uk/forensic_t/inside/news/docs/postpn258.pdf.

[39] Science & Technology Committee, Seventh Report of Session 2004−05, Forensic Science on Trial, HC 96-I, Recommendation 14.

[40] www.genecodes.com.

[41] See Gerlin, A The Hardest Count: How do you identify the victims of a suicide bomber? Time Magazine, 17/07/05; Bennetto, J Terror in London: Police identifying victims of Asian tsunami switch, The Independent, July 12 2005.

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well as PACE, these are the Criminal Justice and Public Order Act 1994; Criminal Evidence Act 1997; Criminal Justice and Police Act 2001; Criminal Justice and Police Act 2003 and the Serious Organised Crime and Police Act 2006.

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[44] Section 64(1A) Police & Criminal Evidence Act 1984, as amended by the Criminal Justice and Police Act 2001.

[45] s63(2A) & (2B) of the Police & Criminal Evidence Act 1984, as amended by s10 of The Criminal Justice Act 2003.

[46] National Police Records (Recordable Offences) Regulations 2000 (SI 2000/1139).

[47] Science & Technology Committee, Seventh Report of Session 2004−05, Forensic Science on Trial, HC 96-I, Recommendation 15 – 19 generally.

[48] GeneWatch UK, The Police National DNA Database: Human rights and privacy, Briefing Number 31, June 2005.

[49] Regina v. Chief Constable of South Yorkshire Police ex parte LS; Regina v. Chief Constable of South Yorkshire Police (Respondent) ex parte Marper Consolidated Appeals [2004] UKHL 39 available online at: http://www.publications.parliament.uk/pa/ld200304/ldjudgmt/jd040722/york-1.htm.

[50] Article 8: Right To Respect For Private And Family Life

1. Everyone has the right to respect for his private and family life, his home and his correspondence.

2. There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others.

[51] Article 14: Prohibition Of Discrimination

'The enjoyment of the rights and freedoms set forth in this Convention shall be secured without discrimination on any ground such as sex, race, colour, language, religion, political or other opinion, national or social origin, association with a national minority, property, birth or other status.'

[52] Regina v. Chief Constable of South Yorkshire Police ex parte LS; Regina v. Chief Constable of South Yorkshire Police (Respondent) ex parte Marper Consolidated Appeals [2004] UKHL 39, paras 1 & 2.

[53] Regina v. Chief Constable of South Yorkshire Police ex parte LS; Regina v. Chief Constable of South Yorkshire Police (Respondent) ex parte Marper Consolidated Appeals [2004] UKHL 39, para 15.

[54] Regina v. Chief Constable of South Yorkshire Police ex parte LS; Regina v. Chief Constable of South Yorkshire Police (Respondent) ex parte Marper Consolidated Appeals [2004] UKHL 39, para 86.

[55] See for example: Genewatch UK, The Police National DNA Database, January 2005 available at: http://www.genewatch.org/HumanGen/Publications/Reports/NationalDNADatabase.pdf.

[56] 'The more complete the database, the better the chance of detecting criminals, both those guilty of crimes past and those whose crimes are yet to be committed. The better chance too of deterring from future crime those whose profiles are already on the database' Lord Brown of Eaton-under-Heywood, Regina v. Chief Constable of South Yorkshire Police ex parte LS; Regina v. Chief Constable of South Yorkshire Police (Respondent) ex parte Marper Consolidated Appeals [2004] UKHL 39, para 88.

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Police collection and access to DNA samples

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Abstract

As forensic techniques continue to improve, reports on the success of the police in using DNA analysis for solving past and present criminal cases are becoming an everyday occurrence in the media. There are two avenues by which police can collect and obtain access to DNA samples. The first is on the basis of legislation that allows the police to forcibly collec t samples in some situations. The second is through an access order granted by the court, which allows access to samples from existing collections held by other parties. The purpose of this paper is to compare these two legal mechanisms that allow the police to acquire and access DNA samples. My concern is the increase in collection of DNA samples for genetic research, the moves to standardise data collection and the computerisation of medical records, may make research collections more attractive to the police. Are we are prepared for research collections to become an extension of the National DNA Database used for crime detection? In the USA a decision has been made that the police should not be allowed access to samples and information derived from 'sensitive' research. This article considers 'the certificates of confidentiality' that have been instigated by the National Institute of Health in the USA in order to prohibit such uses of research collections by the police. In this article I consider whether certificates of confidentiality should be used in the UK, as a way of providing greater protection to researchers and participants in research.

Police collection and access to DNA samples

As forensic techniques continue to improve, reports on the success of the police in using DNA analysis for solving past and present criminal cases are becoming an everyday occurrence in the media. The importance of DNA analysis as a police investigative tool is also increasingly evident in the 'fight against terrorism' which has resulted in increased police powers. There are two avenues by which police can collect and obtain access to DNA samples. The first is through the Police and Criminal Evidence Act 1984 (PACE) and its amending legislation,[1] that allows the police to forcibly collect samples in some situations. The second is through an access order granted by the court, which allows access to samples from existing collections held by other parties. The purpose of this paper is to compare these two legal mechanisms that are available to the police for acquiring and accessing DNA samples.

My concern is the increase in collection of DNA samples for genetic research, the moves to standardise data collection and the computerisation of medical records, may make research collections more attractive to the police. Are we are prepared for research collections to become an extension of the National DNA Database used for crime detection? In the USA a decision has been made that the police should not be allowed access to samples and information derived from 'sensitive' research. This article considers 'the certificates of confidentiality' that have been instigated by the

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National Institute of Health in the USA in order to prohibit such uses of research collections by the police. The aim of these certificates is to protect the integrity of researchers, as well as the privacy of patients and participants in research. In this article I consider whether certificates of confidentiality should be used in the UK, as a way of providing greater protection to researchers and research participants.

How do the police obtain samples?

The police are given authority under legislation to collect DNA samples, which are then given to the Forensic Science Service (FSS) for the construction of reference profiles that are deposited in the UK National DNA Database (NDNAD). NDNAD, which is administered by the Forensic Science Service, was established in April 1995 and was the world's first national criminal DNA collection.[2] Since its establishment, the success of using DNA analysis to identify, confirm or eliminate suspects in criminal investigations and to establish links between different crimes has meant that there are now national DNA databases in most European countries.[3] NDNAD is the largest national criminal database in the world containing around three million profiles, representing 5.24% of the UK population.[4] Recently there has been concern about the large number of profiles that have been collected from juveniles. Johnston says that the total number of profiles from juveniles on NDNAD is 750,000 and of these, 24,000 profiles are from juveniles that have never been charged with any offence.[5] The fact there are so many juvenile samples in the collections has lead to protests from parliamentarians and the parents of the adolescents concerned.[6] According to the Forensic Science Service that runs NDNAD, in a typical month in 2003, matches are found linking suspects to 15 murders, 31 rapes and 770 motor vehicle crimes.[7] The database has also been used to solve crimes that have been committed many years ago, due to an increase in the number of recently acquired samples and the durability of DNA profiles. This has resulted in the Forensic Science Service achieving a success rate of 45% when matching a crime scene sample with a stored database profile.8 Even if an individual has not provided a sample, NDNAD has become a means by which to trace relatives that may be on the database and thereby identify the individual. For example, the shared, inherited nature of DNA means that it is possible to trace relatives of suspects and to find the suspect who did not have a sample on NDNAD;[9] as well as being able to determine the surname of an individual by analysing their Y chromosome.[10] It is not surprising that even in a report of 1997/98, the Government stated that 'the impact of the National DNA Database — which the FSS set up on behalf of the police in April 1995—has exceeded all expectations'.[11]

The collection of DNA samples by the police

The foundation legislation for the collection of samples by the police is the Police and Criminal Evidence Act 1984. However since its enactment there have been a number of important amendments to this Act, as well as additional new legislation that has expanded police powers and the classes of people from whom samples and profiles can be collected and retained. For example, prior to 2001, if a person was not prosecuted or acquitted, their DNA sample had to be destroyed and their profile had to be removed from NDNAD. In 2001, s. 64 of PACE was amended by the Criminal Justice and Police Act 2001, which meant that profiles on NDNAD could be kept

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although the DNA sample was destroyed. This resulted in a substantial increase in the size of NDNAD. In 2004, the new Criminal Justice Act 2003 extended the pool of people who could have their profile retained on NDNAD to include all people who had been arrested for a recordable offence. Prior to this, it was only possible to retain DNA profiles from individuals who had been charged with, or reported for a recordable offence.

As well as recognising differences between classes of people, the current law also makes a distinction between intimate samples and non-intimate samples. Both of these different types of samples can be used for DNA extraction. The protections in place for taking an intimate sample from an individual are greater than for non-intimate samples. Samples that are classified as 'non-intimate' under the Act can also be lawfully taken from the individual without consent. Therefore non-intimate samples are most routinely sought by the police. The removal of cheek cells by a buccal swab is classified as a non-intimate sample and is now one of the most common methods of obtaining a sample from an individual.

'Intimate' samples

'Intimate' samples are a sample of blood, semen or other tissue fluid, urine or pubic hair, a dental impression, or a swab taken from an orifice other than the mouth.[12] These samples must be taken from an individual in police detention by a registered medical practitioner or health-care professional, with the individual's written consent, and authorised by a police officer of the rank of inspector. The police officer must have reasonable grounds to believe that the individual has been involved in a recordable offence[13] and that taking an intimate sample can confirm or disprove the individual's involvement. If the authorisation is given by the police officer, the individual must be informed of the grounds for giving the authorisation[14], as well as the fact that the sample will be the subject of a speculative search and checked against other samples or information.[15] An intimate sample can also be taken from an individual who is not in police detention if two or more non-intimate samples have already been taken but these were insufficient.[16] If an individual refuses to give consent and this is considered by the police to be without due cause, the police must warn the individual that the refusal will be taken into account if the case goes to trial.[17] In the case of intimate samples, an individual can decide not to consent and this will be respected. The procedures in place are transparent and must be followed in order for the sample to be used as evidence in a court case.

'Non-intimate' samples

The vast majority of DNA samples are regarded as 'non-intimate' samples for the purpose of the Police and Criminal Evidence Act 1984. The amendments to PACE by the Criminal Justice and Public Order Act 1994 resulted in buccal swabs being reclassified as 'non-intimate' samples. This means that buccal swabs can now be taken without consent providing that the suspect is 'lawfully detained'.

There are four situations when this is lawful:-

- individuals are in police detention or being held in police custody by the police on the authority of a court[18];
- an individual has been charged or informed that he will be reported for such an

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offence[19], as well as being able to be asked for another sample if the first is inadequate;
- an individual has been convicted of a recordable offence[20];
- an individual has been detained following acquittal on the grounds of insanity or unfitness to plead[21].

As is the case with intimate samples, an officer (the rank is not specified) must give an authorisation for the removal of a sample and the individual must be informed of the grounds for giving the authorisation. The authorisation for taking a sample before a person is charged can only be given if the Inspector has 'reasonable grounds . . . for believing that the sample will tend to confirm or disprove involvement in a recordable offence'[22]**.** The individual must also be informed before the sample is taken that the profile may be used in a speculative search. An example of a speculative search is when the profile is matched against profiles from unsolved crimes. Reasonable force may be exercised by any constable to remove a sample. All of these procedures must be fully recorded as soon as practicable. This means that although someone may have been arrested for an offence, but not charged or found guilty, speculative searches will still be run on a regular and often weekly basis, using the individual's profile. This gives the police wide powers to acquire DNA samples and explains why the NDNAD is one of the biggest collections in the world, and is continuing to expand.

The recent unreported case of Philippa Jones, suggest that the courts will take action to ensure that samples and finger prints are taken in lawful circumstances.[23] Philippa Jones was a teacher who was arrested but not prosecuted, after being accused of hitting a child with a ruler. She applied to the High Court for a declaration that the taking of her DNA sample after the Crown Prosecution Service had decided not to prosecute was unlawful. Her solicitors argued that Ms. Jones's DNA sample had been taken when she was not lawfully detained, but was under false imprisonment. The custody officer should have authorised her release after the decision had been made not to prosecute but had failed to do so. Mr Justice Wilkie agreed with this argument and approved a consent order requiring that Ms. Jones's DNA sample, photograph and fingerprints be destroyed and damages paid. The police have played down this unreported decision, but it suggests that the courts are prepared to take action to ensure that the collection of DNA samples is carried out according to the requirements of the legislation.

Another method of obtaining samples that is proving to be very effective for the police is intelligence screening, which is used when a match has not been obtained from NDNAD. To date there have been 282 intelligence-led screens (across England and Wales) and the Forensic Science Service has processed over 80,000 samples.[24] This involves the police asking for volunteers in an area where a serious crime has taken place to come forward and give a DNA sample for the process of elimination. The profiles derived from these samples are not added to NDNAD. The most recent use of this technique was in February 2006, in the search for Sally Bowman's murderer. In the area of South Croydon, 4,000 letters were sent to men aged between 20 to 40-years-old, who either live or work in the area, and were either white or light skinned, asking them to give a DNA sample. According to DCI Cundy, 'Obviously if someone does refuse then each case will be reviewed on its own merits….I'll look at the evidence available, how their name entered this murder inquiry and obviously

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we'll give careful consideration to whether someone should be arrested for Sally Anne's murder.'[25]

Fear that a refusal to participate in the investigation might arouse police suspicion makes the consent quite hollow. A policeman represents the exercise of public power regardless of whether coercive measures are actually used or not. This procedure has become accepted by society. It is difficult to argue against such procedures when they can be highly effective and when there is strong support for measures that seek to prevent or solve crime.

The retention of samples

The growth of the UK National DNA Database is largely due to the changes to the Police and Criminal Evidence (PACE) Act 1994 in 2001,[26] which now allows sample and fingerprints to be retained indefinitely even if an individual is only suspected of an offence. Prior to this amendment, a sample obtained from an individual who was not suspected of committing an offence had to be destroyed once the investigation was concluded. Now, under s.82 (1A) of the Criminal Justice and Police Act of 2001, samples and finger prints from persons who are not prosecuted or who are acquitted of an offence may be retained.[27] Prior to this legislation samples and finger prints were routinely destroyed after an investigation and could only be retained if the individual had been found guilty of an offence. Under this amendment any profile lawfully obtained as a result of a criminal investigation can be kept indefinitely and checked against other profile on NDNAD, as well as the results being able to be disclosed to other persons.

This change in the legislation was subject to legal challenge in the case of *R (on the application of Marper) v. Chief Constable of South Yorkshire*.[28] It was argued that to keep the DNA samples and analysis of individuals who had not been convicted of a crime was a breach of their right not to be discriminated against and their right to privacy (Art. 14 and Art. 8 of the European Convention on Human Rights (ECHR)). The House of Lords final decision found that the amendment by the Criminal Justice and Police Act 2001 did not constitute a breach of Art. 8 or Art.14 of the ECHR. Chief Justice Lord Woolf stated that the Police and Criminal Evidence (PACE) Act 1994:-

> *'represented an attempt by the Parliament to achieve a fair balance between the interests of the law abiding public as a whole and the individual citizen. Where this was the situation, it was important that the courts showed appropriate deference to the body whose decision had the advantage of being able to rely on unimpeachable democratic credentials.'*[29]

The court stated that the amendment was an interference with the privacy rights of Art. 8 but that this was justified because 'Parliament has drawn up a code carefully designed to prescribe that circumstances in which the steps referred to can *and cannot* be taken.'[30] The storage of the samples was seen as being proportionate, as the samples that were retained were limited to those which had already been lawfully taken. Also samples could only used for the purpose of 'prevention or detection of crime, the investigation of an offence or the conduct of a prosecution' under s.82 (1A) of the Criminal Justice and Police Act 2001. The only adverse consequence that

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would affect individuals would be if their samples matched the samples that related to the offence. Therefore any adverse consequences to the individual were not out of proportion to the benefit gained by the public. The end result is samples and DNA profiles can be stored indefinitely regardless as to whether an individual is arrested, yet no criminal proceedings are pursued, or if he or she is found to be innocent of a crime. However these DNA samples and profiles can only used for the prevention, detection of crime, the investigation of an offence, or conduct of a prosecution, as long as they were collected with lawful consent. It has not been tested in the courts as to whether these broad parameters also include research to establish new techniques for DNA analysis or identifying individuals. In the UK there is no longer a distinction between those who are suspected of a crime and those who are arrested, as all samples can be kept indefinitely.

Speculative Searches

Once a sample is analysed and the profile is entered into NDNAD, it can be used by the Forensic Science Service to carry out speculative searches which compare profiles with other profiles, or with information that is held by the police. Speculative searches are a general search through NDNAD to establish whether the new DNA profile matches any profiles from unsolved crime scenes. These searches do not have to be related to the specific offence that the individual may have been detained in the police station for. Whether consent must be obtained for a speculative search depends on whether individuals are suspected of a recordable offence, or if they are arrested on suspicion, charged, or informed that they will be reported of a recordable offence. Individuals who are only suspected, rather than arrested, of committing a recordable offence can only be the subject of a speculative search if they consent in writing.[31] The consent form that is used by the police states that the samples will be retained and the individual cannot withdraw the consent. The individual consents to the speculative search for one situation, and this consent also means that their sample will be kept indefinitely for other searches that may be unrelated to the individual. In contrast, all individuals that have been arrested can have non-intimate samples forcibly taken from them. Intimate samples (which individuals have consented to the taking of) and non-intimate samples can be used for a speculative search and retained indefinitely without consent. Samples can be kept indefinitely even though the individual has not been found guilty by a court and speculative searches are carried out on the profiles on a daily basis. This gives the police wide powers of investigation and the success of matching DNA profiles to unsolved crimes is an incentive to collect DNA samples, which the police have the powers to do.

How can the police access DNA samples held by third parties?

In cases where the police may not get a match with a sample from the NDNAD, they may be forced to seek other sources of identifiable DNA samples. Access by the police to medical information or human tissue held by healthcare professionals, researchers and institutions is not a new phenomenon and there have been a number of reported cases. Guthrie cards,[32] which are an established feature of most affluent countries' health care system, have been used by the police to solve criminal cases. In October 2003, the Guthrie card collection at the Huddinge Hospital, south of Stockholm, was successfully used in the investigation of the murder of former Swedish Minister of Foreign Affairs, Anna Lindh. Similar uses of Guthrie cards have

been made in New Zealand.[33] In 2001, police were granted a warrant to access samples collected by researchers in a Scottish prison, in order to prosecute Stephen Kelly for knowingly passing on HIV to his partner.[34] It is unclear whether this is a growing trend, or whether the police are only accessing such information and samples in high profile cases, and so it is only these cases that come to public attention. The police in the UK do not keep statistics on the type of court orders that are granted and whether these are for access to samples and medical information. To date, no research has been carried out on the extent that collections or other sources of medical information are being accessed by the police.

Guthrie cards are not the only potential source of DNA in this country. In 2000 the Chief Medical Officer carried out an audit of all the body parts and biological samples retained after a post-mortem and held by NHS Trusts and medical schools in the country. This was a response to the scandals at Bristol Hospital Infirmary and Alder Hey Hospital in Liverpool, where children's body parts had been retained after post-mortem for research purposes without consent.[35] This census revealed that there were approximately 54,300 organs, body parts, still-births or fetuses were held by pathology services within the National Health Service which had been collected from 1970 to 1999.[36] Of the 3 million post-mortems carried out in the UK from 1970 to 1999, tissue was also retained from 65% of post-mortems on children, 72% of post-mortems on infants (under 1 year) or stillborn babies, and 39% of post-mortems on adults.[37] However this census does not cover the collection of tissue that is carried out as a routine part of health care and there are no figures available on holdings in the UK. However in the USA it is estimated that 'there are more than 282 million samples are held in the nations' laboratories, tissue repositories, and healthcare institutions.'[38] These collections are growing at a rate of 20 million cases per year.

However, what is probably more useful to the police is the growth of large DNA collections for genetic research. Examples of existing collections are the ALSPAC study[39] and the North Cumbria DNA collection (though this project is no longer being funded).[40] The Medical Research Council, one of the main funders of medical research in the UK, has also provided funding to establish of a system of regional DNA banks as well as the UK Biobank.[41] The UK Biobank will investigate the correlation between genetics, environment and lifestyle as well as individual susceptibility to disease, and will contain DNA samples on half a million people.[42] Many large longitudinal epidemiological studies are now taking DNA samples from participants in order to understand the role that genetics may play in disease. There are also moves to standardise collection procedures and to facilitate data-sharing.[43] No audit has been carried out on the biological samples collections that exist for diagnosis or for research purposes, and there is no clear idea of the extent of these holdings in the UK. Alongside this, routine medical information is becoming more centrally computerised and there is an increase in the type of information generated through treatment and research activities that could be useful to the police. For example, the computerisation and linkage of medical records systems at a national level,[44] increases the amount of comprehensive medical information on patients and the ease with which it may be accessed.

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There is the possibility in the future that such standardised and accessible collections will be attractive to the police, because they will be an easy entry into a comprehensive and useful body of information. In order to gain access to medical information and DNA information in such collections, police could approach the custodian directly or apply for an access order through the courts. In England and Wales, special procedures are required before the police can access personal records or human tissue or tissue fluid which has been taken for the purpose of diagnosis or medical treatment that 'a person has acquired or created in the course of a profession' and are held in confidence. Such records can only be obtained under an access order[45] unless the holder of the records is prepared to hand them over without the order. The object of these provisions is to 'safeguard the confidence of the maker or holder of such material and not that of the suspected person.'[46] In the case of medical information this would protect the health care professional's obligation of confidentiality rather than the patient's interests. The court's interpretation of this provision is that it is up to the professional 'to decide whether he wishes to make this disclosure, bearing in mind the degree of confidence reposed in him.'[47] If the professional did decide to hand over the records to the police without an access order, they could be liable for an action of breach of confidence by the patient. This is unless the breach can be justified – such as for the prevention of serious harm to another.[48] If the professional decides that it is their duty not to breach confidence then the police must apply to the circuit judge for the access order. The professional would then be able to make representations to the circuit judge that an order should not be made. Therefore the effect of the access order is to protect the healthcare professional from any actions for breach of confidentiality through the disclosure of information, or the granting of access to a DNA sample by the police.

The implications of the access order

The effect of the access order is to place a huge responsibility on the professional, who has to decide whether there are valid grounds for appearing before a judge to refuse access to a DNA or tissue sample. The person who has made the donation of DNA for a research project has no involvement in this deliberation. It is not up to the participant in the research project or the patient to determine whether this sample can be used. It is the doctor or researcher who is the gatekeeper in determining whether there will be access. Most research participants will not be aware that the police may be granted access to the research material and findings, as current practice does not include such information as part of the consent process. In contrast, the person who is involved in the criminal process may be more aware of the processes and procedures involved, even though they may not have much choice as to whether the DNA sample is taken from them and used by the police. The fundamental difference is that while someone who has a sample taken for inclusion in NDNAD knows that this will be for broadly defined 'crime prevention', research participants are not necessarily aware that this could also be the use of the information and samples given for the purpose of medical research. Both situations reflect the fact that 'crime prevention' in our society has been given a high priority and that there are wide powers given to the police for crime prevention.

It is also unclear whether healthcare professionals and researchers are aware of their rights and responsibilities in regard to court orders to access DNA samples in their

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custody. There may be cases where people comply with a police request because they are not aware of their legal rights and responsibilities, and the possibility of appearing before the court to argue against an access order being granted. While most researchers would want to co-operate with police, there may be other cases where this is regarded as a breach of confidence and that the justification in releasing the DNA sample or information may not be warranted. The benefit of the access order is that any reasons for not wanting to comply with police requests can be put before a judge to decide. In contrast, if DNA samples are collected by the police it is not a requirement of the procedure to have this reflection from a judge. If the removal of a DNA sample is approved by a senior officer then there is nothing that the individual can do about it, unless it is found to be unlawful. Very little is known about whether healthcare professionals are aware of their legal responsibilities, and if this is a common occurrence, as there has been little research done on this issue and statistics are not kept by the police.[49]

USA Certificates of Confidentiality

In the USA concern about the privacy of research participants and the integrity of researchers has led to the establishment of 'certificates of confidentiality', which have been developed by the National Institute of Health in the USA. Researchers can apply for a 'certificate of confidentiality' from the National Institute of Health which will 'protect the privacy of research subjects by protecting investigators and institutions from being compelled to release information that could be used to identify subjects with a research project.'[50] Certificates of confidentiality 'allow the investigator and others who have access to research records to refuse to disclose identifying information in any civil, criminal, administrative, legislative, or other proceeding, whether at the federal, state, or local level.'[51] In this context 'identifying information is broadly defined as any item or combination of items in the research data that could lead directly or indirectly to the identification of a research subject.'[52]

The aim of the certificates is to protect the privacy of participants in research studies in order to encourage participation in research. In the USA much of the rationale for introducing the certificates was based on a concern that if such protection was not given, then people from marginalised groups in society would be deterred from participating in research projects. The certificates can be used for biomedical, behavioural, clinical or other types of research that is sensitive. 'By sensitive, we mean that disclosure of identifying information could have adverse consequences for subjects or damage their financial standing, employability, insurability, or reputation.'[53] The guidance stipulates that sensitive research activities would include collecting genetic information and its storage for long-term use. All personally identifiable information maintained about participants in the project while the certificate is in effect is protected in perpetuity. The protection afforded by the certificate is permanent.

Should we be thinking about 'certificates of confidentiality' in the UK?

Currently, we can only speculate that police do not seek access to DNA samples held by researchers through an access order. However as we see the build up of collections through the greater funding of genetic research and the standardisation of procedures,

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in order to allow the sharing of samples of information and samples between collections, we may see this situation change. Such collections may be useful to police when they have exhausted the NDNAD, or they wish to verify, or check evidence that they may have. It is such situations in the future that must be considered, and researchers should think through the eventualities and procedures that must be followed if they are to be presented with a request for access from the police. Such a request clearly has implications for the relationship between the healthcare professional and the individual. Seiden and Morin argue that if the privacy of the patient should be considered less important than society's interest in solving and preventing severe crimes, the role of healthcare personnel as gatekeepers must be fully recognised in the law.[54] In the UK this is recognised in the law, as there is an opportunity to appear before a judge in order to argue whether an access order should be granted. However, my concern is that there may not be appropriate legal and ethical support or procedures in place within institutions to deal with such an eventuality. Therefore, in future, professionals may find themselves ill-equipped to deal with a police request and the issues that it raises. While an access order recognises the role of the healthcare professional as a gate-keeper it does little to recognise that the DNA sample comes from an individual, who may also have legitimate concerns – unrelated to concerns about being found guilty of criminal activity – about whether the police should have access to such samples or information.

Certificates of confidentiality offer a mechanism that protects researchers and research participants by refusing access to research that is regarded as especially sensitive, such a genetic research. As large sample collections are built up and medical information can be linked, integrated and interrogated with greater ease, this may become more of an issue in the UK. At the current time there is too little information on how access orders are being used and whether this is an issue for healthcare professionals in particular. It is also evident that the protection offered to research participants is currently outweighed by the public interest in preventing crime. We do not want to reach a situation where our research collections have inadvertently become extensions of the NDNAD, without there having been a debate on this issue and consensus that this is an appropriate development in a civil society.

[1] There are a number of pieces of legislation that have supported the establishment of the NDNAD. As well as PACE, these are the Criminal Justice and Public Order Act 1994; Criminal Evidence Act 1997; Criminal Justice and Police Act 2001; Criminal Justice and Police Act 2003 and the Serious Organised Crime and Police Act 2006.
[2] This National DNA Database (NDNAD) is run by the Forensic Science Service under the control of the Home Office for the Association of Chief Police Officers (ACPO).
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[5] Johnston, P. (2006) Huge rise in juvenile DNA samples kept by the police. Telegraph News 09/01/06 http://www.telegraph.co.uk/news/main.jhtml;jsessionid=W1OL4PEVEXQ5PQFIQMFCFFOAVCBQYIV0?xml=/news/2006/01/09/ndna09.xml (Accessed 05/04/06) and also G. Langdon-Down. DNA

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[9] S. Bhattacharya. Killer convicted thanks to relative's DNA. 20 April 2004 NewScientist.com news service http://www.newscientist.com/article.ns?id=dn4908 (Accessed 22/02/06).
[10] A. Jha. How DNA may tell police the surname of the criminal. The Guardian 22/02/06; 6.
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[12] s.65 (1) Police and Criminal Evidence Act 1984
[13] Under the Police and Criminal Evidence Act 1984 s.27 (4) a recordable offence is one which carries a sentence of imprisonment.
[14] s.62 (5)(b)(i) (ii) Police and Criminal Evidence Act 1984.
[15] Ibid s.62 (7A).
[16] Ibid s.62(1A).
[17] Ibid s.62(10).
[18] Ibid s.63 (3)(a).
[19] Ibid s.63(3A)(a).
[20] Ibid s.63 (3B) Police and Criminal Evidence Act 1984. This provision also allows an individual convicted of a recordable offence to be attend a police station to have a non-intimate sample taken, if this did not happen at the time.
[21] Ibid s.63 (C) Police and Criminal Evidence Act 1984.
[22] Ibid s.63 (4) Police and Criminal Evidence Act 1984.
[23] *Jones v Chief Constable of West Midlands Police*, The Times, 24/03/06.
[24] FSS. Fact Sheet Intelligence-led Screens. FSS website http://fss.humid.e-symposium.com/Intelligence_led_screens.doc (Accessed 27/02/06).
[25] BBC News. DNA screened in model murder hunt. BBC News website (Accessed 24/02/06). http://news.bbc.co.uk/1/hi/england/london/4743760.stm (Accessed 27/02/06).
[26] PACE was amended by the Criminal Justice and Police Act 2001 in order to bring about these changes.
[27] Annex F destruction and speculative searches.
[28] [2003] H.R.L.R. 1.
[29] Ibid Lord Woolf C.J. at para 16.
[30] Ibid Lord Woolf C.J. at para 24.
[31] s.63(2) Police and Criminal Evidence Act 1984.
[32] A blood sample is taken from a heel prick of babies shortly after birth to test for a number of conditions which has resulted in comprehensive collections of stable blood samples that are stored for a number of years. The Guthrie Card system was originally devised to test for PKU (Phenylketonuria, an easily curable enzyme- disorder of the liver) and is now a routine feature of most modern healthcare systems.
[33] In the New Zealand High Court decision of *H v G* (2000) 18 FRNZ 572, the police were granted access to a PKU collection in order to solve a murder case.
[34] *Her Majesty's Advocate v. Stephen Robert Kelly* [2001] ScotHC 7 (20th February, 2001).
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39 The Avon Longitudinal Study of Parents and Children (also known as Children of the 90s) is based in the University of Bristol. "It enrolled 14,000 mothers during pregnancy in 1991-2 and has followed the children and parents in minute detail ever since. Over the last 12 years the study has collected half a million biological samples from parents and children, everything from placentas to milk teeth." The study has now collected blood samples and cell lines will be developed from them. (Accessed 15th December 2003 www.alspac.bristol.ac.uk).

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[47] *R v Wayne Singleon* [1995] 1 Cr. App.R. 431,439.
[48] *W v Edgell* [1990] Ch 359, 2 WLR 471.
[49] Personal communication with the Data Protection Officer, Thames Valley Police, Kidlington, August 2005.
[50] USA National Institute of Health website http://grants1.nih.gov/grants/policy/coc/ background.htm> (Accessed19/03/04).
[51] Ibid.
[52] Ibid.
[53] Ibid.
[54] Samuel C. Seiden & Karine Morin, The Physician as Gatekeeper to the Use of Genetic Information in the Criminal Justice System, 30 J.L. Med. & Ethics 88.

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First Impressions Count: Serious detections arising from Criminal Justice Samples

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Abstract

DNA samples on the England and Wales national database matching those found at scenes of serious violent or sexual crimes were identified. The earlier offence leading the sample to appear on the database was noted. The bulk (60-84% according to inclusion criteria) involved theft, drug or other offending. The result, indicating offender versatility, is consistent with most research on criminal careers. Its importance for operational police lies in identifying the contribution made by DNA samples taken after less serious offences in clearing subsequent serious crime, and the importance of taking such samples from as wide a list of apparently 'trivial' crime types as possible. Examining specific relationships between early and later offences revealed a significant link between providing a DNA sample following a drug offence and subsequently committing murder.

Background

In little under two decades, the use of DNA in the investigation of crime has become widespread. Since Sir Alec Jeffreys and colleagues pioneered what was first known as genetic fingerprinting[1], advances in technology have allowed DNA profiling to be carried out at high speed and volume, at lower cost and with smaller crime scene samples, making its wider use in crime detection increasingly viable and appealing.

The England and Wales National DNA Database (NDNAD) has been impressive in scale, speed of development, and the protections it affords against false matches.[2] The technique's potential was anticipated from an early stage and received significant Government support. Large investments were made in populating the NDNAD[3] and legislation was introduced to facilitate sampling as many of the offending population as possible[4]. By increasing the number of putative offenders from whom samples are taken (hereinafter Criminal Justice samples), the probability of samples taken from scenes of crime being matched will increase. This will come to be limited primarily by the turnover of the active offending population, ie the rate of which people begin and end their active offending career.

The Home Office DNA Expansion Programme was launched in 1999, funded with £182 million between April 2000 and March 2004[5]. The 1994 Criminal Justice and Public Order Act had previously enabled the police to take non-intimate samples without consent from all those charged with (not necessarily arrested for) any recordable offence. The Act also reclassified a mouth swab as non-intimate, thereby removing the need to involve medical professionals for sample collection. Additionally the growth of the NDNAD was facilitated by powers introduced in the Criminal Justice and Police Act 2001 (CJPA) allowing retention of samples from persons who were not prosecuted or who were acquitted, providing such samples had been obtained lawfully in the first instance.

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Since the first record was entered in 1995, the NDNAD has grown to over 3 million entries by November 2005[6]. With the 'active criminal population' in England and Wales estimated at 2.6 million people[7], the magnitude of the achievement is undeniable, although the notion that this means that all of (or more than?) the active criminal population features on the database would be a substantial overestimate, because of the churn rate referred to above.

Criminal Careers and Crime Switching

The term 'criminal career' refers to the offending trajectory of criminal behaviour, and its consistency and variation between and within offenders. The pertinent research literature deals with questions such as: Why do some people desist from crime and others continue? Are there people who do not stop offending at any stage of their lives? How does age and length of offending affect what crimes are committed? Such questions are relevant to operational policing because they allow a detailed picture of the active offending population to be developed. Individual criminal careers are described in terms of a number of dimensions, notably length, offending rate, and offending patterns (primarily versatility and escalation). Combinations (long or short careers, high or low offending rates, specialisation or versatility) produce diverse patterns at the individual level. This information has the potential to inform strategy. For example, the estimated size of the offender population and the offending patterns within it should favour certain crime control strategies over others. If the offending population were relatively small but those active remained so over substantial periods of time and offended at a high rate, then the targeting of individuals by police would be an appropriate tactic. If the offending population were large and comprised people committing only a couple of offences each, preventive approaches would be more attractive. Of course the real world will contain a mixture of 'types', but their relative size will favour some reduction strategies over others.

Understanding of criminal careers has traditionally been acquired through analysis of convictions and other official processing of offenders. DNA affords another window on criminal careers, with some disadvantages relative to the conventional approach, but with advantages, for example the possibility of including 'prolific unknowns' i.e. those whose DNA is found at many crime scenes but not in the NDNAD, and looking at residual career lengths of those never arrested[8]. In this brief paper, an attempt is made to use DNA sampling to address the issue of offender specialisation and its policing implications.

The simplest way of addressing offender specialisation/versatility using NDNAD is to compare the offence which resulted in an offender having DNA taken (the Criminal Justice sample) with the offence at which matching DNA was subsequently found. If the two offences were always the same, specialisation would be total (within the limits of the data). If the two offences were no more alike than a pair taken randomly, one from Criminal Justice samples, and one from crime scene samples, then versatility would be total, again within the limits of the data.

Recent analysis of DNA matches in England and Wales seems to suggest that offenders are, to a substantial degree, versatile in their offending behaviour. In 2002-2003, eighty percent of matches for Criminal Justice samples related to offences that

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were different from the initial arrest offence for which the Criminal Justice sample was taken[9]. This may overestimate offending versatility. For example if the offence leading to a Criminal Justice sample being taken is Burglary in a Dwelling, and matching DNA later found at the scene of an offence categorised as Burglary Other, the two offences, because falling in different Home Office recording categories, would count towards versatility and away from specialisation, although most people would regard such an offender as a somewhat specialised burglar. It would be very instructive if the data could be presented as a full matrix of pairs. This would then allow both a view of versatility less obscured by categorisation, and calculation of a baseline of total versatility.

Having noted the potential of NDNAD in looking at offender careers, and that it has so far been scarcely realised, it must be asserted that previous research of the more conventional kind establishes a high degree of versatility in most criminal careers[10, 11, 12, 13]. Although debate exists about the precise level of specialisation exhibited by offenders, the degree of their versatility in both offence and method is substantial[14]. It is difficult to overstate the implications of this for the targeting of prolific offenders, by forensic and by other means. Insofar as offenders are versatile, detection in one offence offers an opportunity for detection in subsequent offences of other types. The evidence for this comes from the detection of notorious offenders – for example the highwayman and murderer Dick Turpin was brought to justice for poultry theft![15] It also comes from research showing the high proportion of those committing trivial offences who are also involved in more serious offending[16, 17]. Schneider[18] identifies the high rate of self-reported shop theft amongst active burglars. Wellsmith and Guille[19] (2005) show the levels of active criminality in a sample of those repeatedly subject to fixed penalty notices. Rose[20] found little evidence of specialisation amongst serious traffic offenders, compared to mainstream offenders. Further, Sugg observed a wide range of ancillary offending (pre- and post-conviction) for attendees of probation motoring programmes[21]. In work highly relevant to the context of this paper, Frederick et al. [22] examined the impact of expanding the Offender Index (equivalent to UK's Criminal Justice samples) of New York State. They found, regardless of the severity of an individual's first adult offence, a high degree of versatility for all but a minority of offenders

There is an urgent need to begin looking at exactly what types of crime are linked with serious offending. Are there indicator or precursor minor offences? If so then how can this knowledge be used to greater effect? The questions we propose to address are the following:

What other types of crime do offenders committing a serious offence also commit? What implications does the resolution of that question have for the practice of taking DNA samples from those coming into contact with the criminal justice system as putative minor offenders?

It is probably worth emphasising that the purpose of this modest research is not to demonstrate any kind of Markov-type property in crime switching patterns[23], as useful as that assuredly is. Rather, we wish to explore in a very simple way the potential power of consistent and vigorous use of Criminal Justice sampling powers by police officers with a view to best enabling detections of serious offences. This

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paper sits alongside the findings of Soothill et al.[24] which quantify the relative risks of convictions of very serious offences based on prior convictions of a range of offences.

Data

We obtained data on all solved serious offences within the Metropolitan Police Service (MPS) jurisdiction for the calendar year 2003. The offence types were all cases of murder, manslaughter, attempted murder, sexual offences, rapes and various types of robbery. This amounted to 9424 criminal matters. These events will be termed *index offences* in what follows.

Of these 9424 index offences, some 11 percent yielded a crime scene sample which could be matched with an offender on the National Database, i.e. where a Criminal Justice sample had been taken at an earlier time, some 1003 index offences in all. The earlier event which led to the taking of a Criminal Justice sample will henceforth be referred to as the *precursor event.* Matching Criminal Justice samples from precursor events after April 2000 to index offences could be performed very quickly. Those precursor events collected before April 2000 were stored on a separate database, and their extraction would have been extremely time-consuming, particularly for an unfunded study such as the one reported here. It was thus decided to use only those observations with a precursor event Criminal Justice sample collected after April 2000. The resulting sample size came to 492 index offences.

The data fields obtained from the MPS included information about each index offence: the c*rime reference number*, *specific offence*, *crime typ*e, *occurrence date* and *police beat*. For every record the precursor event that was the origin of the corresponding Criminal Justice sample was recorded. Entries in the *specific offence* field relate to the actual charge as legally defined in legislation. The *crime type* field groups charges into broad categories consistent with Home Office counting rules. Even though *crime type* is primarily an administrative field it was used for this analysis in order that research findings could be interpreted by police officers and analysts consistent with their systems. Had another typology of aggregated offence types been developed, the practitioner audience may have difficulty generating the same relationships observed here.

A few points about these data are worth making. First, there was no information about location and dates for the precursor offences. It would have been desirable to determine spatial patterns between precursor and index offences, but the data precluded this avenue of analysis.

Second, links between index offences and precursor offences could only be supplied for precursor offences recorded after April 2000. As Criminal Justice sampling, in principle, is meant to follow an individual's first detected recordable offence, the conclusions reached are limited to those with short criminal careers to date. The longest career represented in these data will be around three years. The study thus focuses on detections achievable by Criminal Justice sampling *in the short term*. This is important in its own right. Detections achieved in the longer term should also be researched.

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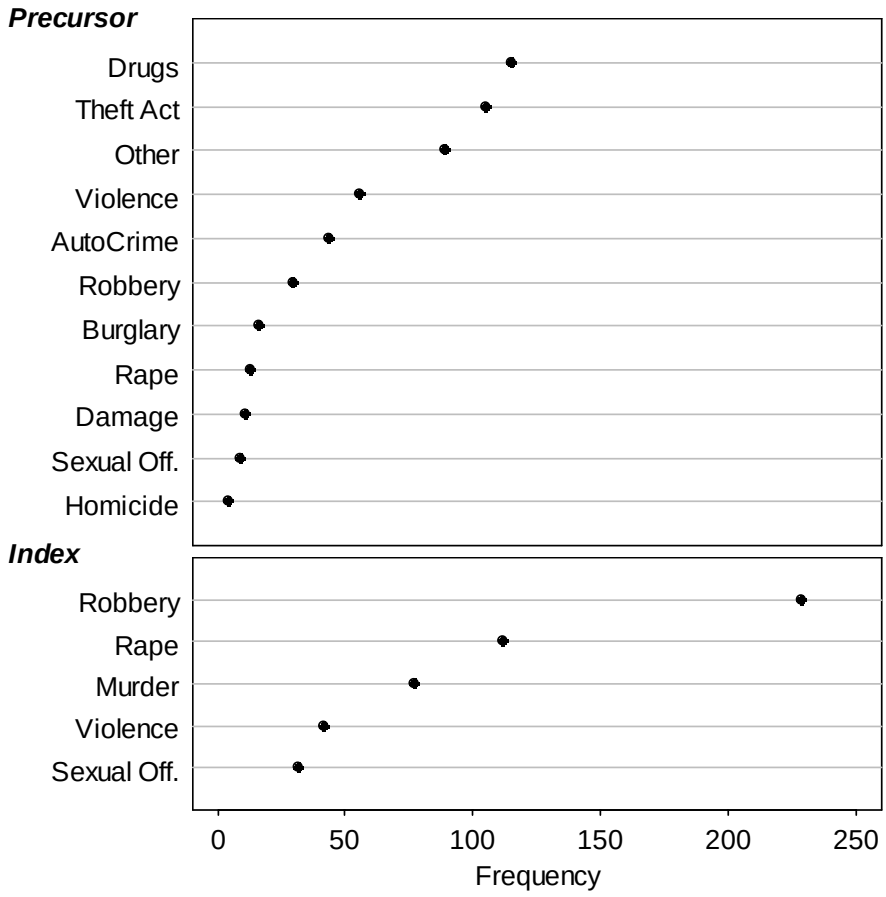
Third, it would be desirable to comment on and control for the Criminal Justice sampling rates of different offence types. This may influence patterns observed for precursor offences with low Criminal Justice sampling rates (due to most arrestees having been sampled for a previous offence, say). While feasible, scrutinising the Criminal Justice sampling rate was beyond the scope of this study.

The last qualifier about these data is that we have no information about the details of individual offences, apart from their type. Thus, we cannot make any inferences about variation in the level of seriousness of index offences according to precursor offence type. Given that all the index offences are serious, this is not of immediately crucial importance, but should be explored in future work.

Analysis

The first step was to calculate the frequency distribution for the index and precursor offence types separately. The resulting distributions (see Figure 1) showed an uneven distribution for both, reflecting that some offences are more common than others[25]. Of the eleven possible offence types for precursor events, four categories were responsible for approximately seventy-five percent of the respective distribution. Precursor offences represent a wider range of criminal behaviour than index offences as the latter are, by definition, restricted to a subset of all potential criminal activity, whereas precursor crimes are not constrained in a similar way.

Figure 1 – Precursor and Index Offence Frequencies



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It is apparent that the distribution of incidents for the index offences is skewed towards a couple of categories. It is worth pointing out that the observed distribution relates to detected crime, not recorded crime, hence the reason that there were so few violent crimes observed in the data. Due to the small observed frequency for 'Other Sexual Offences', it was decided for the remainder of this analysis to collapse this category with 'Rape' and label these observations 'Sexual Offences'.

The next step involved cross tabulating precursor by index offences. The results showed a number of low row and column totals and a large number of empty cells. Given that a fifth of the cells had no observations it was decided to only include the four most prevalent precursor events (drugs, theft act, other[26] and violence). This diminished the sample size to 365 index offences, a loss of twenty-seven percent of the sample. The contingency table is displayed in Table 1.

Table 1 – Joint frequency distribution of Precursor and Index offences

		Index				
		Murder	Robbery	Sexual Offences	Violence	Total
Precursor	Drugs	29	49	26	11	115
	Theft Act	10	59	27	9	105
	Other	16	32	31	10	89
	Violence	7	25	19	5	56
	Total	62	165	103	35	365

The distribution presented in Table 1 allows a conventional chi-square test of independence to be performed, that is whether the distribution of index offences is dependent on the distribution of precursor offences. However, even if the null hypothesis of no dependence is rejected, it is far from clear how the relationship between the two variables influences the magnitudes of the cell frequencies. Typically we would be interested in which cell combinations deviate from expectation by a substantial amount and in which direction. Cells 'of interest' can only be identified in a post hoc manner as the p value produced by a chi-square test only takes us so far.

To aid interpretation we visualise the bivariate distribution using a *mosaic* plot in Figure 3. Mosaic plots are merely a graphical representation of a contingency table that are easier to interpret and more informative than a contingency table coupled with a p value from a chi-square test. In effect mosaic plots are an extension of grouped bar charts[27, 28]. Mosaic plots consist of tiles, representing individual cells, having areas proportional to the cell counts in the original table. The plot is constructed in the following way: begin by splitting a unit square into horizontal bars with heights relative to the marginal frequencies of one factor. Figure 2(a) depicts this stage (verified by observing from Table 1 the relative differences between the marginal totals of the precursor offences). The next stage involves splitting each horizontal bar vertically according to the frequencies of the second factor. In other words, the vertical splits are based on frequencies of the second factor *conditioned on the first*. Due to this conditional splitting property, the tiles will only be aligned vertically if the two factors are independent. Figure 2(b) shows the second phase of splitting, in this case using the marginal frequencies of the second factor (index offences). This depicts a joint distribution identical to the expected distribution, which is logical as

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we have not yet conditioned by either factor. If the vertical splits were calculated using conditional proportions and they were identical or thereabouts to the marginal proportions then: (i) conceptually this would be weak evidence against the null hypothesis of no dependence and (ii) visually the tiles would be aligned with each other.

Figure 2 – Mosaic plots showing marginal splits of (a) precursor events only and (b) precursor and index events

(a) (b)

Friendly[29] extended the application of mosaic plots by shading and bordering tiles according to the magnitude and sign of residuals at the cellular level.

Figure 3 displays the mosaic plot of index offences by precursor events. The area of the tiles indicates the cell frequency relative to the sample size. The tiles' border (solid or dashed) indicates the sign (positive or negative respectively) of the residual for each cell and the shading indicates its magnitude. Here, the standardised Pearson residual[30] has been used to compute individual cell deviations from expectation. They are normally distributed so that values greater than absolute two are statistically significantly different at $p<0.05$.

Taking the top row of tiles, corresponding to the precursor offence of Drugs, we can see it is relatively thick compared to the other categories (from Figure 1 we can verify it is in fact the most common precursor offence). Four tiles make up the Drugs row. The largest of which corresponds to Robbery offences (located second in from the left) and accounts for a sizable proportion of Drug offenders. The border of the tile is dashed, indicating the observed frequency for the cell, although large, was less than the expected frequency. Finally, the shading the cell (grey) combined with the legend indicates the standardised residual for this cell lies somewhere within two standard deviations of zero.

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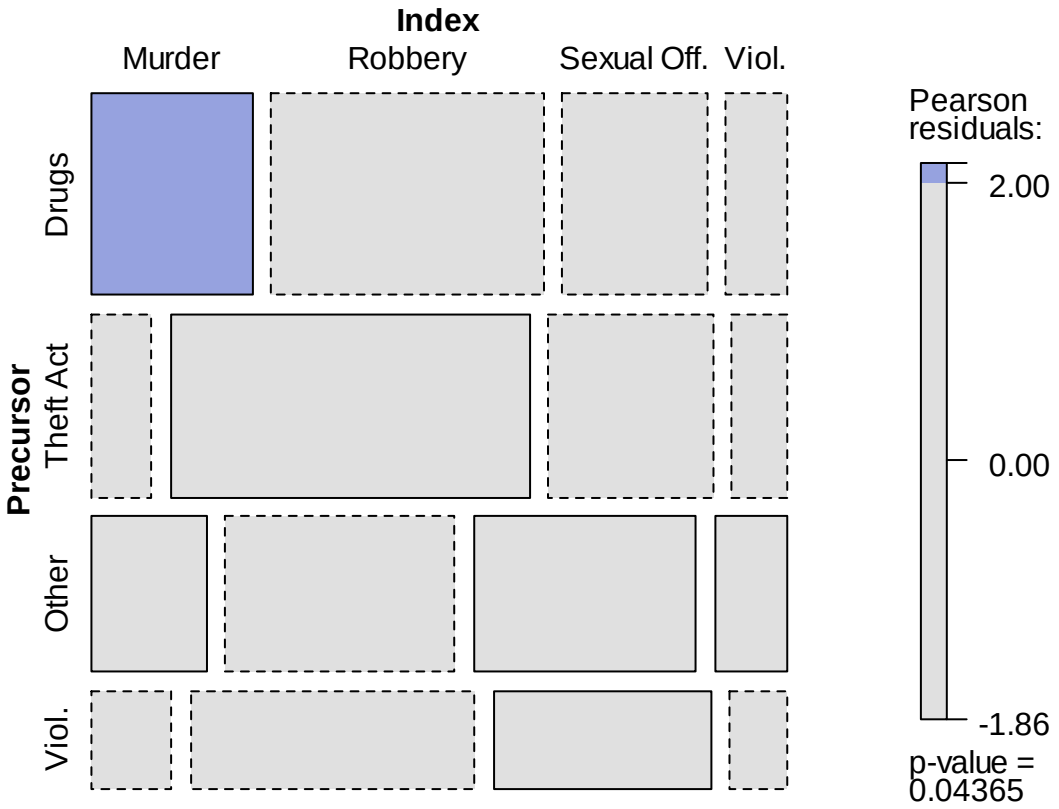
Figure 3 – Mosaic of Index Offence and Precursor Event combinations.



The index-precursor mosaic has a number of remarkable features. Overall there was moderate evidence of a relationship between precursor and index offences (χ^2=17.3 (d.f.=9), p = 0.044). This is reflected in Figure 3 by the observation that the tiles do not align vertically. The second point is that the bulk of precursor events (60%) were for drug and theft offences, evidenced by the proportion of the plot taken up by the tiles within the top two rows. The same figure using all precursor events (i.e. those shown in Figure 1) is nearly forty-five percent. This dramatically illustrates the point about offender versatility. It means that the bulk of DNA evidence used to detect serious violent and sexual offenders will come from matches taken following theft or drugs offences. Including the 'Other' category boosts the figure to eighty-four percent for the data used in Figure 3 and sixty-three percent including all cases. More dramatically, the proportion of cases where the precursor event was the same as index offence (ie offender specialisation) was only about ten percent.

This does not mean that no specialisation is evident in the data. To know this one would need to know the sampling fraction for taking DNA samples for each precursor event type. However it does mean that the absolute majority of DNA evidence in serious cases as defined here results from taking swabs from the perpetrators of other

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offence types. In our view it strongly supports the case for taking Criminal Justice samples as widely as possible.

While Figure 3 shows the general picture linking precursor and index offences, it also allows us to go further and look at particular individual associations evident in individual cells. Only one cell (murder-drugs) had a standardised residual greater than absolute two, although there were two other cells (murder-theft and robbery-theft) with substantial residuals significant at the 10% level. The remainder of cells (13) had residuals of trivial magnitude.

Arrestees for precursor drug offences go onto murder at significantly higher numbers than expected, accounting for *nearly half* of all detected murders. One plausible reason for this may be that the murders are drug related; if the precursor offence indicates participation in the supply of controlled drugs then the consequential commission of murder, while not normal, is not unexpected. Unfortunately, the data available for this analysis do not allow the testing or even the exploration of this explanation. What type of drugs offences (possession, supply or production) or murders (drug-related, gang-related, intimates) these represent is unknown[31]. Further research on the topic would be valuable, but as a preliminary indicator the vast majority of drug offences detected by MPS are for possession (approximately eighty percent for 2004/05). If this relationship holds for the Criminal Justice samples used in this analysis, then it would suggest against an explanation of murders directly related to drug dealing.

Regarding the murders, all homicides in the MPS are the remit of the Serious Crime Group, the investigative unit housing, among other things, Operation Trident[32]. There is no way of telling from these data what types of murders these represent. One way to explore this further would be to compare the composition of murder categories[33] by the different Criminal Justice sampling offences as well as all murders. If there were a greater number of Category B murders linked to precursor drug offences compared to other Criminal Justice sampling offences, then the high number of murders linked to earlier drug offences could be explained by occupational (drug dealing) risks. Unfortunately this information was not able to be provided by the MPS.

Sensitivity analysis

In order to determine if the standardised residuals for the murder-drug, murder-theft and robbery-theft cells (the only cells displaying substantial residuals) are linked in some way, a sensitivity analysis was performed (for details see the Technical Note at the end of the paper). The objective is to observe whether changes in frequencies of certain cells generate high residuals in other cells.

The first cell selected was the murder-drug combination. By controlling for the high murder-drug frequency, the residuals for murder-theft and robbery-theft were diminished such that they were no longer statistically significant. The next residual to be scrutinised was that associated with the murder-theft cell. The impact of adjusting the observed murder-theft frequency was that the robbery-theft residual was no longer significant at the ten percent level, but the murder-drugs cell was (just). Finally, manipulating the robbery-theft frequency impacted the residual of murder-theft so that it was no longer significant at any level, but murder-drugs retained a high positive

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residual, significant at just over five percent. Table 2 displays the results of the sensitivity analysis. Pearson residuals have been converted to p values, to aid in interpreting to significance level of high magnitude residuals.

Table 2 – p values of cells due to sensitivity analysis

	P values of Pearson residuals		
	Murder-Drugs	Murder-Theft	Robbery-Theft
Observed	0.03	0.06	0.09
Controlling for influence of:			
(i) Murder-Drugs	0.36	0.17	0.14
(ii) Murder-Theft	0.10	0.93	0.19
(iii) Robbery-Theft	0.05	0.12	0.29

To summarise the results of the sensitivity analysis, the frequency of murder-drugs combinations appeared to 'produce' the low murder-theft frequency, which in turn served to inflate the significance of the robbery-theft combination. It appears that the excessive murder-drugs frequency is a stable feature of the relationship between precursor and index offences, over and above manipulations of other offence combinations. Other apparent links between precursor and index offences depend on the drugs-murder combination.

Discussion

The analysis presented shows first and foremost that the offender versatility found in other criminal career research is reflected here. The central and in our view important finding is that taking Criminal Justice samples from theft and drug offence arrestees has a higher payoff in absolute terms in providing evidence in later cases of serious violent and sexual offences than does taking them from earlier offences of violence. This does not mean that the per case benefit is greater, simply that at the levels at which samples are currently taken by offence type, more later evidentiary benefit is gained from prior theft, drug and other offences than from prior violent or sexual offences. The implication of the study is believed to be that opportunities to take Criminal Justice samples in less serious cases should never be foregone, since they provide the bulk of DNA evidence in later serious offences. The deterrent effect of the buccal (mouth) swab should also not be understated, and its extent should be quantitatively researched.

A secondary finding of the study speaks to the more specific links between detected crime types. These observations are not of profound relevance in their own right. What makes them notable is that they offer an insight as to how unsolved crimes may be tackled through efforts in detecting other crime types. Criminal Justice sampling facilitates crime detection in a proactive sense by providing the immediate ability to test crime scene samples against a database of known individuals. There was a relationship between individuals arrested for drug offences and murderers and this was greater than we would expect by chance. This offence combination appeared to explain virtually all of the dependence observed between precursor and index offences. Once the murder-drug effect was accounted for the other relationships diminished. The interesting aspect of the murder-drug observation is that drug

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offences are the only precursor crime category not associated with a detection rate (in that the total number of drug offences are not known or reported in a similar fashion as burglaries or assaults are), but we argue that it probably reflects police attention. A number of explanations present themselves. First, it could simply be that the murders are drug related in the sense that involvement in the drugs industry is dangerous. Another possibility is that drug offenders who go onto murder are the extreme result of a labelling phenomenon[34] although why that should be especially so for drug offenders is difficult to state. A third possibility is that attributes associated with drug offending above the threshold at which it comes to be officially processed may be associated with murder via the linkage of both with impulsivity. Qualitative study of, and interviews with, the substantial numbers who present with the precursor-index link of drug offence and murder seems worthwhile.

The major qualifier for these results is that the data used for this work only considers relatively short career lengths (three years at most). This is a considerable weakness in the sample. It is highly likely that the individuals with serious offence detections are those who have long careers. The most versatile, prolific and serious offenders are most likely to have been excluded from our sample. This could easily be circumvented by expanding the search criteria in a more ambitious study. If this comment is well-founded, it may suggest that the central finding, of the relevance of less serious precursors to more serious later offences and the consequence of maximising DNA capture in the solution of serious crime, is conservatively stated here.

Despite the uncertainties surround the data, the results indicate some promising directions for operational policing. They encourage police to take Criminal Justice sampling seriously and point to the wider benefits of increasing detection rates for volume crime. More certainty of the impacts of volume crime detections could be gained by taking a more longitudinal approach and considering a more representative sample. A research programme to develop the approach mooted here could offer substantial benefits in understanding and practice.

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Technical Note: Sensitivity Analysis on a Contingency Table

The procedure used here involves determining which cells, or factor combinations, display frequencies excessively high or low compared to the expectation level. The rationale comes from three observations as to the nature of contingency tables:

Extreme values within a cross tabulation have the ability to skew expected cell frequencies of the entire table. This is because the row and column totals, derived from the observed distribution, form the basis of determining the expected distribution. The row and column totals of an extreme value cell will become elevated (or diminished), thus raising (or lowering) the expected frequencies for *all* cells that share a row or column with the extreme value cell. The expected

frequencies for cells not sharing a row or column with an extreme value are skewed in the opposite direction.

In order to discern other patterns in the observed distribution, the influence of extreme value cells needs to be neutralised. A relative measure of the influence of any cell to the rest of the table is the standardised Pearson residual (which is just the square of the cell's χ^2 component). The significance of a cell's observed frequency can be assessed by the magnitude of its residual (anything greater than absolute two indicates deviation from expectation at the five percent level).

Artificially altering the observed distribution so that the influence of extreme values is negligible would reduce the skewness inherent in the expected distribution and therefore allow residuals for the remainder of the table to be scrutinised while "controlling" for extreme values.

In order to discern the structure of dependence in the contingency table, cells with large absolute standardised Pearson residuals are selected and artificially altered so that their residual is less than absolute two. The resulting observed distribution is scrutinised, through calculating residuals, for remaining patterns of dependence. Cells with a standardised residual greater than absolute two are of interest here. If none exist, one could infer that any patterns present in the original observed distribution were generated by the extreme value. Cells with high residuals after extreme values are controlled for represent factor combinations which are significant over and above the influence of the extreme value.

It is possible that pairs of cells may display a reciprocal relationship, so it is important to repeat the exercise by altering other cells. We would expect that cells displaying large absolute residuals post adjustment to be evidence of real relationships.

This type of analysis can be easily implemented in a spreadsheet application. The observed, expected, residuals and χ^2 scores can be displayed using embedded formulae from the observed table. Thus, the impact of manipulating the distribution can be scrutinised directly. Different cells can be selected until the user has a good understanding of how or if the bivariate distribution deviates from expectation.

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Bar-coded children: an exploration of issues around the inclusion of children on the England and Wales National DNA database

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Abstract

The forensic database of England and Wales is the largest in the world with profiles from over 3 million people. Samples can be taken without consent, not only from convicted criminals, but, also from all those arrested on suspicion of a recordable offence even if they are not subsequently charged. There has been little public debate on the database, in contrast to other applications of genetic technology, and, in particular, a lack of discussion on the inclusion of children despite the UN Convention on the Rights of the Child and the debate around children's consent. The paper begins by briefly introducing the significance of the inclusion of children on the England and Wales National DNA database (NDNAD) in the context of current law. Next there is a report of the findings of a small focus group study carried out with children aged 10-12 and one of their parents, who were contacted through their schools. The study explored issues related to the inclusion of children on the NDNAD, including children's responsibility and independence, and gathered responses to real life case studies about the taking of DNA samples from children. These findings are used to *further* support multi-disciplinary arguments on why the inclusion of children, between the ages of 10-12, may be considered controversial.

The law and the National DNA Database

The National Police DNA database in England and Wales has been steadily growing and is the biggest in Europe with over 3 million samples.[1] There are at least 750,000 juveniles age 10-17 included (230,000 were added in 2004-05).[2] Under the current law in England and Wales, DNA samples can be taken from anyone arrested in connection with a recordable offence, without their consent. Recordable offences cover most criminal offences including offences under the Public Order Act.[3] This has changed since 1984 when bodily samples could be taken only from those suspected of 'serious arrestable offences'.[4] These samples are kept permanently and the DNA profiles and some personal data are entered on the National DNA database even if the person is never charged or is subsequently acquitted of the offence.[5] The data from these people is subject to speculative searches for matches with samples from crime scenes in the same way as the profiles from convicted criminals. Close matches may also be picked up which could reveal a familial connection. The law in Scotland is under review but currently profiles from people who are not convicted are required to be deleted from the database. [6] This was also the situation in England and Wales until May 2001 when the retention of DNA samples was legalised. It had been found that around 80,000 samples had been illegally retained and one of these had been used to secure a conviction for murder. [7]

Although age 10 is the age of criminal responsibility this does not mean that children will be treated as adults in terms of prosecution and punishment. For example, in Scotland where the age of criminal responsibility is eight, over 99 per cent of children

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under the age of 16 are not prosecuted but are dealt with in children's hearings. Where children are prosecuted the prosecution must be able to prove *mens rea*.[8]

However, for the police database children are treated as adults or, more harshly than adults. If a sample is taken during the investigation of any recordable offence, even if the child is not later charged or cautioned, the sample is retained. Under a pilot scheme, which was operating in Lancashire at the time this research was conducted, samples may also be on the database, with parental permission, from children who have been served with penalty notices for 'nuisance crimes' including dropping litter, vandalism or harassing neighbours.[9] In these cases the 'crime' may not be a recordable offence.

The retention of samples from those who are innocent (i.e. never charged with an offence or found not guilty by a court) was tested in the case of Marper & S. Both Marper and 'S', a 12 year old boy, had been cleared of all criminal charges but their fingerprint and DNA samples retained . This case went to the Court of Appeal and then the House of Lords who upheld the judgement that it was legitimate to retain DNA samples indefinitely. The Court of Appeal ruling included the words:

> *'Not all un-convicted people are equal from a policing point of view, even though they are from a legal one; and amongst those who have been charged but not convicted it is especially so…….the courts know well that among [those acquitted] is a significant proportion – markedly higher than in the un-convicted population at large – who will offend in the future'.* [10]

This ruling supports the police in their view that the database could hold the records of 'the entire persistent criminal population' (estimated at 3 million).[11]

What is interesting about the NDNAD in relation to children?

First, it is interesting that there has been a lack of public concern in general about the national police database and, in particular, a lack of concern about the inclusion of children. This is despite the increasingly protective measures taken for children in other areas of law (e.g. health and safety) and by parents in their day to day care. Second, children are not given any special treatment when DNA samples are collected, stored and used. This is inconsistent with the special consideration usually given when genetic samples are collected, for example, for health databases or research, and, in the way children (especially younger children) are dealt with in the criminal justice system. Third, parents have no rights to refuse permission to take a sample even from a young child (age 10 or over) when arrested for a recordable offence, nor is any other responsible adult involved to safeguard the child's interests. The lack of special consideration for children could be seen as contrary to the United Nation's Guidelines for the prevention of juvenile delinquency which states that when dealing with children accused of committing crimes there should be:

> *Consideration that youthful behaviour or conduct that does not conform to overall social norms and values is often part of the maturation and growth process and tends to disappear spontaneously in most individuals with the transition to adulthood;*

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> *[and]*
>
> *Awareness that, in the predominant opinion of experts, labelling a young person as "deviant", "delinquent" or "pre-delinquent" often contributes to the development of a consistent pattern of undesirable behaviour by young persons.* [12]

The GeneWatch report on the police database did not specifically mention children other than to make a similar point about the dangers of premature labelling, 'keeping records permanently on the database, particularly in the case of juvenile offenders, can also be seen to be a problem as it undermines the long-standing principle of rehabilitation.'[13] The National database contains samples of 24,000 young people (under 18) who have never been charged, convicted or cautioned [14].

In the United Nations Convention on the Rights of the Child, children are recognised as a special case. Article 40 reads:

> *States Parties recognize the right of every child alleged as, accused of, or recognized as having infringed the penal law to be treated in a manner consistent with the promotion of the child's sense of dignity and worth, which reinforces the child's respect for the human rights and fundamental freedoms of others and which takes into account the child's age and the desirability of promoting the child's reintegration and the child's assuming a constructive role in society.*[15]

Fourth, there is a surprising lack of empirical data on the attitudes of children and their parents to NDNAD, raising concerns about whether there has been sufficient consideration and relevant public debate on present practices that result in children as young as 10 being included the NDNAD. This data may support *further* arguments about whether or not children can be considered morally competent and responsible agents.

Fifth, having the criminal age of responsibility as low as 10, as compared with 12 in the Netherlands, means that children in judicial terms *can be* considered as morally competent agents that are responsible and blame worthy. While this can be defended, we will provide *further* arguments to show why this could be considered controversial from a multidisciplinary perspective.

Purpose of a focus group study on the attitudes of children and their parents to NDNAD

The aims and objectives of this study can be set out as follows

- To explore a number of issues indirectly relating to the inclusion of children on the NDNAD – namely, independence and responsibility and understanding right and wrong – and then to draw out a number of analytical themes to interpret select findings.

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- To explore two real life case studies, when DNA samples are taken from children, and to elicit a *direct* understanding of attitudes from children aged 10-12 and their parents, thus generating more themes to interpret findings. The primary purpose is to widen the constituency of debate on the inclusion of children on NDNAD, deepening understanding of the views of children and their parents.

- To use the data gathered as support for further multi-disciplinary arguments as to why the inclusion of children, aged 10, may be controversial. This is a secondary purpose of this study.

Method of focus group study

Questions on public attitudes to the police database have been included in more general surveys reports. However, these were not specifically on the inclusion of children, nor did they include young children themselves.[16] While children might find a one-to-one interview with an adult intimidating, the focus group method meant that they were talking in a group with their peers in a familiar setting. The opening topics of responsibility and independence were ones that both children and parents were interested in and had strong opinions about. The discussion was then steered towards more specific issues by the use of short case studies about children and the NDNAD based on newspaper reports.

The focus groups

The primary aim of this pilot study was to talk to the youngest age group that would be on the police database in UK. The simplest way to contact children and obtain parental permission to talk to them was through their schools. Since many children of this age will be collected from school, it was decided to hold separate focus groups with children and parents on school premises immediately after the end of the school day. The four schools chosen were in the same town and included two academically selective single sex secondary schools, one non-selective secondary and one Church of England primary school. There was a total of 21 children (thirteen boys and eight girls) each of whom brought one parent or, in two cases, both parents. Eight focus groups were carried out, with an average of six people per group – four focus groups with the children and four with their parents. Only three fathers took part, all in focus group one. The schools sent out letters on our behalf asking parents whether they and their year 6 or 7 child would like to take part in a discussion group as part of an EU funded project. They were given a general indication of the topics in the letter, with more specific information provided at the end of the discussion. Children and parents were each given a gift voucher after the focus group had ended. Each focus group lasted around one hour and was recorded and transcribed in full.

The protocol

As a warm-up question, parents were asked whether they thought it was a difficult time to be a parent, and children were asked what they liked about being the age they were. This led into a discussion on independence and responsibility of children; what sort of things children are allowed to do on their own, what responsibility they have

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and how parents decide. Next, all groups were asked about their own, or their child's, understanding of right and wrong, where they learn this, and, (for parents), whether they consider it is harder to teach children about right and wrong than it was for their own parents. Parents and children were then reminded (or informed) that the age of criminal responsibility differs between countries but is set at 10 years in England and Wales, and were asked what they thought about that fact. They were then introduced to/reminded of the existence of the National DNA database and that 'when someone [adult or child over 10] is arrested on suspicion of an offence….the police can take a DNA sample and store it on the police database.' After collecting any immediate concerns or thoughts on the database two short case studies based on newspaper reports were distributed and read, one at a time. The children's versions had simpler language and omitted some details e.g. in case study 1 'a sample of her genes was taken' (checking what they understood by that) rather than 'she was DNA swabbed' and omitting the town where the offence took place. Both parents and children discussed the case studies and, where necessary, were probed for how long they thought samples should be kept, whether they should be destroyed if the child was innocent, what they thought about speculative searching of the database and whether they felt differently about a DNA sample being on a database compared with a fingerprint.

Finally both groups were asked what 'a genetic sample can tell us' and probed for their ideas on the importance of genes, upbringing or environment as the key to identity. This topic was introduced by examples of people looking for their 'real'/genetic relatives as a theme in TV soaps.

Themed findings and further analysis on the inclusion of children on NDNAD

Responses to general questions: responsibility, autonomy and authority

For children in years 6 and 7, freedom outside the home is limited, with elaborate procedures for checking up on them and ensuring their safety. Parents are both anxious about their children and recognise the need to gradually allow some freedom. Children, aged 10-12, are 'bathed in an atmosphere of rules'.[17] The responsibility they have is that gifted by their parents, usually involving jobs around the house and helping with younger siblings. Children have limited responsibility. For example,

> *From five boys in year 7: 'Lay the table and do the dishes and do the polishing sometimes.'… 'I set the table and do some other stuff sometimes or take everything off the table afterwards'…'I feed my goats in the afternoon and check my chickens for eggs' (Boy FG2)… 'I've sometimes got to look after my younger brother'*
> (Boys, Year 7, FG3)[18]

Parental caution is common. When they are allowed out, this is under strict conditions for their safety, as this 11 year old girl explains:

> *'I'd actually want to be able go out and not have a plan of my set route…. 'cos she makes sure that she knows where I am, she knows who I'm going with and have to sort of tell her how I'm doing it…it's kind of annoying'*
> (Girl, Year 7 FG1)

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Moreover, parental caution is negotiated, with their children and other parents. For example:

> Parent 1: *They all wanted to go, the whole class, into town, and I'm like, but it's because they've got these mobile phones they think they're safe. They say oh I'll phone you if I'm in trouble…*
>
> Parent 2: *I said no…and then my son was actually in town with his dad and he ran into another set of parents, it was the Williams', and you know Hannah's mum was there saying how awful she thought the whole situation was and Hannah hadn't been allowed to go, so [my son] came home absolutely gutted that, oh no, we ran into someone who also said No. So then we started to feel a bit better. At first I was tempted to say, you know because I fully believed that the whole class, you know how it is when children feed you these things. So we initially agreed that possibly, at a future date we'd drive into town together and split up for half an hour*
>
> Parent 1. *In fact all the parents had said no*
>
> Parent 2. *Yeah, but we didn't realise it!*
>
> Parent 1. *And I just thought I was being really mean*
>
> Parent 2. *Yes I did, as well, it was a big issue*
>
> (Parents of 10/11 year old children, FG3, names changed)

Children recognised and identified that a major influence in knowing right from wrong came from their parents:

> *'I think you usually take what the parents think are wrong and right and you'll probably end up thinking of as wrong and right because you usually do pick up the traits in your parents...'*
>
> (Boy Y7, FG2)

Children recognise the role of parents but also seek to influence them:

> Moderator: *And do you help at home?*
>
> Girl: *'You get away with more because all you have to say is I'm doing my homework…You have a permanent book in front of you 'Do the washing' 'I'm doing homework' … You're watching TV like this … 'will you go and walk the dog?'[parent's voice]…doing homework [her reply] [laughter]*
>
> (Girl, Y7, FG1)

Another important influence was from others – mainly the children's peer group – and the school. At one primary school we found that the school reinforced the importance of the learning from others by way of a poster:

> *'We've got a poster in there with like a polar bear, one polar bear standing up, right, and one polar bear just skidding across the floor, and it's got a sign saying watch from others, you can't make mistakes all yourself'*
>
> (Girl Y6, FG3)

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Transgression of the rules and children's sense of right and wrong tend to gravitate towards their immediate experience of their 'life-world', so oft quoted responses were:

> *'Using your mobile phone to stay up and chat late at night and you use up all your credit…so they (parents) have to top it up again.'*
> *'Wasting your pocket money (laughter)'…*
> *'Bullying -- I'll not say any more'*
> (3 Girls Y7 FG1)

> *'Smoking…Swearing…Drugs…Vandalism…Disrespecting adults and showing off and giving way to peer pressure.'*
> (5 Boys, Y7, FG2)

Many children in our focus groups demonstrated a certain sophistication in knowing the difference between right and wrong. They were able to contextualise rightness and wrongness, demonstrating an ability to move beyond simple authoritarian rule following. Nevertheless, taking responsibility cannot entirely be disentangled from authoritarian figures, namely parents and teachers. The two examples below, from the same child, show that she will admit her mistake, taking responsibility for the action, but only when 'caught' and that tied up with learning what is right is an awareness that responsible behaviour elicits reward from authority figures.

> *'If your friends are like saying 'will you play with my hair in assembly?', 'will you play with my hair just while we wait for the music?' and the teachers says 'oh can you stop doing that in assembly it's not dutiful', I'd think now at my age I'd be grown enough up to say sorry it was my fault, I told her to do that so…'*
> (Girl, Y6, FG3)

> *'And you learn mistakes from others, because you can see, if kids in like your age are responsible, like sensible and you know reliable and then they get lots of credit for it [from teachers] and then you think well I would like to do that…'*
> (Girl, Y6 FG3)

Indeed, what is clearly evident is that the ability to situate rightness and wrongness within its appropriate context is offset by a heavy dependence on rules and authority figures. In this example, while the respondent sense of 'fairness' is abstracted out to being dependent on circumstances, blameworthiness is still entangled in being told off by an authority figure:

> *'… 'cause if they didn't know it was wrong then they should just be told not to do it again but if they'd made that mistake…done that thing before or they knew it was wrong then they should be told off - be blamed'.*
> (Girl, Y6 FG3)

When parents were asked whether their children understand right and wrong, they tend to quickly answer 'yes', but the ensuing discussion makes it obvious that this 'yes' was for a normal child of 10-12 years old for whom knowledge of right and wrong cannot be separated out from parental retribution.

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In the girls' grammar school a parent commented:

> *'I think they're much more likely to think about, you know, likely retribution than whether something is right or wrong. Will they get away with it?'*
> (Parent, FG1)

To which another parent added:

> *'But I think the thing about retribution is true because our daughter will lie to, not to me in a major way, but she will lie to avoid punishment. And you just think I'd rather you told me the truth. So it isn't a sense of right and wrong it's a sense of fear of the punishment'*
> (Parent, FG1)

The fear of retribution and punishment shows that children's judgements about right and wrong, while intellectually sophisticated, are tied up with reward and punishment.

In this sense their full autonomy as moral agents comes in to question because such common behaviour militates against taking full responsibility for oneself and ones actions. While this is also true of some adults, it is likely that many children of this age do not have that capacity. This begs the question why have the criminal age of responsibility as low as 10, when moral autonomy is clearly linked (philosophically) with self-determination – the ability to determine the course of ones own life. Arguably, while having a low criminal age of responsibility does requires further judicial proof that they are indeed morally responsible, it is not clear that this makes much sense, when it is questionable that children aged 10-12 have the capacity for being classed a morally autonomous agents. According to Mill, at least, this means that we are dealing with people who are, (to use Mill's famous phrase in *On Liberty*), 'in the maturity of their faculties'.[19] Here, Mill is clearly hinting at linking autonomy with becoming an adult, i.e. with maturity rather than the maturation process.

Responses to case studies: approval, consent, responsibility, autonomy, authority and child-development/stigma

The first case study was taken from a report in New Statesmen (21/4/05) referring to an incident in England and read:

> *'In February 2005 a 13-year-old schoolgirl was arrested for throwing a snowball at a police car. A sample of her DNA (gene sample) was taken and put on the National Police Database.'* [20]

Most of the immediate responses were to say that the police had over-reacted, and that the arrest and the subsequent DNA swab for recording was considered a disproportionate measure in relation to the 'offence'. Quite clearly parents showed disapproval of the action taken by the police. For example:

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> *'No, not for throwing a snowball*
> *'It's a prank it's not a crime, it's a prank'.*
> (Parents, FG4)

Some girls put the same view more strongly:

> *'Yeah right if it went through the blooming windscreen ...but not just for throwing a snowball'.*
> *'How weird [all talking at once], throwing a snowball!'*
> *'You throw snowballs at people so what's the difference … a person is like weaker than a car so surely…'*
> *'It shouldn't make any difference [that it's a police car not an ordinary car]'*
> (Girls Y7, FG1)

As did the boys from another school:

> *'A 13 year old schoolgirl was arrested for throwing a snowball at a police car, it's pathetic.'*
> (Boys, FG4)

There was a significant minority, however, who voiced approval but also drew out the implications of why they approved, and how they could improve the current system.

> *'Yes I am aware of it and I think it's fantastic… Of course I'm biased because I was 11 years in the police force but even if as a result of that one person is caught for a serious crime then I think it would all be worth it.'*
> (Parent, FG1)

> *'What could happen if she could do it perhaps once and if they didn't take a DNA she could do it again and again and they don't realise that she's the same person and if they take the DNA they'll know it's the same person and send her to a young offender's institute.'*
> (Boy, Y7, FG2)

> *'You should keep it on the database but perhaps put in the less important parts of the database so then she's not always there and she's not always there doing one little thing but then you've still got reference for it if she does anything else'.*
> (Boy Y7, FG2)

Most respondents however expressed disapproval, offering grave reservations about taking a sample on many and varied grounds: parental consent, the child's emotional welfare (both in a developmental sense and as a way to avoid stigma); the ability to foresee the consequences of their actions.

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One parent, for example, objected to the case study on the grounds that it did not require parental consent:

> *'Terrifying, I would be furious, I would be livid if they did that without my consent.'*
> (Parents YR7, FG1)

Another parent had reservations on the grounds that children are very much in a state of transition, so that having any official misdemeanour 'pinned on to you' would not reflect a child's development and their need to progress.

> *'Yes I think that's important for the child, that they kind of feel, that, you know, ok. I shouldn't have done that or, that was a really stupid mistake or, that they can take it on board, that it was something wrong. But it shouldn't be that she would then feel it's something that's been pinned on you as it were. Because its part of a child's development to be able to move on.'*
> (Parent, Y7, FG2)

This was reinforced by another parent, below, who was critical of stigmatising or, 'pigeon-holing them':

> *'… I think that you're almost pigeon-holing them when they are still a child. You're not giving them a chance to change. Children do a lot of growing up, a lot of changing around that age.'*
> (Parent, FG1)

Surprisingly this theme of the importance of children's development and change was also reflected in the some of the children's focus groups. For example:

> *'If they were little… like T did something wrong and then they grew out of it then when you're a teenager again you'll probably grow back into it and when you're an adult you'll grow out of it.'*
> (Boy, Y7, FG2)

More specifically, one parent noted that this example could have had serious emotional repercussions:

> *'The repercussions for that child emotionally, could be quite vast I think'*
> (Parent Y7, FG1)

Exploring the question of child development further, it is difficult to see any straightforwardly linear progression. This was reflected in 11 and 12 year olds commenting on the behaviour of a 13 year old – the teenage subject of the arrest in our first case study. For them teenager's were different. For example:

> *'She's a teenager as well that makes a difference. Teenagers just do stupid stuff. They do'.*
> (Girl Y7, FG1)

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Interestingly this connects to some of the differing models in the psychological literature. Whereas in Piaget's model one stage is clearly an advance on the next, there is no such staged sense of progress if one looks at Erikson's socio-emotional model of development (an emotionally biased model).[21] Whereas in Piaget's intellectually biased model, child development involves a move from concrete to formal operations, involving the ability to think more abstractly, the picture is complicated if we take heed of Erikson's socio-emotional model. This is because adolescents and teenagers, according to Erikson, experience a psycho-social crisis in the fifth stage (out of eight) in their social-emotional development. Called the identity versus identity diffusion (or fidelity) stage, adolescents and teenagers, from 13/14 to about 20, experience a period of identity experimentation that they grow out of. 'Even the best adjusted adolescents' according to Erikson 'experiences some role identity diffusion; most boys and probably most girls experiment with minor delinquency; rebellion flourishes etc.' [22]

Another critical reaction to the case study involved the introduction of possible mitigating circumstances, introduced through careful reflection of how and why adolescents and teenagers act in the way that they do. A significant number of focus group participants raised the issue of peer group pressure in mitigation. There are a number of examples:

> *'Teenagers they also have lots of daring and if it was a dare some people can't get out of dares always.'*
> (Boy, Y7, FG2)

> *'I think they probably know what's right and wrong in many cases but they might follow their friends. They can act very responsibly and very grown up if they're on their own, but if there is a group of them together and they encourage each other to do things and then that [right and wrong] might get forgotten.'*
> (Parent, FG1)

> *'But some children are very leadable and if they're with the wrong people even though they know that it might not be the right thing to do they're worried about what their peers will think and they'll go along with stuff just because its happening.'*
> (Parent, FG1)

The idea that children of 11 or 12 are unable to fully understand the consequences of their actions, introduced in the previous section, was reinforced in response to the case study. For example:

> *'Sorry, it goes back to do they know right and wrong? And can a child of that age, 11 say, can a child of that age see that far ahead? So they may see I'm going to throw a snowball and that's a fun thing to do because we've taught them that throwing snowballs is a good thing to do. You could almost tell them otherwise.'*
> (Parent, FG1)

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The second case study, significantly different from the first, introduced the idea of 'on the spot fines' for yobbish behaviour. It was taken from a report in the Sunday Times 29/5/05. The parents' version read:

> *'Children of 10-16 years old can be given on-the-spot fines of £30 or £40 for yobbish behaviour under a new scheme to be launched in June 2005 in seven areas (including Lancashire). The youths will be served with penalty notices for 'nuisance' crimes such as vandalism, harassing neighbours and dropping litter. They will be asked for proof of identity and will sign a form to acknowledge receipt of the penalty notice which will be issued in front of their parents. Fingerprints and DNA will be taken if they consent. The penalty notice will be recorded on the police national computer but will not count as a criminal conviction'*[23]

Many parents and children responded more favourably to this kind of measure, partly because it involved the parents and avoided DNA being logged and stored indefinitely on a police database. In the main they showed approval of this measure. There are a number of examples:

> *'Better than being put on the system for throwing a snowball at a police car'.*
>
> *Mod: Right, You think that's better. Why?*
>
> *'Cause it just is…plus you're tackling them…it works much better. And it's up to the parents what happens.*
>
> *Mod: OK so they're involving the parents and you think that's important.*
>
> *Yeah.'*
>
> (Boys, FG4)

And:

> *'… (it) will make sure the parents make sure the children won't do it again and also parents should be involved because they may have seen that their child is under the influence of someone else …and they don't want their fingerprints and DNA taken because they'll make sure they won't do it again. They really don't want the child on [the database].'*
>
> (Boy, Y7, FG2)

Although the general reaction to this second case study was much more favourable, there were a series of reservations that reflected disapproval.

One expression of disapproval revolved around the fact that it was in effect blaming parents and making them pay without directly tackling miscreant adolescent behaviour. For example:

> *'Well, parents may become responsible for paying it… I don't know what the age is that they (children) can take on a part-time job, but apart from pocket money, they're not always going to have this money are they, so you are really punishing the parents…'*
>
> (Parent, FG3)

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Another expression of disapproval vocalised the fact it was inequitable, not distinguishing those who could pay and from those that could ill afford it (children and poorer parents). Moreover it was inappropriately directed, children thinking they could get away with it, if their parents paid up. For example:

> *'Where are children of 10-16 going to get £30-40 from – not a lot of money to some people but it's a lot of money for other to find and if the parent just pays the children might think well I've just got away with it.'*
> (Parent, FG4)

Yet another sense of disapproval came out of the fact it concentrated too much power in the police. For example:

> *'It also seems to make the police judge and jury.'*
> (Parent, FG2)

Conclusion

The issue of including children from the age of ten has not led to negative media coverage or debate. There has been coverage of Grant Shapp's campaign, COND (children off the national DNA database), but this aims only to remove those who are innocent.[24] The parents and children in this study supported the existence of a NDNAD and its use to solve crime. However, they had reservations about samples being taken for petty crime, were critical where there was a lack of parental involvement and felt that there are dangers of stigmatising young people for a one-off act. Practical suggestions included the keeping of samples for a limited time or in a different part of the database.[25]

The focus group study revealed that these children, age 10-12, had limited responsibility and independence. For them, right and wrong is tied up with reward and punishment and taking responsibility is interpreted as admitting fault when 'told off' rather than being self-governing. Parents were cautious about granting new types of independence but recognised the need to negotiate gradual change with their children, as they grew older. Both parents and children saw the dangers further ahead in the teenage years when, as one mother put it, 'the hormones set in'. For this reason many took issue with the case study involving the 13 year old girl because the arrest and taking of a sample did not make any concession to her being a teenager. Specifically, they argued that teenagers are in a state of transition and there is a danger of life long stigmatization for one act where children might have been subject to peer pressure and are certainly less able to foresee the consequences of their actions. The involvement of parents in the second case study met with more approval from parents and children although some had reservations about the effectiveness of the on-the-spot fines, which parents would probably pay, and about increased police power.

Finally there are further multi-disciplinary arguments that support the data and may add weight to the argument that the inclusion of children on the NDNAD is controversial.

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- Although children are given special consideration and care in the criminal justice system, the setting of the age of criminal responsibility at age 10 does imply that children can be considered able to take responsibility for their actions. However, it seems unlikely that the children in this study, including those at academically selective schools, could be classed as autonomous moral agents which makes the inclusion of this age group on the NDNAD controversial (according to J.S. Mill at least).[26]

- Including children on NDNAD may be inappropriate for developmental reasons. Since they are in a state of transition, in which their intellectual development is complicated by socio-emotional development, it is controversial to consider them criminally responsible with the capacity (at least) to be tried and convicted, when it is possible that they will grow out of their socially unacceptable behaviour. This is reflected in the UN convention on the Rights of the Child, quoted earlier.

- The policy is inconsistent with policy in the area of health care where there has been a move to find ways of including children in decision-making processes as much as possible, treating each child as an individual.[27] In health care children are unlikely to be considered 'Gillick competent', in terms of being able to refuse treatment, before age 13. [28]

Children are probably included on the NDNAD because they can be included, rather than as the result of a debate over their inclusion when the database was first set up. The purpose of this research was to shed light on aspects of children's life worlds and parental attitudes in order to highlight one aspect of the NDNAD and the ethical and social issues which it raises.

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Policy Implications of Defining Race and More by Genome Profiling

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Abstract

The genome revolution has provided the basis for many new applications in diverse areas such as health, food and agriculture, and forensics. While standard DNA profiling has become the paramount form of identification in forensics, expansion of genomic applications is being considered and tested to provide more descriptive information to facilitate the capture of perpetrators. Two major applications are being explored and tested: 1) ancestry profiling from which race can be inferred; and 2) profiling for physical traits to provide a genetic-based description or sketch. The use and incorporation of these new applications raises several logistical questions and ethical issues. This article will explore some of the policy implications in the use of expanded genome profiling for forensics purposes.

Introduction

The discovery that every person carries a unique molecular signature that can be detected in virtually every human tissue was a major boon to crime scene investigators.[1,2] Almost a decade prior to the completion of the sequencing of the human genome, DNA fingerprinting became the identification tool of choice following the standardization of a core panel of DNA markers and development of local, state/regional, national and international databases.[3] Now, with the wealth of advances in genomic technologies and a much greater understanding of human genetic variation, molecular forensics is potentially on the cusp of another revolution.

Whereas the genetic similarity between humans was heavily emphasized upon completion of the Human Genome Project, the follow-up project of the HapMap instead focused on genetic variation of individuals from different populations.[4] The impetus for defining genetic variation among populations was to facilitate the identification of genes and variations functionally relevant to human health and disease. However, other applications of genetic variation have arisen from the enormous datasets now available. There are at least two forensic applications using genome profiling. First, genetic variation between populations can be used to determine ancestry. Race can then be inferred, with debatable accuracy, from a prediction of ancestry. A second application and newer approach in forensics is the application of genetic knowledge of physical or behavioral traits to develop a composite sketch of an individual based solely on genetic information.

Predicting race and an individual's appearance based on genetic information presents some ethical and moral issues that warrant careful consideration before these technologies are used routinely. This paper will review some of the science of genome profiling applied for forensic uses and discuss several of the policy implications arising from this new technology.

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Genome Profiling to Predict Ancestry and Race

All of the DNA contained in a single cell comprises what is known as the human genome. DNA is actually a chemical composed of four units, abbreviated A, T, C, and G. The human genome contains three billion units strung together. The three billion units are arranged into large packages known as chromosomes which are visible under a microscope. Humans have 24 chromosome pairs numbered one thru 22, plus a pair of sex chromosomes (XX in females and XY in males). Half of the chromosome pair is inherited from the mother and half from the father.

It is the order of the units, or sequence, that is critical for normal development, growth and functioning. Humans are 99.9 percent identical in their genome sequence and genes are made of distinct regions of DNA sequence. The remaining 0.1 percent difference accounts for human diversity. Studies of human genetic variation or alterations in the sequence of DNA units or structure of chromosomes, can vary depending on the type and location of variation. For example, variation may occur in regions of DNA that do not encode for genes located on either the X or Y chromosome.

Another type of variation involves short sequences that are repeated in tandem, known simply as short tandem repeats (STRs). The standardized forensic DNA profile is composed of a set of core STRs found throughout the human genome in non-coding regions. Each individual has a varying number of repeats at each of the sites. For example, one individual may have four STRs (ATCG) at one site while another individual has nine (ATCG) repeats. No additional information such as health risks or appearance can be gleaned from the standardized DNA profile (purposely so).[5] Although not part of the standard analysis, a weak correlation has been shown between some of the STR markers and racial groups.[6]

There has been substantial interest in developing DNA profiles that may provide more descriptive information from biological specimens left at a crime scene. In particular, this information would be useful in criminal investigations to identify and apprehend perpetrators as quickly as possible and before further crimes can be committed. Data collected from studies of human genetic variation may be applicable to these purposes. Population genetic studies using particular DNA variants (referred to as markers) have enabled clustering of individuals into groups that correspond to geographic or ancestral origin.[7] About 93 to 95 percent of human genetic variation is found *within* populations with most of the remainder corresponding to variation *between* populations.[8]

DNA markers with wide frequency differences between populations have been used to infer ancestry.[9] For example, a panel of these variants – known as 'ancestry informative markers' or AIMs – have been used to predict proportions of an individual's ancestry – e.g., 80 percent African and 20 percent European or 10 percent Asian and 90 percent European.[10,11] Using these markers, several companies have been launched to provide ancestry information to interested individuals and law enforcement agencies. For example, DNAPrint Genomics has offered ancestry genotyping services to law enforcement agencies including Canadian law enforcement agencies, the U.S. Federal Bureau of Investigation, Scotland Yard, and the U.S. Army.[12]

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Whereas ancestry confers origin, race is a socially defined concept. The concept of race is derived from a historical division of the human population. In the 18th century, Carl Linnaeus defined four 'types' of humans: Americanus, Europaenus, Asiaticus, and Africanus.[13] These divisions were primarily determined by geography/origin and physical features such as skin pigmentation, hair texture, and nose shape (see Figure).

Figure 1. The cover of Linnaus' book (http://www.linnaeus.uu.se/online/animal/1_1.html). The table summarizes the descriptive features of populations.


CAROLI LINNÆI
SYSTEMA
NATURÆ
NATURÆ REGNA TRIA,
SECUNDUM
STOCKHOLMIÆ
Apud GOTTFR. KIESEWETTER.

Europeaeus	skin (white); build (muscular); hair (long, flowing), eyes (blue); disposition (gentle, and inventive)
Americanus	skin (reddish); build (erect); hair (black, straight, thick); distinct facial features (wide nostrils); disposition (stubborn and angered easily)
Asiaticus	skin (sallow; yellow); hair (black); eyes (dark); disposition (avaricious and easily distracted)
Africanus	skin (black); hair (black, frizzled); skin texture (silky); distinct facial features (nose flat, lips tumid); disposition (relaxed and negligent)

Although studies have shown a high correlation between genetically-defined ancestry and self-identified race,[14] predicting an individual's race based on these markers still involves some guesswork. In populations where admixture is high, the ability to predict race will likely be reduced (admixture refers to the mixing of one or more populations). For example, many individuals from countries in Central America and the Caribbean have a three-part heritage: Native American, European, and African. The individual's place of residence, where they were raised, and culture will certainly influence the race they self-identify with which cannot be revealed through DNA analysis. However accurate though, a descriptor such as 'perpetrator's ancestry believed to be 80% Northern European and 20% Native American' is not likely to be used in an All Points Bulletin.

Genome Profiling to Predict Physical Appearance

For investigatory purposes, knowing an individual's race can help narrow down the field of suspects or the population of individuals sought for a crime. However, knowing an individual's race can be misleading if used to predict certain physical traits. What exactly does someone look like who has a mixed background of European, sub-Saharan African, and Native American genetic markers? For companies like DNAPrint, since a unique description cannot be predicted based on a given ancestry profile, a collection of photographs is provided of what a person with a

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particular ancestry profile *might* resemble. Although two people can have the same ancestry profile, it does not mean that they will share all of the same physical features. For even one physical trait, the data have been conflicting regarding the strength of the relationship between skin color and genetically-defined ancestry.[15,16] Just as admixture can confound the prediction of race, admixture can present challenges for the prediction of general physical appearance. Therefore, a substantial gap remains between ancestry and/or race and physical appearance.

In addition to the core DNA profile, markers on the X and Y chromosome are routinely run to determine gender, an obvious genetic trait. This is the only physical trait that can be easily revealed through DNA analysis today. An expanded genome profile of other physical traits could provide further details to assist in the identification of the perpetrator. Advances in developmental and medical genetics have identified genetic variations associated with physical traits that may be applied for law enforcement purposes. For example, data gleaned from genetic studies on diseases with abnormal skin pigmentation or certain developmental features (e.g., head circumference, height, hair texture) could be applied to predict certain physical characteristics of an unknown individual.

Imagine a description of a perpetrator obtained solely from blood spatter found at a crime scene:

> *'Suspect is believed to be a male Caucasian with blue eyes, straight brown hair (possibly thinning), light to medium skin color, and likely to be overweight with an aggressive personality.'*

While this is far from a perfect description, it may considerably reduce the field of suspects. Realistically, it is unlikely that genomic data can provide such definitive descriptions given the complexity of gene-gene and gene-environment interactions that probably contribute to the development of both physical traits and behavior. But while the data to support this type of genetic-based description are mostly weak as described below, the potential exists and companies are investing in research to develop these expanded genome profiles.

Skin pigmentation

To begin, differences in skin pigmentation span a continuum of color across human populations. Variation in skin, hair, and eye color is attributable to virtually one pigment known as melanin.[17] Two distinct types of melanin are produced: black/brown pigments are produced by eumelanin and red/yellow pigments produced by pheomelanin. Each melanocyte (melanin-producing cell) has the capacity to synthesize both types of pigment. Melanin is secreted to surrounding hair follicles or is retained by melanocytes of the eye. Melanin is synthesized within specialized intracellular organelles known as melanosomes. Differences in the number, size, and distribution of melanosomes are observable between ethnic groups.

Several genes are known to be involved in the production of melanin (see Table 1). For example, of nine common variation in a gene known as MC1R, three have been associated with fair skin and red hair and are absent in the African population. A study

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of 859 Caucasian individuals reported that all 71 redheads carried at least one MC1R variant and >60% carried two or three variants.[18] Interestingly, 34% of individuals carrying two red hair color markers were *not* redheads. A recent paper reported an association between a variant in the gene SLC24A5 and lighter skin color in admixed populations.[19]

Table 1. Select genes associated with certain physical traits

Trait	**Genes/Chromosomal regions**
Skin pigmentation	TYR, TYRP1, TYRP2, P, MC1R, SLC24A5
Eye color	Chromosome 15 and 19, P, ASIP
Hair color/texture/loss	MC1R, MATP, FS, TGFA, EGFR, KRN1 (keratins)
Body shape	TBX15, GPC4, and HOXA5

Eye Color

Given the vastness of the human genome, it is a major challenge to identify the key gene or genes responsible for a certain trait or disease. As a first step, scientists may attempt to narrow down which chromosome the causative gene may reside. This approach would be analogous to finding a perpetrator – given a city, the first step would be to identify the likely neighborhood the person lives or works. With respect to eye color, several studies have identified certain chromosomal regions where putative eye pigmentation genes may reside. Chromosome 19 has been linked to blue or gray eye color[20] and chromosome 15 to brown or blue eye color.[21],[22],[23] A subsequent study of 629 individuals found that persons carrying particular genetic variants in a gene known as the P gene on chromosome 15 were less likely to have blue or gray eyes.[24] Another study of 502 twin families confirmed the link between 15q and eye color.[25] A variant in the ASIP gene in the melanin pathway has also been associated with dark hair and brown eyes in European-Americans.[26]

Hair Color/Texture/Loss

Hair growth rate, texture, color, and shape differ between individuals; however, some hair characteristics are associated with certain population groups. For example, Asian hair is on average the thickest and most coarse hair type compared to Caucasian and African-American hair. Obviously, if hair samples are left behind at a crime scene, information can be gleaned without the need for genetic analyses.

Factors such as light, hormones, temperature, nutrition, and genetics affect various hair characteristics. Current understanding of genetic polymorphisms linked to hair color, structure, or alopecia (hair loss) is weak. As mentioned above, the relationship

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between red hair/fair skin and genetic variants in MC1R has been reproduced and validated.[27,28] Other studies have demonstrated associations between the gene MATP and dark hair, skin, and eye color in Caucasians.[29]

Several genes have been implicated in the regulation of hair follicle development or control of hair growth cycle.[30] Of the genes known to be involved in follicle development or hair growth, only a few mutations have been associated with abnormal follicle shape and wavy hair. Variations in keratins, proteins present in hair and nails, have been identified in Japanese and Caucasian individuals, indicating the occurrence of genetic variants that are highly specific to a certain population.[31]

Another hair trait is male pattern baldness. Despite its name of male pattern baldness, it is also the most common form of hair loss in females. The frequency of baldness varies between populations, effecting between 50 and 80 percent of Caucasian men but half as common in Chinese, American Indians, and African-Americans. The frequency of baldness increases with age in men but not women. Although presumed to result from a genetic predisposition (yet to be defined), differences in trait frequency between populations have also been attributed to diet, smoking, and disease.

Other Traits

For other physical traits, less is known about the biological pathways and genes. While many genes are known to be involved in bone growth and development, genes related to bone and tissue structure are even less certain, such as nose, ear, cheek or eye shape. Identifying genes associated with other morphological features would thus require a considerable amount of new research, but would likely provide only vague descriptions at best due to environmental influences.

The MC1R gene accounting for red hair color and fair skin has also been linked to freckles.[32] In addition to facial features, genes have been linked to small head size,[33,34] obesity,[35,36,37] height,[38,39] and other such descriptive characteristics. Genes involved in fat distribution that may be useful in predicting body shape, such as hourglass, pear, or apple shape, were recently elucidated.[40]

Beyond appearance, an increasing amount of study has focused on the genetics of behavior. Behavior is likely to be more complex than the all of the physical traits combined given the influence of lifestyle, family, culture and other factors. Several genetic variations have been associated with traits such as shyness,[41,42] novelty-seeking,[43,44] and aggression and violence.[45,46]

A Slippery Slope

In comparison to the quantitative preciseness and accuracy of the core STR DNA identification profile, AIMs and genetic markers associated with ancestry and physical or behavioral traits appear to be far less reliable for identification purposes. Regardless of the validity of this technology or whether it will be useful to forensic investigators, expanded genome profiling will pose major challenges in its use. To begin exploring some of these challenges, I describe several procedural and logistical

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issues in the investigative format of who, what, when, where, and how. The discussion is limited to the use of an expanded genome profile for unidentified biological specimens collected from crime scenes. Not surprisingly, many of the responses to the practical questions regarding the appropriate use of an expanded genome profile are influenced by ethical issues.

Who?

The first question and likely the most difficult question to be addressed is the issue of who, or more precisely for which crimes, should undergo expanded genome profiling. This same question was also one of the first questions encountered during the initial use of the core DNA profile.[47] In the U.S., only those convicted of sexual crimes or other violent crimes were profiled and their information stored in DNA databases. In 1990, the FBI Laboratory's Combined DNA Index System (CODIS) was initiated as a pilot project in 14 states. The FBI's authority to establish a national DNA index for law enforcement purposes was codified in the DNA Identification Act of 1994.[48] In 1998, the FBI's National DNA Index System (NDIS) became operational, enabling laboratories across the country to exchange and compare DNA profiles. The most recent statistics from NDIS indicate that more than 2.8 million profiles are stored in the database, 96 percent belonging to convicted offenders.[49]

The type of crimes for which the core DNA profile was required and stored gradually expanded to include all felonies, juvenile offenders and all arrestees even if not convicted.[50] This expansion was due in part to technological advances enabling DNA extraction and profiling from very small biological samples in addition to the often more plentiful blood and semen samples left behind at crime scenes.[51]

But who exactly would an expanded genome profile be ordered for? Only specimens from unsolved crimes would benefit from an expanded genome profiling, but would this include all crimes or be reserved for sexual or other violent crimes? Should a tiered approach be used where all specimens from heinous crimes of murder and rape as well as other crimes committed multiples times be automatically tested for an expanded genome profile, followed by all crimes unsolved for some specified period of time such as three months? Or, regardless of the crime, should all biological specimens left behind at a crime scene be subject to expanded genome profiling?

Specific criteria will be needed to determine which samples collected from crime scenes will be tested for an expanded genome profile and at what stage of the investigation. However, several issues need to be considered in the construction of such a policy. First, what are the benefits and risks of using expanded genome profiling for some or all crime scene specimens? The obvious benefit is that expanded genome profiling would lead to the more rapid apprehension of the perpetrator. However, while this assumption seems logical, there is no evidence to support this. If a pilot project is initiated, data could be collected retrospectively and compared to police statistics on time to apprehension prior to the use of expanded genome profiling. This data will also be important in demonstrating the cost-effectiveness of this new technology. Although technology is rapidly advancing resulting in reductions of the amount of specimen needed, cost per assays and turnaround time, depending on the policy, new expenses and burdens will inevitably be incurred on forensic laboratories.

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Second, in determining who or for which crime expanded genome profiling should be conducted, the impact of expanded profiling on a defined group of individuals must be considered. The present make-up of DNA databases suggests proceeding very cautiously with expanded genome profiling. In Britain, the profiles of 4 in 10 black men compared to 1 in 10 white men are stored in the world's largest national police database.[52] If we assume that the number of unsolved crimes will follow the criminal statistics of solved and convicted crimes, the issue of racial profiling based on genetic make-up becomes a significant concern.

One of the fears is that expanded genome profiling will lead to reification of the belief of the biological basis of race. In particular, the use of expanded genome profiling may lend credence to the opinion that criminal activity is associated with a particular genetic make-up prevalent in certain races and/or individuals. This concern is not without precedence. During the 1960's and 1970's, it was found that institutionalized or incarcerated men had a higher prevalence of an extra Y chromosome than non-incarcerated men, leading to the development of an unsupported stereotype of these individuals – 'tallness, low IQ, a behavior disability, and nodulocystic acne.'[53] Subsequent studies could not conclusively demonstrate that the extra Y chromosome was linked to aggressive or violent behavior.[54,55,56] Race was not associated with the extra Y chromosome, although the racial make-up of incarcerated men at that time is very different from today. But the experience from this work illustrates how quickly unsupported stereotypes can arise, setting the precedent for associating genotype and criminal behavior. Therefore, it is difficult not to wonder whether expanded genome profiling will follow a similar path.

Ancestry testing may provide more definitive information about an individual's heritage beyond the self-identified race/ethnicity categories commonly used. While this may be informative from a scientific or personal interest perspective, it may or may not be useful in providing additional information about the perpetrator's identity. Beyond the race/ethnicity statistics of convicted criminals, ancestry data may provide more definitive (and biological) links between criminal behavior and ancestry. As there are no pure populations, everyone is a mixture of populations and groups. If it were possible to identify one or more ancestral markers linked to criminal behavior that cut across race/ethnicity categories, that could result in the creation of a new type of profile but one that would not be obvious without testing. Therefore, the association would not be useful in deciding which vehicles to stop for a traffic violation, but might be predictive of criminal behavior.

So, how likely would it be for a genetic marker or genetically-defined trait to be associated with individuals of a certain race or ethnicity? First, an individual or group would need to conduct research to ascertain this relationship. If the actual sample collected from the crime scene as well as the result from the genome profile were destroyed after the perpetrator was apprehended and tried, this would make it next to impossible to establish an association between race and a behavioral trait. Nevertheless, it is certainly possible for a researcher to study the genetic make-up of ex-incarcerated individuals independent of data collected from forensic analysis. However, the data would likely fail to be replicated given the complexities of defining the genetic and environmental components of behavior, the latter of which is believed to play the bigger role.

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If certain genetically-defined traits were associated with criminal behavior, irrespective of race/ethnicity, it is quite possible that this data could be used to screen individuals to ascertain the likelihood of committing criminal acts. A number of scenarios could be envisioned – screening may be available to parents of newborns, children with unruly or aggressive behavior, or those that have committed misdemeanors; to school administrators; to prospective adoptive parents; or to employers. Regardless of how weak the predictive test result might be, individuals testing positive would most likely experience some form of discrimination. As all of these scenarios would not involve police or forensic investigators, this will be a major issue for society to address about the use of genetic screening for behavioral traits. Given some of the market strategies enabling consumers to directly order genetic tests for ancestry, paternity, and some health conditions, it is not outside the realm of possibility that these types of tests would be next to be offered.

Despite the low likelihood of identifying an association between genes, race, and criminal behavior, this fear will likely linger given that populations have been discriminated and stigmatized based on genetic make-up (e.g., sickle cell anemia and African-Americans). Developing a policy that specifically defines for which crime(s) the samples will be tested and calling for the destruction of both the sample and expanded genome profile results following apprehension and trial of the perpetrator will be critical to minimizing abuses. Secondly, educating the public about how these profiles will be used to aid criminal investigations and the safeguards that will be put in place will be equally important in allaying fears. As will be discussed in the next section, the issue of what to test in an expanded genome profile will be critical to avoiding potential associations between a certain genetic make-up and trait/behavior or crime. For example, knowing the behavioral characteristics of a person who has already committed a crime may not be as helpful in finding and apprehending a suspect as knowing certain physical features.

Lastly, one of the most common concerns of DNA profiling is the potential violation of privacy. There appears to be a sliding scale of privacy rights with respect to DNA profiling. Biological specimens left at crimes scenes are often considered abandoned property and therefore, privacy rights of the specimen do not exist. Convicted criminals have fewer rights than arrested individuals or suspects, and arrested individuals or suspects have fewer rights than innocent individuals. Since the type of profile discussed here only pertains to abandoned crime scene specimens, there would not be any privacy violations if the expanded genome profile was performed solely for the purposes of acquiring additional descriptive information about the perpetrator and subsequently destroyed upon apprehension.

The concern comes into play, however, when the expanded genome profile provides information beyond descriptive features that are then attached to the perpetrator once their identity is known. An expanded genome profile that reveals information about health and behavioral traits would present a much greater violation of personal privacy than the core DNA profile or an expanded profile for physical features. Therefore, the discussion on what to profile is intimately linked to the privacy concerns. The potential disclosure of health and behavioral information would likely constitute a major violation of 'informational privacy.'[57] Since many genes are

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associated with multiple traits and conditions, privacy violations must be weighed against public safety for genetic information that may unintentionally reveal additional information about other traits such as a medical condition.

Another privacy concern relates to family members. Given the inherited nature of the information, expanded genome profiling can potentially reveal information about the perpetrator's family members. Even for health applications of genetic testing, the disclosure of genetic test results to relatives has been the subject of substantial debate.[58,59] Again, if the sample and information gained from expanded genome profiling is destroyed upon identification and apprehension of the suspect, privacy violations of family members will be substantially minimized. Only the core DNA profile will be needed and stored to confirm the identity of the perpetrator to the crime scene specimen.

One factor that may address many of the concerns raised about whom or for what crime an expanded genome profile would be ordered is the creation of a universal database. If a core DNA profile is obtained and stored in a national database from everyone at birth, an expanded genome profile would only be beneficial if the perpetrator was not in the database, such as that of a person visiting or recently moved from another country.

What?

The next question is what exactly will be profiled. Ancestry profiles from which race can be inferred have been available for the past few years. However, as genomics research continues to uncover the link between genetic variation and physical and behavioral traits, which traits should be included in an expanded genome profile? Can these expanded profiles be standardized like the core STR profile? At present, the novelty and dynamics of the field will likely not permit standardization for the foreseeable future. If the technology can be validated and demonstrated to be useful in different groups across the country, then a uniform expanded genome profile would be beneficial for both law enforcement and testing laboratories.

If the sole purpose of an expanded genomic profile is to identify and apprehend a perpetrator, it would seem logical that the information derived from the test provide only descriptive information pertaining to physical features such as hair and eye color, height, weight/build and skin pigmentation. It would be preferable if these traits could be determined directly rather than inferred from ancestry due to the range of features in a given population (e.g., skin pigmentation in individuals with Indian ancestry) and admixture. Inclusion of behavioral or health information would be of much lesser importance unless it can be demonstrated to be useful in identification.

Since many genetic variants associated with physical traits are likely to be located in and around genes, and genes often have multiple functions, additional unintended information may be revealed. This poses a challenging dilemma to identify genetic variants for traits that do not reveal additional information pertaining to heath status. For example, it is commonly known that individuals with fair skin are at higher risk to melanoma given their increased sun sensitivity. In testing specimens for the red hair and fair skin genetic marker, additional information is revealed pertaining to the

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individual's risk of melanoma.[60] If such information is 'discovered', do the police or investigating authorities have an ethical obligation to share that information with the perpetrator, particularly if an intervention is available that could prevent disease onset or reduce risk of disease? Although it would seem obvious that an individual of fair skin would be at increased risk of skin cancer, perhaps a subset of fair skin individuals have a higher risk than others that would only be revealed through genetic analysis of the red hair/fair skin gene.

As science and technology moves closer toward the goal of being able to sequence the human genome for $1000 or less, it is foreseeable that many, if not all, individuals, will have their genome sequenced. If every individual has their genome sequenced as part of routine healthcare, the risk of discovery and need to disclose becomes less of an issue since the individual is already likely be aware of their health risk. However, the privacy of the information will still be of concern and it will be critical that the information is destroyed and no record is made in the individual's criminal record.[61]

Secondly, and perhaps more importantly, what is the added value of an expanded genome profile? Given that ancestry profiles or other genetic testing of physical or behavioral traits cannot provide an exact description, how will the added benefit of an expanded profile be determined? For a new medical innovation, a randomized clinical trial would be conducted to determine whether a new tool is better than current practice as measured by defined clinical outcomes. However, it is unlikely that a forensic trial could be performed since so many variables are either uncontrolled for or unknown. As mentioned earlier, comparison to statistics prior to the use of expanded genome profiling may be able to indicate the benefits of these new applications.

Given that the profile will be less than perfect, will it still be useful? A similar question has been asked regarding the use of race in medical decision-making: does knowing someone's race aid in diagnosis or treatment decisions? Some argue that while race is an imperfect surrogate for disease diagnosis or likelihood to respond to treatment, the information is nonetheless helpful.[62] Will defining race in forensics be more clear-cut than defining race for medical decision-making? In the absence of better identifying descriptors, having some data is better than no data at all. If the limitations of the test are not well understood (e.g., low predictive value), the test may potentially pose greater risks than no test at all due to false results, misinterpretation and wasted precious time in search of a perpetrator with an incorrect physical description.

One of the potential risks of testing are false positive and false negative test results. If an expanded genome profile indicates that the suspect is likely to be a white male with red hair and the police narrow their investigation to individuals matching this description, what are the consequences of this inaccurate description? Although it is probably not necessary for police investigators to understand the minute details of genome profiling, it is imperative that they understand the limitations of the test. Probability rather than certainty is the rule with genomics for complex traits and behaviors. At this early stage of testing where only one or a few genes are associated with a particular trait, we clearly have a long way to go before reaching a high

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confidence level of prediction of physical traits. Given the high stakes involved, a misinterpreted or unvalidated test potentially poses greater risks than no test at all.

When?

If time is selected as the major determining factor for when to use an expanded genome profile, what is the appropriate length of time before using this technology? For example, how long should investigators wait, if at all, to obtain an expanded genome profile – if the perpetrator is not apprehended within 24 hours, one week, or six months? Should it be influenced by the type of crime – a shorter wait period for rapes and homicides versus burglary and assaults? Although it may be presumed that immediate testing of the sample will provide investigators with valuable information to identify and apprehend the suspect, the questionable predictability of some results, cost, and potential risks may discourage the rush to profile.

The question of when to test would only arise if it were determined to be inappropriate or unfeasible to immediately test all crime scene specimens. Some type of triage approach may be useful to separate samples from crimes that may be tested at later dates from samples that would not be tested at all. This would also require a closer relationship between investigators and forensic services to ensure that testing commenced at the specified time. However, it would seem that the majority of risks of expanded genome profiling would be minimized if the genome profile only provides information on physical traits and all information including the sample is destroyed when no longer needed, thereby opening the way for automatic testing policy of all crime scene specimens without obvious suspects. If the need for some type of triage system is due to economic or technical reasons, the limited use of the expanded profile should be weighed against the benefits of testing all samples.

Where and How?

And lastly, and probably the largest issue of all, where will the information be stored and how will it be used? Since national DNA databases have been established for the storage of core DNA profiles from convicted and arrested individuals, the infrastructure to store an expanded genome profile is in place. However, for individuals who have been apprehended and photographs and/or a core DNA profile are stored in their record, an expanded profile has little additional use. Once an identity has been made, the information collected from an expanded profile would serve no additional purpose and should therefore be permanently destroyed.

How will the information be used? The obvious use of information gleaned from an expanded genome profile is to narrow the search to individuals meeting the description. In the case of the Louisiana serial rapist, police were misled by eyewitness accounts that the perpetrator was a white male.[63] However, DNA profiling indicated that the perpetrator was a black male and investigators re-focused their search based on the genetic description. While drag-netting based on geographic proximity to the crime (e.g., neighborhood or village) has raised criticisms of violations of civil liberties, the use of expanded genome profiling could also raise criticisms if the use and development of the profile is not confined to identification purposes.

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Will all jurisdictions be able to afford the costs of expanded genome profiles? Where will testing be performed? Comparable to new medical innovations that require cost-effectiveness or cost-benefit analyses, the value of added expenses allocated to expanded genome profiling needs to be demonstrated. However, if some jurisdictions, particularly small towns or rural communities, cannot afford the additional costs, will that place them at a significant disadvantage compared to more affluent communities? A report from the National Commission found huge disparities among resources of local law enforcement agencies.[64] Analogous to expansion of newborn screening programs with the advent of tandem mass spectrometry technology, law enforcement will bear the costs of new equipment, laboratory space, and training for personnel and tight budgets will be strained further. As an alterative, law enforcement agencies may outsource DNA profiling as is already done with newborn screening to reference laboratories to reduce in-house costs. However, given that many states are back-logged with samples awaiting the core DNA identification profile, the addition of expanded genome profiling will likely add to the ongoing burden.

Conclusion

As forensic profiling continues to rapidly move forward using genomic information to provide a 'genetic' sketch derived from biological crime scene specimens, the ethical issues associated with these new applications will continue to arise. While it is impossible to foresee every potential risk of these new technologies, it is prudent to address the known risks such as inaccurate (false positive) test results, individual and family privacy, and inflammation of racial profiling practices. It is essential that these issues be addressed concurrent to the development of forensic applications and not after their implementation.[65]

In my opinion, however, many of these issues can be addressed by clearly defining the use of expanded genome profiling for the sole purpose of gathering descriptive information of the perpetrator. As such, to the extent possible, genetic variants that do not provide useful information about the perpetrator's physical characteristics should not be included. Following capture and trial of the individual, the profile result would be removed from his/her record and replaced with the standard DNA profile. Under no circumstances, except for laboratory quality assurance and quality control purposes, will any research or analysis of samples or data be permitted. If adequate safeguards are developed to ensure only the intended use of the expanded genome profile, problems should be minimized.

At present, the science presents a much bigger challenge to the justifiable use of expanded genome profiling than the ethical and social issues. Given the uncertainties and lack of data regarding the predictive value of these tests, much more research is needed to understand the genetic mechanisms of the development of physical traits before such tests can be deemed useful and effective.

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Behavioural Genetics in Criminal Cases: Past, Present, and Future

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Abstract

Researchers studying human behavioral genetics have made significant scientific progress in enhancing our understanding of the relative contributions of genetics and the environment in observed variations in human behavior. Quickly outpacing the advances in the science are its applications in the criminal justice system. Already, human behavioral genetics research has been introduced in the U.S. criminal justice system, and its use will only become more prevalent. This essay discusses the recent historical use of behavioral genetics in criminal cases, recent advances in two gene variants of particular interest in the criminal law, *MAOA* and *SLC6A4*, the recent expert testimony on behalf of criminal defendants with respect to these two gene variants, and the future direction of behavioral genetics evidence in criminal cases.

Use of Human Behavioural Genetics in Criminal Cases

With increasing frequency, practitioners in the U.S. criminal justice system have introduced expert testimony regarding the biological predispositions of criminal defendants, thus far with limited success. With the scientific research still in its infancy, criminal defendants have encountered significant hurdles when introducing expert testimony into U.S. criminal courtrooms regarding behavioural genetics. These defendants have primarily failed in their attempts because of the inadequacy of the science, the theoretical incompatibility of the evidence with the claim advanced, or because of procedural issues in U.S. criminal law barring the introduction of such evidence.

In several cases, criminal defendants have introduced biological predisposition testimony in an attempt to negate the presumption they acted voluntarily in the commission of the crime. The majority of defendants to advance such claims have done so in the context of drug or alcohol addiction.[1] In these cases, the defendant claims to have acted involuntarily as a consequence of his drug or alcohol addiction, for which he had a genetic predisposition.[2] This claim has largely failed primarily because it is at odds with the firmly rooted position in the U.S. criminal law that voluntary intoxication cannot serve to excuse criminal conduct. In contexts other than addiction, however, American courts have demonstrated some willingness to entertain the claim that a defendant's biological predisposition negates the voluntary act prerequisite for criminal liability. In the 2004 case of Herman Henry 'Bud' Von Dohlen, for example, the Supreme Court of South Carolina found persuasive the argument that the defendant's mental disease, severe depression arising from a genetic predisposition, rendered the homicide a product of disease, disassociated from the will, rather than a voluntary criminal act by the defendant.[3] Von Dohlen was convicted and sentenced to death for the armed robbery and murder of a dry-cleaning shop employee he fatally shot in the back of the head.[4] In support of his claim for post-conviction relief, a psychologist testified that as a result of 'his altered mental state '[the murder] was not a volitional thing but out of his conscious awareness or

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control.''[5] On appeal, the court reversed the earlier court's denial of post-conviction relief, finding instead that the psychological testimony created a 'reasonable probability the outcome of the trial might have been different had the jury heard the available information about [the defendant's] mental condition.'[6]

Defendants have advanced related arguments to rebut the mental state (mens rea) element of the crime, although, based on a review of appellate records in U.S. cases, only a few defendants have offered evidence of a behavioural predisposition for this purpose. In one of the few recorded instances of such a claim in the U.S., *State v. Davis*,[7] the defendant argued that his mental condition, to which he was genetically predisposed, prevented him from forming the requisite intent to commit first-degree murder, reckless endangerment, or possession of a weapon on school property.[8] In support of this defence, he presented psychiatric testimony that he had a 'genetic predisposition' for depression and mental illness, shown by the history of severe depression in his family.[9] The jury rejected his claim,[10] and the court affirmed on appeal, noting that the objective manifestations of Davis's behaviour prior to and during the commission of the alleged crime properly informed the jury's determination of his mental state.[11] Although genetic predisposition testimony has likewise been introduced to establish the defendant acted in accordance with a mental disease or defect in support of an insanity defence, courts generally conclude the defendant could still appreciate the wrongfulness of his conduct and conform to the law.[12] Nonetheless, when such testimony is introduced to bolster expert diagnosis of a mental condition, defendants have had more success.[13]

The majority of criminal defendants to have introduced expert testimony regarding their behavioural predisposition in U.S. criminal cases have done so in an attempt to mitigate their sentence, rather than to excuse or justify criminal conduct.[14] When used as mitigating evidence, defendants argue that their genetic predispositions make them less culpable offenders because their behaviour arose not as a result of 'bad character' but from 'bad genes.' Although such evidence could be used along with other mitigating circumstances, several criminal defendants have relied on behavioural genetics as the principal theory of mitigation during sentencing. [15] For example, in *Crook v. State*,[16] the defendant argued that his organic brain damage predisposed him to fits of violence. On appeal, the Supreme Court of Florida vacated the defendant's death sentence finding that the defendant's brain damage should clearly have been weighed to determine the appropriateness of a death sentence. As the science develops, particularly in elucidating the relationship between specific genetic factors and behavioural outcomes, mitigation theories like this one will likely become more prevalent in U.S. criminal cases. To date, however, only a few experts have managed to link the defendant's general behavioural predisposition and his specific criminal act in question;[17] establishing the link between a general genetic predisposition and the ultimate criminal act will be essential for this evidence to have significant future relevance.

Current Developments in Human Behavioral Genetics Research and Violence: *MAOA* and *SLC6A4*

The above cases illustrate the use of expert testimony in U.S. criminal cases regarding a defendant's general genetic predispositions with respect to his criminal conduct. It

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is possible that these earlier attempts to introduce behavioural genetics in the criminal law may have been too simplistic. Earlier claims in U.S. criminal cases rooted in behavioural genetics sought to establish that a single chromosomal abnormality (XXY), or a mutation at single gene (*MAOA* knockout) could explain, or even excuse, violent criminal behaviour. Recent scientific research, however, has illuminated a more compelling understanding of the interplay between specific gene variants, environmental stressors, and violence. These new scientific discoveries may provide a more meaningful understanding of behavioural differences between individuals, and have a greater potential impact on criminal proceedings.

In 2002, a research team based in New Zealand published a seminal paper that proposed a mechanism through which a person's genetic makeup and childhood experience might combine through a gene-environment interaction (G x E) to increase an individual's risk of becoming violent or expressing antisocial tendencies as an adult.[18] Essentially, this research team concluded that individuals with a particular allele of the *MAOA* gene, together with a history of serious childhood maltreatment were more likely to manifest violent and antisocial behaviour as adolescents and adults.[19] Previous research made evident that although many abused children become violent adults, most do not. The researchers postulated that a child's genetic makeup might modify his susceptibility to maltreatment. Specifically, the researchers tested whether a functional polymorphism in the promoter region of the *MAOA* gene would characterize genetic susceptibility to maltreatment. They selected the *MAOA* gene for study, in part, because an earlier study had identified a mutation of the *MAOA* gene in a Dutch family with a history of violence in the males.[20] This mutation, which eliminated MAOA enzymatic activity, was linked to male antisocial behaviour. While the *MAOA* mutation in the Dutch family has since been demonstrated to occur only rarely, the polymorphism of the promoter region of the *MAOA* gene causes common variants in gene expression.

The *MAOA* gene – located on the X-chromosome – encodes the *MAOA* enzyme, which metabolizes neurotransmitters such as serotonin, norepinephrine, and dopamine. The promoter region of the *MAOA* gene has either four repeats (causing high activity of the MAOA enzyme) or three repeats (causing low activity of the enzyme). In the DMHDS study population, 63% had four repeats and 37% had three repeats. The research team determined the gene variant possessed by each study participant, as well as the incidence of childhood abuse for each participant. They ascertained that endowment with the 3-repeat allele of the *MAOA* gene together with childhood maltreatment was significantly correlated with violent antisocial behaviour in adolescents and adults. Consequently, they concluded that '[f]or adult violent conviction, maltreated males with the low-MAO-A activity genotype were more likely than nonmaltreated males with this genotype to be convicted of a violent crime by a significant odds ration of 9.8.'[21] These study findings were replicated by Foley et al. (2004),[22] Huang et al. (2004),[23] Jaffee et al. (2005),[24] and Nilsson et al. (2005).[25] Although each of these later studies used varying definitions of child maltreatment, violent behaviour, and genetic risk, they all concluded that there was a gene x environment interaction consistent with the research reported by Caspi et al.(2002).

A year after publication of their paper on *MAOA* and child maltreatment, the research team of Caspi et al. (2003) published a second example of a gene x environmental

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interaction.[26] In the second paper, they reported a functional polymorphism in the promoter region of the serotonin transporter gene. The official term for the serotonin transporter gene is SLC6A4, although it is sometimes referred to as SERT and 5-HTT. The SLC64A gene – located on chromosome 17 – encodes a protein that facilitates activity of the serotonin transporter system. The serotonin transporter facilitates re-uptake of serotonin from the synapse back into the neuron. The promoter region of the SLC64A gene can have either a 'long allele' or a 'short allele.' The long allele is correlated with high activity of the serotonin transporter system, while the short allele is correlated with low activity.[27]

The researchers sought to understand the genetic and environmental interaction between the *SLC64A* gene variants and stressful life events. Specifically, they were interested in examining why some individuals become depressed and suicidal when faced with stressful life events, while other subjects appear to be more resilient. They hypothesized that the long allele of the *SLC64A* gene served as functional protection for carriers against the effects of stressful life events. Caspi and his colleagues once again reported a sophisticated gene and environmental interaction highly correlated with the differences in coping with stressful life events. They concluded that '[i]ndividuals with one or two copies of the short allele … exhibited more depressive symptoms, diagnosable depression, and suicidality in relation to stressful life events than individuals homozygous for the long allele.'[28]

This research may have significant potential application for criminal law. In much the same way that genetic predisposition evidence has previously been presented, these more specific interactions provide a more detailed understanding of differences in human behaviour and potentially more compelling testimony for consideration by juries. For example, a defendant charged with a violent crime may claim his behaviour could in part be attributed to the interaction of his genes (e.g., the 3-repeat *MAOA* gene causing low activity of the MAOA enzyme) and his life experiences (severe child abuse). On the other hand, a prosecutor may claim that the defendant's genetic makeup simply means he is a 'born killer' and should surely be incarcerated.

Legal Precedents regarding *MAOA* and *SLC6A4*

To date, testimony regarding these research findings in U.S. criminal cases has been quite limited. In May 2004, the faculty of Vanderbilt Forensic Psychiatry (a component of the Vanderbilt University School of Medicine Department of Psychiatry in Nashville, Tennessee) started to include genetic testing as part of their comprehensive pre-trial forensic psychiatric evaluation of defendants charged with homicide. As of February of 2006, this team has conducted *MAOA* and *SLC64A* genotyping on nine men and one woman charged with first-degree murder. Since August 2005, this team has testified regarding *MAOA* and/or *SLC64A* genotyping of four defendants in U.S. criminal cases. The details of this testimony will be reported in a future publication, once the legal outcome of these cases has been resolved.

In earlier unrelated cases, one criminal defendant sought *MAOA* testing, while several other defendants have introduced claims based on serotonin levels. The 1994 criminal case of Stephen A. Mobley is the sole reported case in the U.S. referencing *MAOA* genotyping prior to the Caspi et. al. studies of 2002 and 2003.[29] At trial, Mobley, who

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was convicted of murder and other related offences, filed a motion seeking funds to hire expert witnesses to assess his potential deficiency in *MAOA* enzymatic activity, based on the then-recent studies suggesting 'a possible genetic basis for violent and impulsive behaviour in certain individuals,' and his family history of violence. The trial court denied Mobley's motion, finding that the link between *MAOA* and violence lacked scientific verifiability sufficient for either the guilt or sentencing phases of his capital trial.

SLC6A4 genotyping has not been referenced in any published U.S. case as evidence presented during trial. Instead, expert testimony regarding a defendant's serotonin levels, a more tenuous claim, has been introduced in several U.S. criminal cases, usually to establish a link between a defendant's low serotonin levels and impulse control or intermittent explosive disorder.[30] The defendants in these cases claim to suffer from an inability to form the requisite intent for the alleged crime, or claim to have diminished culpability for purposes of sentencing. The defendants in these cases have enjoyed some success, such as a reduction from first to second degree murder, or potential mitigating effect during sentencing. However, because the link between serotonin levels and violence or impulse control is poorly understood, these claims have only had limited success when challenged by other expert testimony.

In short, we stand on the cusp of the introduction of this new behavioural research into criminal trials. Expert testimony regarding the research on *MAOA* and *SLC6A4*, together with a presentation of the relevant environmental factors could play a significant role in criminal cases going forward.

Future Directions

We are not proposing that the science of behavioural genetics will favour either the defence or the prosecution in criminal trials. We are simply predicting that research in this area will flourish and will identify more interactions among specific genes and specific life experiences, which promote specific behavioural outcomes. As the data amasses, the conclusions regarding the biological contribution to behaviour will become more precise, and the degree of scientific probability will become more robust.

Criminal defence attorneys, for example, may seek to present testimony regarding behavioural genetics in several circumstances:

- As mitigating evidence during capital sentencing hearings;
- To bolster the argument that a defendant may have been unable to subjectively form the mental state required for a particular crime, particularly with respect to premeditation for first degree murder;
- As evidence to inform the defendant's competence to assist in his defence or to waive Miranda rights;
- In the juvenile justice system to demonstrate that the juvenile's behaviour was partly determined by factors that were beyond his control (such as his genes and his history of child abuse) and that may be treatable, to support retaining the case in juvenile court rather than moving to criminal court.

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The prosecution may also make use of behavioural genetics evidence. For example, the prosecution could rely on behavioural genetics evidence to suggest that a criminal defendant poses a continuing threat to society or to support a finding of future dangerousness. Prosecutors could also use such evidence to malign the jury against the criminal defendant. This likelihood has already been realized in one case,[31] where the prosecutor referred to the defendant's family history of crime during his closing statement to the jury as demonstrating that the defendant came from a 'family of crime.'[32] Although the court acknowledged that in some contexts, 'this statement might be inappropriate, as it might indicate (for instance) a genetic predisposition to crime,' in the case at hand the court was unconcerned because it considered the statement merely hyperbolic, not grossly denigrating.[33]

Consequently, behavioural genetics evidence may be a double-edged sword for criminal defendants. Indeed, recent opinions in U.S. cases demonstrate that the introduction of behavioural genetics testimony by defendants could be adversely interpreted. The opinion issued by the United States Court of Appeals for the Ninth Circuit in *Landrigan v. Stewart*[34] provides a stark example of this phenomenon. Jeffrey Landrigan filed a petition for federal habeas corpus relief, claiming ineffective assistance of counsel during the penalty phase of his capital case because his attorneys, following the defendant's explicit instruction, failed to present mitigating evidence during the penalty phase of Landrigan's trial.[35] Four years after sentencing, however, Landrigan argued that notwithstanding his instructions at trial, he would have cooperated had his attorneys attempted to offer mitigating evidence demonstrating that his 'biological background made him what he is.'[36] The Ninth Circuit found such testimony unmoving, holding instead that 'although Landrigan's new evidence can be called mitigating in some slight sense, it would also have shown the court that it could anticipate that he would continue to be violent.'[37] At this stage of scientific progress regarding behavioural genetics, and the limited treatment options that may be available, defence lawyers should carefully consider whether evidence of an alleged genetic defect would help or hurt the defendant.

We predict that in the future, genetic testing will play an increasingly central role in criminal trials. For example, new research designs make likely that specific groups of genes will be identified that contribute to the development of schizophrenia and bipolar disorder. Criminal defendant will likely seek testing for these gene variants to support a claim of legal insanity. Prosecutors may likewise use a defendant's lack of these gene variants to support the contention that the defendant is malingering a psychiatric disorder and therefore not legally insane. Alternately, genetic testing may play an increased role in the evaluation and disposition of sexual offenders. For instance, specific gene-environment interactions may be correlated with a predisposition toward sexual disorders such as paedophilia. Future research could be used to support the contention that individuals with these factors are more likely to be recidivists, while individuals without these factors be more likely to be rehabilitated with treatment. The defendant's genetic makeup could thus become a central issue with respect to parole or indefinite commitment decisions.

The future promises a deluge of gene-environment research on human behaviour, and such evidence has and will continue to be introduced in the criminal court room. Paul S. Appelbaum, recently concluded that, '[r]ecent research findings … suggest that

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behavio[u]ral genetics may be the next frontier for the world of criminal justice, and mental health professionals are likely to play a critical role in helping the courts make sense of the new date.'[38] The recent use of such evidence in the criminal courtroom suggests that his prediction is beginning to be realized.

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[1] See, e.g., id.; State v. Boushack, No. 94-1389-CR, 1995 Wisc. App. LEXIS 378, at *4–*8 (Wis. Ct. App. Mar. 21, 1995) (rejecting defendant's argument that that his genetic defect limited his self control generally and made his intoxication involuntary).

[2] E.g. United States v. Moore, 486 F.2d at 1150.

[3] Von Dohlen v. State, 602 S.E.2d 738, 743 (S.C. 2004), cert. denied, 125 S. Ct. 1645 (2005).

[4] Id. at 740.

[5] Id. at 742.

[6] Id. at 743.

[7] No. M1999-02496-CCA-R3-CD, 2001 Tenn. Crim. App. LEXIS 341 (Tenn. Crim. App. May 8, 2001).

[8] Id. at *18.

[9] Id. at *12.

[10] Id. at *19.

[11] Id. at *19–*26.

[12] Kenley v. State, 759 S.W.2d 340, 344–48 (Mo. Ct. App. 1988) (rejecting defendant's ineffective assistance of counsel claim because it was reasonable trial strategy for attorney to exclude psychiatric testimony regarding defendant's genetic background and childhood history of violence because it did not satisfy the legal requirements for insanity).

[13] For example, in Robinson v. Johnson, 151 F.3d 256 (5th Cir. 1998), an expert abstained from testifying at trial because he believed Robinson's behavior to be drug-induced. On appeal, the expert filed an affidavit that he now believed Robinson's behavior to be caused by schizophrenia rather than drugs, because of new evidence that Robinson's sister and other family members had been diagnosed as manic depressives and schizophrenics, demonstrating Robinson's genetic predisposition to the disease.

[14] E.g., People v. Sapp, 73 P.3d 433, 469–73 (Cal. 2003), cert. denied, 541 U.S. 1011 (2004) (introducing as mitigating evidence the defendant's psychological and neurological factors contributing to the homicide).

[15] Hill v. Ozmint, 339 F.3d 187 (4th Cir. 2003).

[16] 813 So.2d 68 (Fla. 2002) [hereinafter Crook I] (vacating death sentence for failure to consider Crook's brain damage and mental retardation as mitigating factors); 908 So.2d 350 (Fla. 2005) [hereinafter Crook II] (vacating death sentence after re-sentencing by finding the death sentence was disproportionate in light of evidence of extreme mitigation).

[17] E.g., id. (finding that an expert's testimony explained how the defendant's fit of rage exhibited in the homicide was causally related to his behavioural predisposition to rage and impulse control).

[18] A. Caspi et al. Role of Genotype in the Cycle of Violence in Maltreated Children. Science 2002; 297:851-854.

[19] These conclusions were drawn from the Dunedin Multidisciplinary Health and Development Study (DMHDS). The DMHDS followed about 440 male children from birth to age 26. The children were assessed every two or three years, providing the research team with a wealth of information regarding psychosocial variables including child abuse. For example, the researchers established that 8% of the children experienced 'severe' maltreatment, 28% experienced 'probable' maltreatment, and 64% experienced no childhood maltreatment.

[20] HG Brunner et al. Abnormal Behavior Associated with a Point Mutation in the Structural Gene for Monoamine Oxidase A. Science 1993; 262:578-580.

[21] Caspi et. al., supra note 18, at 853.

[22] DL Foley et al. Childhood Adversity, Monoamine Oxidase A Genotype, and Risk for Conduct Disorder. Arch Gen Psychiatry 2004; 61:738-744.

[23] Y Huang et al. An Association Between a Functional Polymorphism in the Monoamine Oxidase A Gene Promoter, Impulsive Traits and Early Abuse Experiences. Neuropsychopharmacology 2004;

29:1498-1505.

[24] SR Jaffee et al. Nature x Nurture: Genetic Vulnerabilities Interact with Physical Maltreatment to Promote Conduct Problems. Development and Psychopathology 2005; 17:67-84.

[25] KW Nilsson. Role of Monoamine Oxidase A Genotype and Psychosocial Factors in Male Adolescent Criminal Activity. Biological Psychiatry 2006; 59:121-127.

[26] A Caspi et al. Influence of Life Stress on Depression: Moderation by a Polymorphism in the 5-HTT Gene. Science 2003; 301:386-389.

[27] In the DMHDS study population, 31% of the subjects had two copies of the long allele (l/l homozygotes), 17% had two copies of the short allele (s/s homozygotes), and 51% had one copy of each allele (s/l heterozygotes).

[28] Id. at 386.

[29] Mobley v. State, 455 S.E.2d 61, 65 (Ga. 1995).

[30] E.g., Hall v. State, 2005 WL 22951 (Tenn. Crim. App. 2005); State v. Payne, 2002 WL 31624813 (Tenn. Crim. App. 2003); State v. Godsey, 2001 WL 1543474 (Tenn. Crim. App. 2002); People v. Uncapher, 2004 WL 790329 (Mich. App. 2004); Hill v. Ozmint, 339 F.3d 187 (4th Cir. 2003).

[31] Johnston v. Love, 940 F.Supp. 738 (E.D. Pa. 1996).

[32] Id. at 753 n.17.

[33] Id.

[34] 272 F.3d 1221 (9th Cir. 2001), reh'g en banc granted, vacated, 397 F.3d 1235 (9th Cir. 2005).

[35] Id. at 1224.

[36] Id. at 1228.

[37] Id. at 1228–29 (internal citations omitted).

[38] PS Appelbaum. Law and Psychiatry: Behavioral genetics and the Punishment of Crime. Psychiatric Services 2005; 56:25-27.

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2006, Vol.2, No.1, pp.80–91.

The true ramifications of genetic criminality research for free will in the criminal justice system

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Abstract

There is an explicit belief – evident in jurisprudential literature – that developments in behavioural genetics in the very near future will necessitate a dramatic revolution in common law criminal justice systems. This paper considers what is truly shown by behavioural genetics in relation to free will, and the effect of such conclusions on criminal justice systems which rely upon the concept of free will as a foundation element.

This paper ultimately concludes that it is unlikely that criminal justice systems will be shaken – or indeed substantially influenced – by past or future discoveries in genetics. Three major arguments are employed: (1) that theses connecting genetic traits with criminal free will exhibit a naïve conception of partial genetic determinism; (2) that theses connecting genetic traits with criminal free will have been unduly motivated by discoveries in behavioural genetics which are disreputable or misleading; and (3) that even should an unexpected discovery be made exhibiting a strong causal connection between genetics and criminal behaviour, this will not prove to be an intolerable novelty for any criminal justice system which otherwise assumes free will to exist.

Introduction

The reception of genetic discoveries in jurisprudence has been such that the foundation of criminal justice – the assumption of the existence of free will for regular defendants – is popularly predicted to crumble.[1] Indeed, most common law criminal justice systems[2] centre on an assumption of free will. Superficial inspection of current genetic research may inspire an opinion that such research will reveal causal links between genes and criminal behaviour which contradicts this assumption. A general acceptance of genetic determinism among some circles of jurists[3] has lead to the view that fundamental changes must be made to the current system.[4] As noticed by Jones[5], The Honourable Richard Lowell Nygaard, Judge of the United States Court of Appeals, has even suggested the need to create a new set of criminal laws.[6]

I contend, however, that these reactions are melodramatic and misinformed. Firstly, the idea of partial genetic determinism that fuels these concerns is notoriously tenuous, as will be illustrated in part I. In this regard, I will argue that the comments of most jurists suggest a certain naiveté in respect to the ability to establish genetic causality. Secondly, the 'discoveries' specifically linking criminal violence to genes, which excite the public and inspire jurisprudential commentary, have historically been failures. These will be explored in part II. Thirdly, when it is realised that there is nothing intrinsically novel about genetic explanations of behaviour, in the context of this paper, the system's self defence mechanisms appear stronger than many jurists suggest. So in part III it will be shown, firstly, that the criminal justice system's approach to psychological influences and insanity *already* encompass genetically

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based impairments. Also, when the distinction between genetic and non-genetic biological causes is seen to be contrived, it will be shown that genetically deterministic explanations of criminality will simply extend further a recognised legal fiction, which I have called the Second Noble Lie.

Part I – The difficulty of establishing genetic causality

Fears regarding the impact of genetic research on our criminal justice system are founded on the possibility of identifying a genetic pattern 'for' criminality or violence.[7] Often, through the popular media, we are told that researchers have 'found the gene for' a particular physical or social attribute.[8] However, this seemingly straightforward proposition – that g is the gene *for* t – could have one of many meanings, of varying degrees and directions of causation[9]:

1. That everybody possessing gene g will *definitely* have trait t.
2. That *only* those possessing gene g could *possibly* have trait t.
3. A combination of (1) and (2) such that t will be apparent *if and only if* the person has g.
4. That there seems to be *some sort of statistical correlation* between having g and showing t.

Those afraid of the impact of genetic research on the nature of the criminal justice system should be no more propelled by statements in the form (4) than they are by observations that the majority of criminals are male.[10] Certainly, there is no genuine distinction to be made between the merely statistical criminal propensity of those who possess hypothetical gene g, and the increased criminal tendency of those who possess a Y chromosome.[11] Or, similarly, the disproportionate number of Indigenous Australians in custody.[12] Propositions of the form of (4) thus fail to be novel ones, as far as the criminal justice system is concerned.

The question of whether partial propensities based on genetic factors are any different to existing sociological ones will be addressed later. Consider, however, that to cast *new* doubts upon 'the unquestioned hypothesis of free will in the face of scientific knowledge'[13], propositions about genetic causation would have to tend towards (1), (2) or (3). Such contentions would be akin, for instance, to former *Science* editor Daniel Koshland saying:

> *the brain is an organ like other organs… it can go wrong not only as the result of abuse, but also because of hereditary defects utterly unrelated to environmental influences.*[14]

So the interesting situations, as far as sceptics of free will in the criminal legal system are concerned, arise when claims of causality are based entirely on genetic 'defects' and not on the effects of environment.

Consider, now, that we can further specify the types of claims which may be interesting, by ignoring propositions of the form (2). This follows from the straightforward observation that there exist certain laws, already, which apply to only a specific class of possible defendants. For instance, only those in control of a dog could possibly commit the offence of 'maliciously causing dog to inflict grievous

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bodily harm'.[15] Only a woman could commit the offence of 'child murder by mother'.[16] So, if it were found, for example, that only those with the 'rape de-inhibitor gene' could *possibly* commit rape, this should not necessarily illicit a reaction from the criminal justice system – so long as only *some* possessors of this gene actually *did* commit the crime. If some 'rape de-inhibited gene' possessors still abstained from committing rape, this would suggest an element of non-determinism that would allow the system to retain its current approach.

We can thus finally concentrate our attention on propositions of the form (1), since we have seen that those in the form (2) and (4) already have analogues in our system, which are handled without too much concern. Additionally, this has meant that (3) is no more interesting than (1), and so we should focus on what Kaplan has called 'the 'intervention is useless' strand [of biological determinism]'[17].

Certainly, if a 'hereditary defect' is found such that every possessor exhibits criminally violent behaviour, regardless of the environmental conditioning which preventative legal structures attempt to give[18], then the criminal justice system would undeniably have to consider its position in regard to cases involving such persons. However, there has been much opposition to the possible existence of such a 'strong' genetic determinism, in general[19] and specifically for criminality[20]. Additionally, there is a common case study that has become an essential consideration in this debate, namely the story of phenylketonuria (PKU).

The first use of PKU as an example in this argument came in the introduction of Plomin et al:

> *A genetically determined behavioral problem may be bypassed, ameliorated, or remediated by environmental interventions. The best example is PKU, a single-gene defect that formerly resulted in severe retardation… PKU individuals do not suffer retardation if a diet low in phenylalanine is provided during the developing years. Thus, an environmental intervention was successful in bypassing a genetic problem.*[21]

The argument continues with Kitcher:

> *Before the discovery of special diets that enable children to develop normally, it was natural to think of a disease most prominently revealed in severe mental retardation as genetically determined. Armed with the understanding that the immediate causes of the cognitive disability lie in overloads of phenylalanine and under-supply of tyrosine, we can separate the manifested disease from the underlying genes.*[22]

So, we are given this example as a warning, to prevent us from prematurely labelling a behavioural condition 'genetically determined'. It is an instance where a supposedly true proposition in the form (1), namely that everybody possessing the PKU gene will inevitably suffer mental retardation, has in actuality been shown to be incorrect. Complaints have been raised that this account of PKU actually demonstrates an inherent belief by scientists of a less-radical kind of genetic determinism.[23] However for our purposes the PKU story serves as a reassurance that the type of discovery that

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could really shake the criminal justice system is a historically difficult one to make, even for clear-cut single-gene defects.

Of course, this is not so much a conclusive thesis as it is a provider of perspective. It is beyond commentators to show that the 'intervention is useless' strand of genetic determinism is an eternally impossible one, however examples such as the PKU story serve to illustrate the high degree of improbability, at least in the near future.

Another perspective-granting argument – a general theme in many commentaries – is that the number and nature of influences on human development make it particularly difficult to locate discrete genetic causes of behaviour. Additionally, the interaction of biological and social factors makes the thus-far reductionist approach a naïve one. Lewontin et al provide a useful analogy:

> *Think, for example, of the baking of a cake: the taste of the product is the result of a complex interaction of components – such as butter, sugar, and flour – exposed for various periods to elevated temperatures; it is not dissociable into such-or-such a percent of flour, such-or-such of butter, etc., although each and every component (and their development over time at a raised temperature) has its contribution to make to the final product.*[24]

So the manifestation of a trait is seen to be the product of a complex matrix of interactive relationships. Even if we hypothesised a direct connection between a genetic mutation and an exhibited trait, the highly interactive nature of influential factors would make such a reductionist hypothesis impossible to test, meaning that to proceed with the 'intervention is useless' approach in that instance would be fallacious[25].

We are beginning to see, then, that establishing the sort of genetic causality which could threaten notions of free will in the criminal justice system is particularly difficult to do. This has been historically true, even in seemingly straightforward observations of genetic influence such as PKU, let alone for highly complicated behaviour such as criminal violence or aggression. It may be interesting, then, to examine some of the failed attempts at showing the biological causes for criminal behaviour.

Part II – The historical difficulty of biologically explaining criminality

Lombroso's atavisms

The attempt to find biological causes for criminality has not been limited to modern genetic endeavours. Lombroso, in attempting to find physiological signs of a person's criminal propensity, constructed a theory 'based on the idea that criminals were 'atavisms,' throwbacks to an earlier, less 'civilized' sort of person'[26]. The connection of Lombroso's ideas to the modern debate about genetic criminality was inspired by Lewontin et al:

> *Lombroso and his followers attempted to establish a system whereby a predisposition to engage in antisocial behavior could be predicted on the basis of physical characteristics… A rational criminology*

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> *thus became possible, a theory of criminal faces that was the obvious forerunner to today's belief in criminal chromosomes.*[27]

Physiological indicia of criminal likelihood included 'a heavy and developed jaw, projecting [eye] ridges, an abnormal and asymmetrical cranium… projecting ears, frequently a crooked or flat nose'[28]. The idea was, as Kevles described it, that 'since the crime-producing features of the physical organism must be hereditary, so must be the criminality'[29]. Of course, the entire adventure is all too reminiscent of phrenology, and has aptly received the same sort of criticism[30]. The scientific basis is obviously contrived, Lombroso's writing lacking even 'the usual obeisances to cold objectivity'[31]. Ignorance of the complexity of human criminal behaviour thus resulted in a misconceived attribution of criminality to pre-determined biological causes.

Despite the blatantly misinformed nature of Lombroso's *atavisms* idea, it nonetheless raised the same sort of fears about free will in criminal justice that we face with *genetic* causation theory. The similarity is astounding:

> *The Lombrosian criminal anthropologists… tended toward liberal, even socialist, politics and saw themselves as scientifically enlightened modernists. They hoped to use modern science as a cleansing broom to sweep away from jurisprudence the outdated philosophical baggage of free will and unmitigated moral responsibility.*[32]

So we can see that this early analogue to genetically determined criminality was an utterly naïve one. But have modern attempts been any more accurate?

MAOA deficiency

In 1993, Han Brunner and co-workers published an article in Science connecting 'impulsive aggression, arson, attempted rape, and exhibitionism' with 'a complete and selective deficiency of enzymatic activity of monoamine oxidase A'[33].

Reaction to the report was immense, as described by Charles Mann:

> *After the article was published, [group member Xandra Breakfield] was 'stunned' to receive phone calls from lawyers who wanted to test their clients on death row for MAOA deficiency, hoping that it might exculpate them; equally bad were the talk-radio hosts who suggested sterilizing people who carry what one journalist called 'the mean gene'.*[34]

Discoveries such as MAOA deficiency are what motivate and 'inform' public ideas of genetic criminal causality, to the extent that these ideas become manifest in common concerns about criminal justice, yet the findings are tenuous at best. Far from being convincing, the findings regarding the effect of MAOA deficiency on behaviour are connected with problems with any such finding in behavioural genetics, such as the 'misuse of statistical methods, failure to define the trait under study, bias in the selection of cases and controls, and inadequate sample size'[35]. For this reason, even if the findings of Brunner and co-workers are replicated, 'they are unlikely to mollify the critics of previous efforts to link specific genes to human behaviors'[36].

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Others have also shown specific concern, in this instance, to the cake-baking problem of Lewontin et al, pointing at non-genetic origins of the reported violent behaviour:

> *These individuals are mildly retarded… There they are in the middle of families of unaffected people – is it any wonder that they are full of frustration and anger?*[37]

The story of MAOA serves to show that even with complicated technology and adherence to scientific standards – obviously lacking in Lombroso's theories – the biological descriptions of criminality which illicit public reaction are still naïve ones, once again making such reactions misplaced.

XYY

The story of the XYY scare is an even more explicit illustration of the public embracing faulty biological explanations of criminal violence. Like Lombroso's atavisms and MAOA deficiency, this is another false start, which nonetheless gave people the impression that some are born to crime. Kitcher gives one account:

> *…investigation of the chromosomes of men in prison and in mental hospitals revealed an unexpectedly large percentage of men with an extra Y chromosome. So was born the idea of the criminal chromosome. Mothers who discovered through amniocentesis that the fetus they were carrying was an XYY male came to believe, on the basis of apparently rigorous science, that they would be likely to give birth to a future jailbird or maniac.*[38]

Not too surprisingly, the claims – that XYY is an indicator of pre-determined criminal violence – have been conclusively disproved.[39] Once again, alternative causes were pointed at, for instance by Kaplan:

> *XYY males' higher incarceration rate proved to be correlated with their reduced mental ability, but XYY males proved to be no more violent than the population at large – their higher incarceration rate was the result of mostly petty property crimes.*[40]

Like MAOA deficiency, the story of XYY shows that the additional knowledge we have gained since Lombroso's time has not necessarily prevented incorrect statements about inheritable criminality being made. It additionally illustrates the apparent willingness with which we the public accept such claims. Undeniably, such a tendency would simultaneously over-inflate any worries we have regarding the possibility of genetic discoveries causing legal revolutions.

Aside from the unlikelihood of finding a connection, it is also the case that, if a connection *were* to be found, it might not present any real difficulty for the criminal law. It *could* simply be another flavour of an already pervasive phenomenon, which the legal system is equipped to deal with. Similarly, it could fall within the range of the system's self-preservation mechanisms. The next part deals with the scope of the insanity plea, the idea of generalisation in law, and the system's method for handling philosophical issues of free will and determinism.

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Part III – The adaptability and resilience of the criminal justice system

Genotypic mutation as just any other cause of mental disturbance

Consider that, with the XYY theory, it certainly wasn't posited that an extra Y-chromosome directly influenced a possessor's activity. Rather, it was theorised that this genetic mutation had an effect on *brain activity* which, in turn, resulted in criminally violent behaviour. Similarly, the genes for MOAO don't directly affect behaviour – MAOA deficiency creates a metabolic disturbance, which, it was argued, affects brain states to the point where criminally violent acts are more readily committed.[41] It would be hard to imagine a genetic explanation of violent tendency that did not involve a corruption of mental faculties. This seems to suggest, then, a possible connection between psychological defences and hypothetical genetic ones.

Indeed, this link has been articulated by some commentators, particularly Joseph Alper, who has used it to argue against the seriousness of the ramifications of behavioural genetics research.[42] In his words, 'the essential feature of the insanity defence is that none of the definitions of insanity makes reference to the underlying cause of the impairment'[43]. He goes on to point out that 'the requirements for an insanity defense are couched in intention rather than physical terms'[44]. So, since any genotypic mutation that may affect behaviour will inevitably do so via some sort of macro-level psychobiological disturbance, the court will handle genetic defences in the same way that it handles all other psychological deficiency defences.

The court has neither reason nor impulsion to discriminate between the causes of mental illness, whether genetic or environmental. Indeed, since it is generally accepted that most recognised mental illnesses involve a complex interaction between genes and environment[45], any sort of distinction made by the court between genetic and non-genetic causes would be entirely contrived, and so impossible to regulate.

Thus there is no reason to suggest that cases involving genes are, *ipso facto*, different – nor that the predictive power of genes is any greater than other factors, as illustrated in Part I – contrary to the excitement of many jurisprudential commentators. Of course, the practical administration of justice in genetic defence cases is not the main concern of this paper. Rather, we are more concerned with the more philosophical question of whether the *fundamentals* of criminal justice would still be valid if genetic causal discoveries were made. In this regard there is little reason, *prima facie*, to consider the scope of the M'Naughten rules, the insanity defence at large or analogous defences in some criminal jurisdictions such as non-insane automatism. However, it does show us that features of legal structure (such as generality) exist to self-perpetuate its applicability over time – ambiguity leaves room for interpretation, so creating dynamism. I argue that there exists an even stronger self-protective structure, the Second Noble Lie, which will guard the criminal justice system against any concerns regarding genetic determinism, just as it currently guards against philosophical questions of free will in general.

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The First Noble Lie

The First Noble Lie is introduced here mostly for the purpose of drawing an analogy. It concerns the fact that judges inevitably impart their own subjective beliefs into their judgements, but that they must appear to objectively apply laws, for the sake of public confidence in the judiciary. Justice Kirby of the High Court of Australia describes the charade:

> *Whenever tempted to depart from the words of the past, [pre-Mason judges] would usually pull themselves back to the 'noble lie'. They did not 'make' law, they 'applied' it… judges pretended to a mechanical function whilst knowing, when they stopped to think about it, that it is inevitable that they play a creative role in making law.*[46]

There is very strong criticism, in jurisprudential literature, of the 'judges don't make law' approach.[47] Katherine Biber provides a simple yet compelling argument:

> *The 'law' is rarely clear, and applying it to unique scenarios requires acts of interpretation… opposing views are drawn from the same facts and, usually, the same body of legal authority.*[48]

And yet, the judiciary feels it necessary to deny its own law-making function, for instance the current Chief Justice of the High Court of Australia, Murray Gleeson claims that:

> *The capacity of an individual to make an impartial determination of the facts, and to understand and conscientiously apply the law, is the primary requirement of fitness for judicial office.*[49]

This necessity is borne out of the struggle for public confidence in judicial democracy and impartiality[50] and thus intellectual honesty makes way for desired socio-legal policy. This 'Noble' lie illustrates that the legal system has no preoccupation with truth when it comes to conserving those policies that are believed to be essential for maintaining public order. Of course, the more interesting Noble Lie, insofar as it relates to this paper, is that which concerns free will.

The Second Noble Lie

This paper is in response to arguments that discoveries about genetically determined criminality will force the criminal justice system to reconsider its position on free will. Ironically, the system makes little effort to consider its approach to free will at all. As Matthew Jones points out:

> *Courts have shown little indication that they are willing to undertake the difficult philosophical, biological and psychological inquiry necessary to truly formulate an understanding regarding the causes of human behavior.*[51]

Indeed, the law has little regard for whether free will exists or not – free will is an assumption in the criminal justice system, for the sake of policy, rather than a recognition of philosophical truth.[52] Herbert Packer comments on the system's apathetic approach to truth about determinism:

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> *The idea of free will in relation to conduct is not, in the legal system, a statement of fact, but rather a value preference having very little to do with the metaphysics of determinism of free will… Very simply, the law treats man's conduct as autonomous and willed, not because it is, but because it is desirable to proceed as if it were.*[53]

So here we have a Second Noble Lie – intellectual honesty about free will and determinism makes way for pragmatic policy, according to the desires of lawmakers. Even when judges recognise that the assumption of free will may be contrived in most cases[54] they nonetheless perpetuate it, fearing the consequences of being candid.

This approach is certainly consequentialist – the system has no qualms with lying about a person's free will if this is found necessary for socio-legal stability. Additionally, it is distinctly utilitarian in that assuming free will for a person who has none will result in that person being punished, not out of desert, but for the purpose of maximising good governance. As Cragg describes it,

> *an essential element of retributivist accounts of punishment is the view that punishment for wrongdoing is justified only where the person acted voluntarily.*[55]

Thus, by being apathetic towards whether actions are truly voluntary, the punishment in the criminal justice system must be serving a purpose not of *retribution*, but of *deterrence*.[56] It is far beyond the scope of this paper to determine whether this is the best approach. Suffice it to say that supporters of a Kantian legal system will no doubt be disappointed, and advocates of judicial democracy will be shocked by the self-righteous oligarchy which 'Noble' lying amongst lawyers has created.

Whether right or wrong, whether practical or inefficient, this feature of the legal structure exists. Evidently, it has survived the last century's dramatic advances in cognitive science, fending off the challenges of behaviourism and evolutionary psychology. Despite this, many jurists, such as Maureen Coffey[57] and Matthew Jones, suggest that *genetic* research *will* be sufficient to change the criminal justice system to one which 'relies more on utilitarian rationales to justify criminal behavior than it has in the past'[58].

However, for this to occur in light of the Second Noble Lie, critics such as these must argue that the deterministic nature of genes is so great that the lie surpasses its threshold of believability. Even if we ignore the first half of this paper and take for granted the existence of a correlation between crime C and genotype G, it remains to be shown that genetic explanations of criminal behaviour are more powerful and enlightening than mere psychological and environmental ones, since these have failed to shake the system. Such an argument must imply that there is something intrinsically different about genotypic explanations of criminality as far as the court is concerned.

Of course, we realise by now that these statements are false – that there is no reason to consider genetic explanations as *ipso facto* different, and that the potency of genotypic explanations of behaviour has been greatly exaggerated by misinterpreting the results of research. Jones for instance, in coming to his above conclusion, refers to XYY and

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MAOA as 'promising research'[59]. Aside from what jurisprudential commentators have said in ignorance of the true nature of genetic criminal explanations, there is nothing left but an *argumentum ad novitatem* – jurists have simply become excited due to the novelty value of this new research, which they have evidently failed to place in perspective. In failing to present an original problem to the criminal justice system, any genetic defences will be encapsulated by the Noble Lie of the assumption of free will. Even with the assumption, as stated above, that some correlation can be shown to exist between genotype G and propensity to commit crime C, the very nature of genetic research would make such a correlation no more potent than other types of causal explanations which the court has ignored previously.

Conclusion

Jurisprudential reactions to research into genetic criminality have been based on misinformation and consequently have exaggerated the ramifications of this research for the criminal justice system.

For one, it is particularly difficult to establish genetic causality in general, and many conclusions about direct genetic causality have been prematurely drawn or entirely naïve. The discoveries about criminal genetics which have informed jurisprudential writing, such as XYY and MAOA, have actually been embarrassing failures, yet have stirred the imaginations of jurists. Future discoveries conclusively linking criminal violence with any sort of genotypic mutation seem highly unlikely, upon any honest consideration of what is required to establish convincing causality.

Even if such a discovery were made, the criminal justice system would handle it as just any other type of cause, and so cases of genetic defence would be treated as cases of psychological- or environmental-based defences of insanity or automatism are treated now. This also places concerns about genetic determinism within the scope of the system's natural defence mechanism, the Noble Lie of free will. Any hypothetical discovery – however unlikely – of genetically influenced criminal tendency, will simply perpetuate this utilitarian legal fiction, and so be absorbed into the system without a problem.

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[1] For a summary of legal scholarship on the topic see M. Jones. 2003. Overcoming the myth of free will in criminal law: the true impact of the Genetic Revolution. 52 Duke Law Journal 1031: 1042-1050. For dissenting opinion, see M. Jones or J.S. Alper. 1998. Genes, free will, and criminal responsibility. Social Sciences & Medicine Vol 46, Issue 12: 1599-1611.

[2] This paper deals most specifically with the United States and Australian legal systems, as these have been the main sources of concern regarding the impact of genetic research specifically on questions of free will in criminal justice.

[3] See for instance C. Price-Huish. 1997. Born to Kill? Aggression Genes and Their Potential Impact on Sentencing and the Criminal Justice System. 50 SMU L Rev: 603; M. Johnson. 1998. Genetic Technology and Its Impact on Culpability for Criminal Actions. 46 CLEV. ST. L. REV.: 443 at p455; P.A. Brennan et al. 1996. Assessing the Role of Genetics in Crime Using Adoption Cohorts. In Genetics of Criminal and Antisocial Behavior. G.A. Boch and J.A. Goode eds. New York. John Wiley & Sons: 115.

[4] For instance Johnson, op. cit. note 3, pp462-70; R.L. Nygaard. 1996. Free Will, Determinism, Penology and The Human Genome: Where's a New Leibnitz When We Really Need Him? 3 U. Chi. L. Sch. Roundtable: 417-62, at p437; S.I. Friedland. 1998. The Criminal Law Implications of the Human Genome Project: Reimagining a Genetically Oriented Criminal Justice System 86 KY. L.J.: 303-41; A. Evensberg. 2001. 'But Your Honour, It's In His Genes': The Case for Genetic Impairments as Grounds

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for a Downward Departure Under the Federal Sentencing Guidelines 38 Am. Crim. L. Rev.: 1565-72.
[5] Jones, op. cit. note 1, p1031.
[6] Nygaard, op. cit. note 4, p430.
[7] Jones, op. cit. note 1, p1040.
[8] See, for instance, M. Lerner. 2001. 'U' researchers find gene for a type of muscular dystrophy. Star Tribune 03/08/01; N. Wade. Researchers Find Gene for Type 2 Diabetes. New York Times. 27/09/00; J.B. Verrengia Researchers find gene for dwarfism in Amish babies. Laredo Morning Times. 02/03/00; K.A. Fackelmann. Scientists find gene for clotting disorder - action of activated protein C blocked in people with family history of venous thrombosis. Science News 07/05/94; 'Hate gene' breakthrough - Filipino researchers claim to find gene for homophobia. New Internationalist October 2000; U-M scientists find gene for low-frequency hearing loss. University of Michigan Health Service news release 20/11/01; Family and research team work together to find gene for hereditary pancreatitis. University of Pittsburgh Medical Center press release 19/05/96; UT Southwestern researchers find gene for inherited form of high cholesterol. University of Texas Southwestern Medical Center press release. 27/04/01; Hair loss: Scientists find gene for rare condition. Star Tribune. 30/01/98.
[9] This particularisation is of course not unique to this paper, and has been identified in analogous forms by other authors. For instance, S. Pattinson. 2002. Influencing Traits Before Birth. Ashgate. Aldershot: 45-46, which notes that insofar as causation is concerned, genotypes may be viewed as a necessary, sufficient, or contributory condition for traits. The particularisation I have provided is thus a clear analogue of Pattinson's, with the addition of a 'necessary and sufficient' formulation, being my form 3.
[10] T.H. Murray. 1994. Genetic Legacy and Culpability. In The Human Genome Project: Human Aspects Vol II. Madrid. Fundacion BBV.
[11] M. Kirby. 1999. The future of criminal law – some big issues. Address to the 28/07/99 conference of the Criminal Lawyers' Association Northern Territory.
[12] Royal Commission into Aboriginal Deaths in Custody. 1991. Final Report of the Royal Commission Into Aboriginal Deaths In Custody. Canberra. AGPS: §5-7.
[13] M. Kirby. 2000. Through the world's eye. Annandale NSW. The Federation Press: 43.
[14] D.E. Koshland Jr. 1990. The Rational Approach to the Irrational. Science, New Series, Vol. 250, No. 4978: 189.
[15] *CRIMES ACT (NSW)* 1900 s35A.
[16] *CRIMES ACT (NSW)* 1900 s21.
[17] J.M. Kaplan. 2000. The limits and lies of human genetic research: dangers for social policy. New York. Routledge: 11.
[18] H. Wechsler and M. Jerome. 1940. Criminal Law and Its Administration. New York. The Foundation Press: 4-17.
[19] Kaplan, op. cit. note 17, pp 9-56; P. Kitcher. 1997. The Lives to Come: The Genetic Revolution and Human Possibilities. New York. Simon and Schuster: 239-269; R.C. Lewontin et al. 1984. Not in our genes: biology, ideology, and human nature. Newe York. Pantheon Books.
[20] Alper, op. cit. note 1; K. Morley and W. Hall. 2003. Is There a Genetic Susceptibility to Engage in Criminal Acts? Trends & Issues in Crime and Criminal Justice No. 263, Australian Institute of Criminology: 4.
[21] R. Plomin et al. 1990. Behavioral Genetics: A Primer. New York. W.H. Freeman and Co: 9.
[22] Kitcher, op. cit. note 19, p244.
[23] Kaplan, op. cit. note 17, pp13-21.
[24] Lewontin et al., op. cit. note 19, p11.
[25] R.C. Bailey. 1997. Hereditarian scientific fallacies Genetica 99: 125-33 at p126.
[26] Kaplan, op.cit. note 17, p94
[27] Lewontin et al., op. cit. note 19, p54.
[28] Lombroso quoted in S. Chorover. 1979. From Genesis to Genocide. Cambridge Mass. MIT Press: 179.
[29] Kevles. 1985. In the name of eugenics: Genetics and the uses of human heredity. New York. Alfred A. Knopf: 71.
[30] See, for instance, S.J. Gould. 1981. The Mismeasure of Man. New York. W.W. Norton: 142-173, or Lewontin et al, op. cit. note 19, pp53-54, or Kaplan, op. cit. note 17, pp92-95.
[31] Gould, op. cit. note 30, p162.
[32] Gould, op. cit. note 30, p170.
[33] H.G. Brunner et al. 1993. Abnormal Behavior Associated with a Point Mutation in the Structural Gene for Monoamine Oxidase A. Science 262: 578-80, at p578.

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[34] C.C. Mann. 1994. Behavioral Genetics in Transition. Science 264: pp1686-89, at p1689.
[35] Mann, op. cit. note 34, p1688.
[36] Mann, op. cit. note 34, p1688.
[37] P. Breggin, quoted in Mann, op. cit. note 34, p1689.
[38] Kitcher, op. cit. note 19, p69.
[39] Pyeritz et al. 1997. The XYY male: the making of a myth. In Biology as a social weapon. Minneapolis. Burgess Publishing: 86-100; D. Borgaonkar and S. Shah. 1974. The XYY chromosome, male – or syndrome. Progress in Medical Genetics 10: 135-222.
[40] Kaplan, op. cit. note 17, p97.
[41] Brunner et al., op. cit. note 33.
[42] Alper, op. cit. note 1.
[43] Alper, op. cit. note 1, p1608, referencing M.P. Coffey. 1993. The genetic defence: excuse or explanation? 35 William and Mary L. Rev: 353-99.
[44] Alper, op. cit. note 1, p1608.
[45] Alper, op. cit. note 1, p1608; N. Risch. 1990. Genetic linkage and complex diseases, with special reference to psychiatric disorders 7 Genetic Epidemiology: 3-16.
[46] M. Kirby. The First Hamlyn Lecture: 'Judicial Activism: authority, principale and policy in the judicial method'. Delivered 19/11/03 University of Exeter, UK.
[47] For instance, A. Mason. 1987. Future Directions in Australian Law 13 Monash University Law Review: 155-163; A. Altman. 1996. Arguing About Law: An Introduction to Legal Philosophy. Boston. Wadsworth: 226-30; P. Williams. 1993. The Alchemy of Race and Rights. London. Virago: 139-41.
[48] K. Biber. Many shades of grey in white arguments on black deaths SMH 23/12/02.
[49] M. Gleeson. 2000. Judicial Legitimacy 12(6) Judicial Officer's Bulletin: 41-44, 48.
[50] Kirby, op. cit. note 46.
[51] Jones, op. cit. note 1, p1034.
[52] S. J. Morse. 1994. Culpability and Control 142 U. PA. L. REV. pp1587-89; R. C .Boldt. 1992. The Construction of Responsibility in the Criminal Law 140 U. PA. L. Rev. pp2245-47; H. Packer. 1968. The Limits of the Criminal Sanction. Stanford CA. Stanford University Press: 74-75; Jones, op. cit. note 1, pp1034-36.
[53] Packer, op. cit. note 52, pp74-75, quoted in Jones, op. cit. note 1, p1035.
[54] Justice Nygaard does provide at least one admission from the judiciary that the criminal justice system's approach to free will is contrived, or at least flawed, at Nygaard, op. cit. note 4, p422, where he notes that '[o]ur criminal law's philosophy must presume that individuals have a totally free will because our penology is motivated by revenge and the desire to punish offenders. Indeed, Americans are so preoccupied with punishment that we pay almost no attention to, and consequently receive little guidance from, either the social or physical sciences. We seem to shun any evidence that might help us explore the genesis of crime for fear that the evidence will indicate that our philosophical bases for criminal sentencing and our penal modes themselves have fundamental shortcomings. Even worse, we fear being perceived as 'soft' on crime. As a result, we rely upon an unscientific, underdeveloped theory of responsibility and blameworthiness.' While Justice Nygaard's explanation of the motivation for this Noble Lie is, with respect, arguable, the above passage nonetheless illustrates that judicial application of principles regarding free will is performed with knowledge of how contrived those principles are. See also Jones, op. cit. note 1, *his* endnote 21.
[55] W. Cragg. 1992. The Practice of Punishment: Towards a theory of restorative justice. New York. Routledge: 24.
[56] Cragg, op. cit. note 55, pp44-48.
[57] Coffey, op. cit. note 43, pp394-98.
[58] Jones, op. cit. note 1, pp1031-1032.
[59] Jones, op. cit. note 1, p1040.

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Addiction in public health and criminal justice system governance: neuroscience, enhancement and happiness research

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Abstract

Present regulations and prohibitions relating to psychoactive substances rest upon socio-historically contingent and hence arguably irrational foundations. New evidence bases located in post-genomic genetics and neuroscience hold the potential to disrupt them through demonstrating a lack of congruence between the regulations and prohibitions and the alleged and actual harms. How far might we use such knowledge to drive policy? What limits, if any, should be placed on our choices, and what attempts to influence these may be seen as acceptable? This article seeks to address these questions in relation to criminal justice system and public health governance of psychoactive substance use. It will explore the implications of justifications employed in both areas to restrict free choice on the grounds of harm to the self and to others. The central argument made is that the current categorisation of psychoactive substances as lawful or unlawful is likely to become disrupted as the result of several separate discourses which converge over psychoactive substance use: enhancement, cognitive liberty and the degree to which subjective experiences of pleasure, well being and happiness might enable us to improve and maintain our health as individuals and that of society as a whole. In my view, the strategic deployment of concepts of addiction which has enabled the public health and criminal justice systems to be able to share governance over psychoactive substance use is likely to become destabilised by these discursive developments. In that policy in the United Kingdom and elsewhere now draws upon happiness research, while reformers advocate freedom of choice over means of enhancing our states of being, a new focus upon the rational evaluation of psychoactive substances governance seems plausible.

Introduction

This paper will explore the impact of happiness research, cognitive liberty, enhancement, post-genomic genetics and neuroscience discourses on strategic deployment of concepts of addiction in public health and criminal justice system governance. Current thinking frames governance over citizens in neo-liberal consumer societies as resting upon our making rational choices over consumables and activities in the name of freedom in order to maximise our health, wealth and happiness.[1] These aspirations may conflict. Research reveals that although if we are unemployed or in ill-health we are less likely to be happy, once we have achieved a modicum of wealth becoming richer renders us only slightly happier, whereas psychoactive substances and activities may increase our happiness, but only sometimes our health.[2] Psychoactive substances, or those which alter the way our minds function and how we feel, are diverse. Any substance ingested, like food, and many activities, like exercise, alter our moods and hence how we perceive the world and experience our lives. Some, like opiates, may make us feel better in a dual sense, in that they may form the basis of medical treatment as well as enhancing our subjective experiences. Yet when many are taken to excess, feeling good may turn to

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feeling bad. Too much sugar makes us sick, too much amphetamine makes us paranoid and too much exercise makes our joints give out.

This complex potential renders psychoactive substances uniquely central to governance strategies which focus upon inculcating rational choice. Both public health and criminal justice systems rely upon justifications of harm to oneself or to others and notions of addiction to regulate or prohibit our consumption of psychoactive substances. Training us to eschew the short-term pleasures of a sugar rush for the long-term happiness of good health provides a template for rational consumer choices and the conservation of healthcare resources. Coding pleasure as risk encourages us to measure enjoyment in terms of degrees of harm posed to ourselves and to others. Thus we should calculate that the pleasure obtained from too much of a lawful psychoactive substance, or any amount of an unlawful one, leaves us vulnerable to risks associated with addiction and/or criminal liability. Yet present regulations and prohibitions relating to psychoactive substances rest upon socio-historically contingent and hence arguably irrational foundations. Thus new evidence bases located in post-genomic genetics and neuroscience hold the potential to disrupt them through demonstrating a lack of congruence between the regulations and prohibitions and the alleged and actual harms.

How far might we use such knowledge to drive policy? What limits, if any, should be placed on our choices, and what attempts to influence these may be seen as acceptable? This article seeks to address these questions in relation to criminal justice system and public health governance of psychoactive substance use. It will explore the implications of justifications employed in both areas to restrict free choice on the grounds of harm to the self and to others. The central argument made is that the current categorisation of psychoactive substances as lawful or unlawful is likely to become disrupted as the result of several separate discourses which converge over psychoactive substance use: enhancement, cognitive liberty and the degree to which subjective experiences of pleasure, well being and happiness might enable us to improve and maintain our health as individuals and that of society as a whole. In my view, the strategic deployment of concepts of addiction which has enabled the public health and criminal justice systems to be able to share governance over psychoactive substance use is likely to become destabilised by these discursive developments. In that policy in the United Kingdom and elsewhere now draws upon happiness research, while reformers advocate freedom of choice over means of enhancing our states of being, a new focus upon the rational evaluation of psychoactive substances governance seems plausible. In addition, policy moves to encourage the biotechnological industry to join public/private partnerships, taken together with the commercial potential of 'biovalue',[3] or profit generated by products anchored in the biological characteristics of life itself, enhancement technologies and 'cosmetic neurology', provide an economic environment hospitable to this.[4]

Policy, happiness research and harm to oneself and to others

Deriving the normative from evidence bases poses perils for policymakers. Yet, nonetheless, recent calls for them to draw upon national indicators of subjective wellbeing, or how people evaluate their lives in terms of happiness, to craft policies which will maximise happiness are proving increasingly influential.[5] For instance,

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governance in the United Kingdom has been informed by the work of Professor Lord Richard Layard, who has reread utilitarianism in the light of neurochemical and social science research to provide a justification for recommending wide ranging policy changes such as minimising income and social inequalities in order to maximise our health and happiness.[6] He contends that since we innately seek to feel good, and experience happiness, pleasure or wellbeing through altruism, trust and fellow feeling, policies which support our happiness when this does not harm either us or others may promote individual and social flourishing.[7] Not only does happiness cause success,[8] both feelings of happiness in the sense of pleasure, as well as the eudaimonic wellbeing we experience when our lives make sense to us, are good for our health.[9]

Nonetheless, not all happinesses are equal. For instance, as those involved in public health and criminal justice system governance wish us to maintain our health and to remain within the law, we must be persuaded to find happiness in choosing to consume carrots rather than cake or crack cocaine. Such decisions are commonly distinguished in terms of sub-optimal choices of short-term pleasures as opposed to rational adherence to practices promoting long-term happiness. Thus policymakers are likely to seek to influence how we define and experience happiness as opposed to pleasure, and may take a pick and mix approach to the results of research according to how well these match their political views.[10] Although happiness researchers may disagree over how far policy interventions should engage in social engineering to modify our less than optimal choices, governance inevitably seeks to shape them.[11] Thus while proposals by the Secretary of State for Health to raise our levels of happiness and conserve healthcare resources by restoring our mental health, getting us off incapacity benefits and back into the workplace as advocated by Lord Layard demonstrate the potential for post-genomic genetics and neuroscience to anchor public health and social policy, they also suggest how far this potential might support coercive social measures.[12]

Nor is drawing upon happiness research as a basis for policy measures straightforward where criminal justice system policy over psychoactive substances is concerned. Whereas Lord Layard's proposals rest upon demonstrable measures of happiness which permit a degree of normative extrapolation, many things which make us happy or provide us with pleasure are criminalised. Some sanctions may be justified in terms of harm caused to others: while my happiness might be increased by my stealing your Ferrari Testarossa, this would cause you harm so I should be punished or deterred from doing so. Other offences may provide happiness without necessarily harming others. Many clubbers who take ecstasy achieve happiness without apparent damage to themselves or others, or, at the very least, with less harm than that caused to and by those who consume alcohol within the law. While Lord Layard has adverted to this issue in passing, it has not formed a major focus of his rereading of utilitarianism.[13] Nonetheless, it has anchored other initiatives which seek to reform the present categorisation of psychoactive substances as legal or illegal. Supporters of legalisation or decriminalisation of at least some currently unlawful psychoactive substances allege that the harms caused by rendering certain drugs illegal far exceeds that the drugs themselves might pose to individuals who consume them or to society at large, although many regard this claim as unproven or unproveable.[14]

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Current controversies over the ethics of human enhancement approach the area of harm and psychoactive substances from a different perspective. Pharmaceuticals which hold the promise of making us 'better than well' risk being proscribed as designer drugs unless they can be sold as medicines.[15] Thus they have the potential to alter our perception of what it is to be healthy. In that they may be made available to the public only via prescription, their manufacturers promote them as medications to treat a plethora of new 'lifestyle' disease entities such as female sexual dysfunction, allegedly experienced by almost 50% of women.[16] Underpinning this situation is the assumption that while we may ethically intervene in order to remedy harms such as illness to restore sufferers to a state of natural health, to seek to move beyond therapy to enhance our capacities, particularly where this involves irreversible change, is selfish, unfair, threatens human nature and compromises human dignity.[17] This stance has been challenged. Those who favour enhancement see anti-meliorist views as philosophically suspect bioconservatism, based upon overly narrow conceptions of humanity, dignity and autonomy.[18] Transhumanists, characterising humanity as a work in progress, assert a right to self-transformation which may or may not involve psychoactive substance use.[19]

Such a right is allied to that put forward by supporters of cognitive liberty, who argue that the First Amendment on Freedom of Thought of the United States Constitution is 'meaningless without an inherent right to autonomy and self-determination over one's own functional neurochemistry'.[20] This right would entail not only the right to autonomous decisions over consuming psychoactive substances but also the ability to refuse pharmaceutical intervention in the form of compulsory pharmacotherapy, such as vaccines which would block the pleasure inducing effects of illegal drugs.[21] Claims to a right to cognitive liberty also draw upon post-genomic genetics and neuroscience to assert aspirations to enhancement by pharmaceutical means. Exercising such rights or aspirations may well involve the consumption of unlawful psychoactive substances, yet prohibiting our doing so is alleged to be difficult to justify in terms of harm to others outweighing our freedom to seek personal happiness. Indeed, the notion of harm may be deployed to suggest that we suffer significant harm if we are prevented from exercising rights to autonomy over how we pursue happiness, self-transformation and cognitive liberty.

Thus post-genomic genetics and neuroscience reveal potentials for us to reinvent ourselves, to enhance our happiness, health or humanity and to experience cornucopias of pleasures. As Wolpe explains, '[n]eurological biotechnologies differ from others in that they ask us to explicitly consider the kind of 'self' we want to have; or, to put it less dualistically, perhaps, the kind of self we want to be'.[22] In similar vein, the rereading of utilitarianism spurs us on to engage in choices which will maximise our happiness. Extant or future psychoactive substances afford us with opportunities to do so, yet our availing ourselves of these may conflict with public health and criminal justice system governance. Ways in which conceptions of addiction are used strategically to resolve or conceal these contradictions will now be explored.

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Post-genomic genetics, neuroscience and the governance of addiction

Criminal justice and public health governance both deploy the notion of addiction as a central trope. If we are seen as addicted, we have harmed ourselves through an unhealthy seeking after pleasure, and pose harm to others through placing excess burdens on healthcare resources, or committing crimes to fund our drug abuse. Yet classification of psychoactive substances as lawful (alcohol, nicotine), unlawful (cocaine) and/or medicinal (opiates, cannabis) is socio-historically contingent,[23] and fails to conform with their potential to harm our health.[24] Nonetheless, sizeable tax revenues from alcohol and tobacco, combined with international agreements mandating a war on drugs, have sustained a categorisation which conflicts with both the impetus to enhancement and with those who assert rights to cognitive liberty.[25] We, as self-reflexive citizens, are expected to exercise our wills judiciously, to choose lawful pleasures and to maintain healthy lifestyles. Those of us who do not are liable to be seen as engaging in sub-optimal choices, and to be condemned for losing control. [26] Should we be deemed to seek pleasure excessively or inappropriately through consuming unlawful psychoactive substances, we may be subsumed under criminal justice or public health models and punished or treated for addiction accordingly.

How far might post-genomic genetics and neuroscience anchor policy here? Some of us find ourselves unwilling or unable to restrict our pleasures. Research establishing the neurochemistry of reward pathways in the brain has associated this with genetic susceptibilities. Some of us are more likely to take risks to increase our stores of dopamine, some of us can resist psychoactive substances more than others and still more of us have difficulty changing patterns of consumption once they have become habitual. Views on how to characterise this vary over time and place. Moral censure and the involvement of the criminal justice system prevail where intoxications are associated with failures of the will, harmful impacts upon others and unlawful acts. Under a public health model, however, addictions are characterised as chronic, relapsing conditions which should attract treatment rather than punishment or incarceration.

Jurisdictions exercise governance through these alternative models in varying fashions, which impact upon specific groups in different ways, often commensurate with social stratification.[27] In addition, in the United States the emphasis upon the war on drugs has fostered a framing of unlawful psychoactive substance use within the criminal justice paradigm of punishment as prevention of harm to others, on the assumption that many offend in order to support drug abuse. Treatment programmes for offenders operate under the aegis of the drug courts, with the aim of eradicating both habits. Elsewhere, particularly in Europe and the Antipodes, the harm reduction movement leans more towards the public health treatment model. Here reducing harms to users and others is fostered by treatment programmes and measures which provide support for those using unlawful drugs, such as providing them as part of medical treatment.[28] The United Kingdom draws from both approaches.

What impact should the revelation of varying genetic susceptibilities to different forms of addiction have upon offenders? Should my liability for breaking the law be tempered by the fact that my genetic make-up and neurochemistry incline me towards taking undue risks, thereby making unlawful psychoactive substance use more of a

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temptation? How far should my lowly social status, statistically correlated with my risk profile, be taken into account? Classically the criminal justice system has been unwilling to allow evidence of genetic or biological variations to influence ideas of culpability. Where sentencing options are concerned, however, offenders who are categorised as suffering from addictions may be offered treatment for these, often within contexts which are presented as therapeutic. Civil liberties protections may be waived by the offenders, while the penalties of incarceration recede where judges consider that a cure against re-offending based upon addiction has taken place. Misgivings have been expressed over the assertion of biological culpabilities as justifying the removal of such crucial protections.[29]

While the DSM-IV-R uses the more recent clinical term drug dependence to classify those who are deemed to overuse or abuse psychoactive substances, neuroscientists continue to favour the label of addiction as denoting neural adaptations which foster a loss of control over urges to take a drug. Within this model, the pleasure which comes from taking psychoactive substances tempts us to do so excessively. If we do, our volition may be compromised as pure psychoactive drugs 'bypass adaptive information processing systems and act directly on ancient brain mechanisms that control emotion and behaviour'.[30] Even where homeostatic mechanisms within the brain ensure that we no longer experience pleasure from consuming the drug, once we are addicted we crave it nonetheless, so that our ability to decide not to take it, not to damage the rest of our life by seeking it out, or to enjoy the ordinary pleasures of life becomes seriously compromised.[31] Hence drug addiction is characterised as 'a chronic, relapsing disorder in which compulsive drug seeking and drug taking behaviour persists despite serious negative consequences. … Continued use induces adaptive changes in the central nervous system that lead to tolerance, physical dependence, sensitisation, craving and relapse'.[32]

It is currently estimated that genetic factors account for 40-60% of vulnerability to addiction, either as genetic variations, through gene-environment interactions or via variable metabolism of drugs or sensitivity to their effects.[33] Rewarding experiences associated with drugs or with what is usually termed 'natural' rewards, ie other pleasure inducing substances or activities such as sugar or sex, produce similar effects in the brain. It seems likely that all drugs which are subject to abuse share common neural and molecular pathways which provide reward and promote addiction.[34] Thus, as identifiable neuronal mechanisms underlie rewards, craving, relapse and the disruption of the ability to experience pleasure, addiction 'is best conceptualised as a disease of brain reward centres that ensure the survival of organisms and species'.[35] From this perspective, volition is compromised by neuroadaptations associated with addiction which induce relapse.[36] Both patients with damage to the ventromedial prefrontal cortex, the part of the brain associated with reflective decision-making, and those addicted to substance abuse persistently engage in choices which lead to significant harms in their lives. Neural mechanisms which enable the amygdala system, a part of the brain involved in the experience of pain and pleasure, to hijack the capacity to abjure short term gains for long term goals as a result of addiction have been put forward as an explanation for addicts' loss of will power.[37] Thus compulsive drug-seeking and drug-taking behaviour is facilitated by difficulties in decision making and a compromised ability to judge the consequences of one's own actions.

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These genetic and neuronal effects on the wills of those suffering from addiction have obvious implications for the criminal justice system, where punishment is coded to mens rea, or volition. Punishment for voluntary prohibited actions preserves the viability of social groups by curtailing the activity of free riders, and may precede reintegration.[38] However, the extent to which prohibited actions may be considered sufficiently volitional to attract punishment within the criminal law is problematic. New neuroimaging technologies suggest that the genomic and genetic underpinnings of choice may undercut current notions of moral responsibility. Nonetheless, these do not at present indicate mental states at times crimes are committed.[39] Mental condition defences are based upon the materialist assumption that abnormalities or diseases of the mind may be located in malfunctions of the brain.[40] Yet even materialist evidence of brain functioning may be difficult to interpret in these terms. How useful, then, are neuroscientific explanations and technological possibilities for criminal justice systems wherein offenders may be seen as addicted?

A salient caveat here is the increasing complexities revealed by post-genomic genetics. The subtleties of varieties of gene expression, how each variation may result in differing behaviours and the ways in which epigenetics has demonstrated that environment may impact on inherited characteristics all make it clear that straightforward assertions of genetic cause and effect cannot be put forward convincingly.[41] Correlation and statistical associations between biology and behaviour, however, produce hypotheses of possible mechanisms here, many of which are gradually being bolstered by ongoing research. This picture is complicated where investigations of addiction to psychoactive substances are concerned. Much of the extant knowledge of the neuroscience of addiction, neurotransmitters in general and the impact on behaviour comes from the use of animal models.[42] Ethical factors restrict the range of investigations which would be approved for human subjects. Varieties of effect and mechanism exist amongst different species of non-human animals, between these and humans, and amongst humans.

Much of the research involving human subjects where dependence upon psychoactive substances is being investigated is also complicated by the fact that many of these substances are unlawful. Access to the both subjects and substances is thus compromised. Even where human subjects are available, the fact that many who are seen as abusing psychoactive substances suffer from various co-morbidities, such as mental illness, renders verification of comparisons and conclusions difficult. Indeed, one of the commonly accepted rationales for co-morbidity is that substance abuse represents an attempt to self-medicate by those experiencing uncomfortable mental states.[43] A further obstacle is that those who depend upon psychoactive substances tend to avail themselves of more than one, rendering generalisations over the effect of a specific substance problematic.[44] Accordingly, assertions about the neuroscience of criminal responsibility, pleasure and addiction rest upon suggestive rather than certain scientific foundations. To claim otherwise would be to engage in what Healy has condemned as biobabble.[45] In addition, there are obvious philosophical difficulties inherent in connecting biological substrates with both subjective experiences and conscious and volitional actions.[46] Although as outlined above Lord Layard's rereading of utilitarianism, based partially on neurochemical evidence, has influenced policy in the United Kingdom, many philosophers and ethicists contend that it is both impossible and inappropriate for neuroscience to be seen as providing the potential to replace normative questions with scientific ones.[47]

What, then, might the neuroscience and post-genomic genetics associated with psychoactive substance use contribute towards criminal justice system governance? Evidence of compromised volition seems unlikely to overturn present interpretations of mens rea, or criminal responsibility, in the near future. Yet, where this may be interpreted as addiction, a disease in need of treatment, it can be framed in terms of its constituting harm to oneself and one's health, as well as a motivation for harm against others in the sense of crimes against property or persons embarked upon in order to sustain unlawful psychoactive substance use. Criminal justice system and public health governance thus converge over the treatment of offenders who may be classified as addicts. It is to this territory I now wish to turn.

Addiction in public health and criminal justice system governance

Both public health and criminal justice authorities possess coercive powers. Should serious infectious diseases threaten us, we may be segregated, forcibly treated and incarcerated in order to protect the rest of the populace. Similar mechanisms ensure that offenders are imprisoned and punished. Ideally, overreaching of these powers is kept in check by human rights and civil liberties procedural protections. While public health and criminal justice both possess claims to heal individuals and society at large, then, these are underpinned by significant access to lawful force. We may be compelled to accept treatment or punishment when the larger interests of society are seen as being at stake. It is these wider social interests which purportedly underlie public health and the criminal justice system's classification of some pleasures as preferable or lawful. For example, the endogenous opiates we produce through exercise are to be encouraged, whereas the exogenous equivalents we may purchase in the form of heroin are to be prohibited in part because we may commit crimes to fund our habit.

Nor are all lawful sources of neurochemicals seen as equivalent. Public health's concern with resource allocation and the consequences of overindulgence in lawful psychoactive substances such as alcohol, nicotine and food has resulted in policies which seek to moderate our access to them. Restrictions upon places where one might smoke, raising taxes on alcohol and the proscription of certain types of food being sold in schools are some recent examples. Criminal justice policies aim to prohibit or to exact retribution for the consumption of unlawful psychoactive substances. Public health and criminal justice system approaches overlap where offenders are directed towards programmes which purport to treat addictions. Here the procedural protections associated with civil liberties within the criminal justice system are typically relaxed. Participants, in effect, are offered the choice of defining themselves as ill or bad, ie as suffering from addiction as a chronic, relapsing disease or as wilfully engaging in prohibited behaviours which damage both themselves and the larger social fabric. In this light, those who complete the therapeutic programmes successfully escape punitive measures such as incarceration, whereas those who fail to complete are subjected to them.[48] The neuroscience of addiction traversed above offers supplementary measures of treatment which give rise to concerns over the civil liberties of those offenders who may become subjected to them.

Medications which remove the rewards or stimulate unpleasant side effects when specific psychoactive substances are taken, or vaccinations with similar effect, are

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potential forms of compulsory treatment for both actual and potential offenders. Thus individuals with genetic formations associated with a predisposition towards addiction, particularly children, may receive vaccinations, with or without consent, as a preventative measure. Analogies with allegations of the over-prescription of ritalin, tranquillisers and anti-depressants forming part of public health governance are clear. Compulsory treatment, the use of neuroscientific technologies to identify actual and potential offenders and the compromised capacity of vulnerable offenders and minors to consent to such treatment raise separate ethical issues. As these have been explored elsewhere, they will not be considered further here.[49] Hence the definition of addiction as disease, especially when in the context of criminal justice system proscription, gives rise to significant misgivings over compulsory treatments. These acquire additional force from the spectre of relaxed civil liberties protections associated with treatment within the criminal justice system, suggesting prolonged and indefinite liabilities as a very real possibility.[50]

The reformatory force of public health and criminal justice system measures in this arena are aimed at encouraging those subjected to them to aspire to a model of self-reflexive micro-management where conditions defined as disease are eschewed, so-called cures embraced and experiences of pleasure subsumed within a civic aspiration to health. This model frames happiness as eschewing short-term pleasures and minimising harm to oneself or others. Both public health and criminal justice system governance thus characterise pleasure seeking where psychoactive substances are concerned in terms of curtailment. Finding too much pleasure in ‘excessive’ consumption of lawful substances, or in habitually resorting to those prohibited by the law, is deemed to be inappropriate. Yet, nonetheless, many of us continue to do so. At times, most of us choose pleasure over perfect health and virtuous self-restraint. Indeed, the proponents of cognitive liberty and human enhancement would argue that we should be free to direct our own choices here.

Models which seek to explain this seemingly irrational behaviour have veered between characterising it as moral weakness or a form of ill-health. Marianna Valverde has traced the historical transformations of alcoholism and other ‘diseases of the will’ in this light.[51] Recently, together with Pat O’Malley, she has elucidated how the experience of pleasure has been excluded from public health and criminal justice discursive strategies which seek to restrain our consumption of psychoactive substances via the rubrics of addiction and drug abuse.[52] In my view, however, the incorporation of neuroscience into policy discourse and the public imagination has now fostered a simultaneous resurgence and co-optation of pleasure which threatens this strategic deployment of notions of addiction.

Salutogenesis: the obligatory prudential transforming of pleasure

The impetus within public health policy to persuade us to eschew activities which pose risks to our health and espouse those which enhance it is associated with the concept of salutogenesis.[53] The opposite of pathogenesis, or the origins of ill-health, salutogenesis aims to delineate the origins of health and the means by which it might be ensured and maintained. Neuroscientific research has contributed to the salutogenic programme by revealing the extent to which pleasure not only enhances our health but forms a basis of our daily life. Endogenous opiates, for example, ensure that we enjoy

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one another's company, providing evidence for a postulated human trait of affiliation.[54] While the neurocircuits in the brain associated with functional salutogenic mechanisms that contribute to health via specific beliefs and practices are not yet well understood, associations between certain states of being or beliefs and practices and good health are now accepted. If we feel that life makes sense, that we can deal with its difficulties, and are able to love at least some of our lives, our gods and our fellow men and women, then we will be happier, more likely to be healthy than if we do not, and will recover better from ill-health. Psychoactive substances and practices may enhance or substitute for these factors. Thus, pleasure is good for us because it helps to make us happy and healthy. Lord Layard's rereading of utilitarianism rests upon this neuroscience of well-being and mood control. Public health and criminal justice systems wishing to draw upon pleasure as a means to promote health or discourage vice must thus move forward from the elision of pleasure from their discursive strategies noted by O'Malley and Valverde.

Hence, in my view, the neuroscience of salutogenesis, Lord Layard's rereading of utilitarian happiness and recent suggestions that susceptibility to becoming addicted to various substances, such as alcohol, or activities, such as risk-taking, may be associated with particular genetic formations have together supported a reframing of pleasure as the basis of neurochemical algorithms designed to maximise our health. A measure of the degree to which this has become part of popular culture is the daily exhortations in the tabloids to improve our looks and health by engaging in frequent sex with a regular partner,[55] to select foods which will maximise our mood enhancing neurochemicals,[56] to replace our addictions to obesity inducing serotonin imbued carbohydrates with the non-calorific mood enhancing endorphins to be found in regular cardio-vascular exercise,[57] or to log onto a National Health Service affiliated website which will advise us on techniques of sexual pleasure.[58] Public health campaigns encourage us to engage in daily rituals wherein subjective experiences of well-being through pleasure are fostered in order to maximise health. Here our pleasures are not inherently to be valued, but become subsumed within a public health imperative mandating self-reflexive salutogenesis as we become responsibilised to engineer and control our moods in order to ensure that we are as healthy as possible.

Rose has drawn attention to the degree to which the daily self-reflexive practices associated with the maintenance of health and the scrutiny of our inner lives constitute contemporary means of governance.[59] For our neurochemical selves,[60] prudential practices and rational choices associated with the discerning experience of pleasure have become daily obligations as we seek, responsibly, to maximise our health. Public health policy today expects biological citizens to manage their lives reflexively in ways which will maximise their health, longevity and well being.[61] Thus, despite genuflections towards the right not to know, we are responsiblised in terms of discovering our risk profiles, altering our lifestyle practices accordingly and attaining prudential mastery of the neurophysiology of mood maintenance. Under the model I have put forward, discourses of pleasure become part of a mandatory programme of self-maintenance which ensures our long-term health and happiness. Pleasure is experienced subjectively as a neurotransmitter symphony we conduct, pumping up the volume of serotonin via sex, carbohydrates or prozac. These prudential practices come under threat when our desires for pleasure are viewed as intemperate. Judicious moderation or modulation of neurochemicals becomes an essential literacy. Foucault's

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account of the uses of pleasure in classical Greece has at its centre an allied aesthetic.[62] Indeed, this still forms the basis of suggestions that youthful abusers of psychoactive substances might be persuaded to mend their ways by eschewing excess.[63] This aesthetics of moderation is threatened by excessive consumption, the location of pleasure in disapproved psychoactive substances and pleasure seeking habits which interfere with our ability to manage our daily life. It is here where public health and criminal justice framings of addiction and substance abuse become salient. In conclusion, I shall now explore how my portrayal of the discursive strategies over pleasure employed in public health and criminal justice policies may be integrated with recent critical theorising on neo-liberalism, governance and addiction.

Discriminating between pleasures, neo-liberal consumer society and addiction

Gerda Reith asserts that neo-liberal consumer society creates a fetishism of addiction as an artifact of discursive conflicts between consumption, freedom and governance.[64] In her view, citizens in such societies are responsibilised as self-reflexive consumers who are both constructed by their freedom to choose amongst commodities and constrained by their incapacity to escape the burdens associated with such unending rational choices. In these circumstances, the option of adopting the identity of an addict, whose ability to engage in volitional choices may be accepted as compromised, may prove all too tempting for many. Hence today there is a plethora of people defining themselves as addicted to food, sex, shopping, gambling and so forth. From this perspective, treatment for addiction becomes a means of returning weak-willed citizens to their self-reflexive responsibilities associated with consumer choice. The cyclic return of the self-actualising consumer, assuming control over life, is framed as a triumph over 'the daemonic force of addiction'.[65] Those who prove recalcitrant are subjected to the more explicit coercive powers of the criminal justice system.

In Reith's consumer society, freedom is read as freedom to consume. Hence dependence, or lack of freedom, is peculiarly abhorrent, and must be eschewed and condemned. As she explains,

> *'What is new in modern society is not the emphasis on issues of freedom per se, but rather the unprecedented emphasis on freedom as a mode of governance by and through the individual. Innermost states are the medium through which freedom is controlled, as well as the measure of its loss. Today we are governed not against but through our freedom, which is why its loss or vitiation is articulated in terms of its opposite'.*[66]

How does this fit in with pleasure? O'Malley and Valverde associate the elision of pleasure in liberal discourses of addiction with its subsumption within forms of rational and responsible enjoyment.[67] Agreeing with Fox that pleasure is read as risk in public health today, they characterise criminal justice policies embodied in the harm minimisation movement as based upon a rational choice actor performing the felicity calculus in order to avoid harms rather than to experience pleasures.[68] Hence, any right to pleasure within a consumer society is in tension with, but subservient to, the prudential duty to eschew risk. As they conclude,

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> *'Liberal government has thus accumulated a battery of pleasure-denying characterisations, each with its own discursive effectiveness, each linked with an appropriate set of governing techniques. Beastliness requires and justifies force and compulsions; compulsive behaviours trigger and validate therapeutics; free choice consumers require and are provided with information and skilling. Thus does liberalism arm itself with a multiplicity of responses, becoming potentially ever more flexible and adaptable in its capacity to govern without pleasure'.*[69]

My suggestion in this paper is that neo-liberal governance today has moved on from this position. In my view, it now draws upon healthcare's focus upon salutogenesis, post-genomic genetics and neuroscience to colonise pleasure as a means to ensure that rational consumers aspire both to maintain neurochemical mood control and to apply the aesthetic of moderation to the consumption of lawful psychoactive substances in ways which will maximise health. From this perspective, liberalism as portrayed by Reith, O'Malley and Valverde governs not without but through both freedom and pleasure. Addiction accepted as a chronic relapsing disease provides a rationale for a cyclic progression of citizens from the rigours of rational consumption to the shriven status of the sick, before their return from excess to self-reflexivity. Yet while the evidence from post-genomic genetics and neuroscience provides some support for the extension of notions of addiction to ordinary activities like shopping and sex, it also undermines the designation of specific psychoactive substances as lawful or unlawful on the basis of harm read as addiction. If almost everything we imbibe or do has addictive potential, the grounds upon which some things might be prohibited become problematic unless reasons other than addiction are proffered and proven.

This presents many possible future scenarios. Two extremes will be sketched out here. Should notions of addiction be extended to cover prohibitions on specific psychoactive substances according to their potential for harm, an expansion of both criminal justice system and public health governance might be anticipated. An increasing number of us would be designated as suffering from conditions requiring treatment. Pharmaceuticals providing alternative means of experiencing pleasure, or of blocking the pleasure-inducing effects of prohibited psychoactive substances, would be characterised as medication. Avenues for enhancement and claims of cognitive liberty would not be favoured. Alternatively, should the latter prove successful, pharmaceuticals enabling us to experience a range of pleasures or abilities, ideally with potentially harmful side effects being blocked, would be made available in pure, regulated form. Any psychoactive substances posing irrevocable harm to others, like arsenic, would continue to be subjected to safeguards in keeping with the criminal justice system's protective functions.

The disruption of the present systemic inconsistencies of the classification of psychoactive substances as lawful or unlawful which I have argued is catalysed by post-genomic genetics, neuroscience, happiness research, salutogenesis, and the discourses of pleasure, enhancement and cognitive liberty is inevitable under either scenario sketched out above, as well as in a range of others. Which will prove the more likely would appear to hinge upon the future relationship between ideas of freedom, medicalisation, pleasure and prohibition on the basis of harm. A crucial factor in determining which possible scenario will come into being will be the commodification of health. Part of the governance of freedom in neo-liberal society is

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the investment of commercial third parties, often in public/private partnerships, in the 'shaping of the intimate', the construction of disease entities and a commodification of the means by which these might be treated.[70] Risk societies and the health practices of individuals managing their risky selves have given rise to opportunities wherein biovalue might be generated. Such commercial ventures offer biological citizens a plethora of consumer choice in the form of genetic tests, pharmacogenetically tailored pharmaceuticals and neurochemical means by which we might enhance our mood control.[71]

Nor are the law abiding self-reflexive citizen consumers the only market for the products of biovalue. Pharmaceutical companies' interests in providing medication on a large scale at a time when many patents for major drugs are running out have influenced how drugs are marketed, as well as the creation of novel disease entities such as female desire dysfunction disorder.[72] Thus the size of the criminal justice system as a potential market for drugs which target neurochemistry associated with addiction is a substantial incentive to produce valuable additions to the arsenal of governance in the form of magic bullets like ritalin, which attract blanket prescription for behaviour which may be regarded as socially unwise. Under the first scenario, then, the likelihood of inappropriate medication of vulnerable offenders within the criminal justice system, and the 'prophylactic' treatment of those who are viewed as at risk of addiction, seems high. In that version of neo-liberal consumer society, a restricted range of pleasures, those which are lawful and do not make us fat, unhealthy or unhealthily unhappy, or in which we do not indulge to excess, would be made available to us within the commercial sector. Medications or medical treatments which restored those of us who slipped on primrose paths to return to the straight and narrow would be made available through the public health or the criminal justice system. Here the confluence of public health's disease model of addiction, public health powers of compulsion, the criminal justice system's orientation towards reintegration and retribution and simplistic applications of genetic and neurochemical knowledge, taken together, would constitute an impetus towards coercive treatment of so-called addicts and potential addicts which would threaten to overcome civil liberties protections.

Yet the catalysts explored above suggest that if our behaviour in relation to psychoactive substances is examined in the light of happiness research and neuroscience, most of us find ourselves happy enough without excessive striving in a companionable sort of fashion, and prefer to make up our own minds about which pleasures we choose. Hence arguments based upon enhancement and cognitive liberty discourse are likely to prove appealing to many. Insofaras we may purchase access to pleasure as a method of achieving health, we are fulfilling our dual responsibilities as consumer and healthy citizen. When we pay for a year's gym membership in order to maintain cardio-vascular fitness, the self-interrogation practice we engage in before doing so exemplifies this duality. We might weigh up the merits of gym membership against liposuction in terms of cost and health benefits before choosing the former. Many of us have no doubt traversed these decisions and transactions, particularly in the New Year. But most of us fall by the wayside. Almost all gym memberships lapse after the first three weeks. In similar fashion, the vast majority of us who embark upon diets of one sort or another abandon them and become fatter, despite a billion dollar industry selling us diets and fitness, in tangent with millions of pounds spent on

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public health exhortations to amend our ways. Does this mean we must be fixed with the cyclic identity of addicts in order to excuse our lack of will power, as Reith contends? Or might happiness research, taken together with aspirations to enhancement and cognitive liberty provide an alternative way forward?

Happiness research can be read as encouraging communitarian as opposed to consumerist ideals. The ability to locate pleasure outside judicious rational consumption is applauded by Lord Layard. In his view, '[o]ne central fallacy is to think that our lives should be organised for the benefit of ourselves as consumers. We are both consumers and producers and it makes no sense to produce a wonderful material lifestyle, even wonderful health services for the population, if we as workers and producers are becoming more miserable'.[73] Characterising addiction to alcohol (and, by extension, other addictions) as a 'very meaningful indicator of unhappiness'[74], he asserts that neurochemical and social science demonstrate that self-advancement as a primary aim leads to anxiety, and that happiness is to be found through assisting others as well as oneself. Hence the task of policy makers is accepting that all humans are of equal moral worth and working to maximise human happiness via distributive justice. From this perspective, the cycle of addiction, medicalisation and governance constrained choice described by Reith would become disrupted as we found happiness in terms of both pleasure and eudaimonic meaning through altruism, affiliation and limiting consumption. A view of one another as possessing equal moral worth also supports claims that we should be free to choose means by which to enhance our lives as an exercise of cognitive liberty. In this scenario, then, the biotechnological industry would be free to develop products which produced pleasure or enhanced capacities within regulatory safeguards without the need to promote these as medications for constructed diseases. Nations would prosper from revenue accrued from taxing such products as well as from savings in the criminal justice system budget. We as citizens could engage in rational evaluation, choice and experience of pleasure to achieve eudaimonic meaning in our lives.

Conclusion

I have argued that neuroscience, happiness research, salutogenetic public health policies and the commercial potential of biovalue have contributed towards a situation where an explicit focus upon health as both commodity and means of governance entails public health policies which promote self-reflexive practices involving the measured manipulation of mood as not only permissible but obligatory. The strategic use of notions of addiction, risk and drug abuse have been used to anchor an elision of pleasure from past discursive strategies which have sought to promote the virtues of self-restraint essential for prudential self management, as neo-liberal governance frames resistance to these as weakness or crime. Reading health as both a commodity and a means of governance in neo-liberal consumer society means that treatment succeeds when we return to practices involving consumer choice.

The relationship between pleasure and health is problematic for both public health and criminal justice policies as they seek to delineate boundaries of permissibility surrounding psychoactive substances which promote pleasure. When pleasure is framed as both salutogenic and pathogenic, as where, say, orgasms provide endorphins which enhance our immune systems but sugar promotes diabetes, the need

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to regulate the self-reflexive consumption of pleasure becomes acute. Information supplied for this purpose creates a rational interrogation of pleasures and their effects which, when applied to criminal justice system prohibitions on the use of psychoactive substances, reveals systemic inconsistencies. This encourages the framing of the consumption of psychoactive substances as more appropriately falling within the public health rather than criminal justice sphere of influence. Besides this, it adds force to the movement to decriminalise at least some prohibited psychoactive substances, and suggests that pharmaceuticals created in order to enhance our capacities or improve our moods to render us better than well might now be categorisable as virtuous salutogenic medications rather than vice-ridden designer drugs. Pharmaceutical manufacturers anxious to exploit biovalue fully, as patent protections run out, are likely to press for supportive reclassification here.

Thus the fragile accord between public health and criminal justice system policies becomes disrupted, whereupon the potential for re-evaluation of a range of pleasures, and the creation of new means to achieve them, is a plausible outcome. Rationales located in Layard's rereading of utilitarianism, together with claims of cognitive liberty and the movement towards enhancement hold promise here. Perhaps, then, our notion of health, happiness, pleasure and criminal justice may become fleshed out to incorporate the complexities and ambivalences of our lived worlds.

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Policing Procreation: Prisoners, Artificial Insemination and the Law

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Abstract

This article explores the implications of two recent case law decisions in the UK in which prisoners and their partners have sought to utilise the European Convention of Human Rights to challenge the refusal by the Prison Service to provide access to facilities for artificial insemination. After a discussion of the facts and legal principles arising from these cases, the author goes on to consider broader questions of the rights of prisoners' partners; the contested role of the welfare principle, and the challenges posed by recent research which promotes decisional privacy and autonomy in reproductive decision-making.

Introduction

In the ongoing debates prompted by advances in assisted reproduction and in understanding of human fertility, one issue has only been mentioned as an afterthought in much of the research literature in the United Kingdom, when, indeed, it has been mentioned at all: that is, the possibility of allowing male prisoners the opportunity to attempt to father children, and of allowing female prisoners to attempt to become pregnant.[1] The medical and family law literature has recognised and explored this topic to a greater extent than the penological literature, where even in the context of consideration of prisoners' rights this controversial issue has received little attention.[2] The relative invisibility of this issue in the UK stands in contrast to the situation in the USA where the constitutional challenges raised in the *Goodwin* case and more recently in the so-called 'procreation by Fed-Ex' case of *Gerber v. Hickman* have led to a deluge of published articles debating the issues.[3] In addition, the topic came to public notice in 2002 when the New York Post reported that a prisoner and his partner, who were ineligible for conjugal visits, had allegedly bribed guards to smuggle sperm out of a prison and into a fertility clinic, as a consequence of which their daughter was conceived and born[4]. It could, however, be argued that despite the relative lack of publicity the legal position in the UK is more complex than in the US. In the UK, in contrast with many other penal jurisdictions, there is no provision for conjugal visits for prisoners and their partners. If a prisoner and his or her partner wish to conceive a child together, unless the prisoner is permitted Release on Temporary Licence (ROTL), then the prisoner has no alternative but to seek access to facilities for artificial insemination. As Sutherland writes, *'unlike the position in the United States, the right of prisoners to procreative freedom in the United Kingdom is not removed at the prison gates'*.[5] In contrast with the situation in the USA, where there is a blanket ban, the decision as to whether to grant a prisoner access to such facilities is made by the Family Ties Unit, part of the Prisoner Administration Group of the Prison Service.[6] Where prisoners and their families wish to challenge a decision such as this, judicial review and proceedings under the Human Rights Act 1998 provide valuable mechanisms, as does recourse to the European Court of Human Rights.[7] It is, arguably, the discretionary nature of this decision which makes this issue potentially more thought-provoking in legal terms than if there were an outright prohibition on access to these facilities.

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The Recent Case Law in the United Kingdom

The Mellor Case

In *The Queen on the Application of Mellor v. Secretary of State for the Home Department*[8], the Court of Appeal upheld a judgement by Forbes J dismissing an application from a prisoner who was seeking access to artificial insemination. At the time of the judgement, Gavin Mellor was serving a life sentence, having been convicted of murder in 1995. The tariff element of his sentence was due to expire in 2006, although it was possible that he could be granted temporary release prior to that date. His wife, whom he married in prison in 1997, would be 31 when his tariff expired in February 2006. Mellor was challenging Home Office policy which, whilst not operating a blanket ban on artificial insemination, allows access to appropriate facilities only in exceptional circumstances. Mellor claimed that the refusal to allow him access to AI facilities breached his right to respect for private and family life under article 8 of the European Convention of Human Rights (ECHR), and his right to marry and found a family under Article 12.

The court rejected Mellor's claim, taking the view that one of the purposes of imprisonment was to punish the criminal by depriving him of certain rights and pleasures which he could only enjoy at liberty, including the enjoyment of family life, the exercise of conjugal rights and the right to found a family. In his judgment, Lord Phillips argued that a policy which generally accorded prisoners the right to conceive children by AI would '*raise difficult ethical questions and give rise to legitimate public concern*'. He also discussed the difficulties of creating a de facto single-parent family, contending that it is both legitimate and desirable that, when considering whether to have a general policy of facilitating AI for prisoners or the wives of prisoners, the state should consider the implications of children being raised in those circumstances.

This case was brought by a prisoner in relation to his own rights, not that of his partner, although as Mellor pointed out in his initial letter of application, his wife also had a right to found a family. Article 8 appears to protect de facto family life: under Article 12, it could be argued that, following the decision of the ECHR in *X & Y v. Switzerland*[9], if the applicants are married they have therefore founded a family.[10] Depending on how 'founding a family' is defined, if a male prisoner is denied access to facilities for AI, then in order to exercise her own rights his partner would either have to have sex with someone other than her husband, or conceive through formal or informal Artificial Insemination by Donor (AID), and thus bear a child of whom her husband would not be the biological father. Thus the partners of prisoners denied access to AI are themselves eligible to challenge the policy on the grounds that their own rights are being infringed, although to date only one prisoners' wife has sought to challenge the denial of AI facilities on these grounds, with no success either initially or on appeal.[11]

The Dickson Case

In October 2003 Kirk Dickson applied for facilities to artificially inseminate his wife, which was refused. In his letter refusing access to AI facilities, the Secretary of State set out his policy for responding to such requests, which is very close to that considered by the court in *Mellor.*[12] Lorraine Dickson, his wife, failed in her subsequent application for judicial review. Lorraine Dickson, herself an ex-prisoner, befriended Karl Dickson, who is

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serving a mandatory life sentence, via the prison pen friend scheme and married him in 2001. She has since been released from prison. Her husband will not be eligible to apply for release on licence until 2009, by which time she will be 51.[13] Mr Dickson has no children; Mrs. Dickson has two adult children and one school-age child another relationship. In seeking permission to apply for judicial review, her barrister argued that there were 'exceptional circumstances' why AI facilities should be provided: however Pitchford J said that the Prison Service were justified in refusing such facilities, and in taking into account that their relationship had not been tested outside the prison; the 'violent circumstances' of Kirk Dickson's offence[14] ; and the fact that he would not be with the child during a large part of the child's formative years. Lorraine Dickson already has three children by other relationships, and the judge refused to accept that the couple's desire to have a child 'trumped all other considerations.' The Dicksons then sought permission to appeal this earlier decision, and asked for an extension of time in which to do so. In September 2004 the Court of Appeal ruled on this application and refused the Dicksons leave to apply for judicial review, stressing the validity of the Prison Service policy, and describing the Home Secretary's decision to refuse AI facilities as *'an exercise of discretion and proportionality*.'

Analysis

These cases raise important questions about the nature, impact and purposes of imprisonment. Both highlight the ongoing process of interpreting the rights of prisoners and their families under the European Convention of Human Rights and, more philosophically, prompt consideration as to whether the state has a legitimate interest in regulating the creation of the children of offenders.

Punishment and the rights of prisoners

Professor John Williams challenges the loss of the right or opportunity to procreate as a 'natural consequence of imprisonment' as expounded by Lord Phillips in *Mellor*, and explores the court's reasoning concerning the welfare of the child and the problems of guaranteeing equal treatment for male and female inmates.[15] He contends that the explicit denial of prisoners' rights to have children appears to have no authority and contradicts Prison Rule 4. However, the European Court of Human Rights has not yet found a violation of the ECHR where the right of prisoners to procreate was an issue.[16] Of course, if prisoners were allowed conjugal visits then there would be no need to seek access to alternative means of conception, but it has been argued that the necessary privacy required could endanger the security of the prison.[17] The same, however, is not true of AI, which offers a method by which a prisoner can exercise his right to found a family which is compatible with the demands of prison security.

At the core of the debate is the question of whether the right to procreate is lost as a collateral consequence of imprisonment, not only for offenders but also for their partners. It is indisputable that imprisonment removes or limits some rights of prisoners, but it is also indisputable that imprisonment does not automatically result in the forfeiture of all rights at the prison gate. The enactment of the Human Rights Act 1998 has generated litigation and also a greater awareness of the relevance of human rights issues in the prison context.[18] The cases have explored *which* rights survive incarceration, and to what extent. For example, in the recent case of *Hirst v United Kingdom* the European Court of Human Rights considered

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the legality of the disenfranchisement of convicted prisoners whilst in detention.[19] In his recent inaugural professorial lecture Andrew Coyle reiterated that the classic formulation of prisoners' rights laid down in 1982 in *Raymond v. Honey*[20] and subsequently approved by the House of Lords in *Simms*[21] still applies and that its consequences are still every bit as important as they were in 1982[22]; that is, in the words of Lord Wilberforce: *'a convicted prisoner....retains all civil rights which are not taken away expressly or by necessary implication'*. Although apparently following *Simms*, Lord Phillips in *Mellor* seems to suggest that the state's interest in restricting rights is a necessary consequence of imprisonment, which can only be successfully challenged if disproportionate.

The decision in *Mellor* has been subsequently criticised by several authors. John Williams refers to the policy as '*the constructive sterilisation of prisoners*' and argues that the policy as accepted does not provide the appropriate level of respect for prisoners' rights. He is dismissive of the court's reliance on concerns that it would be inherently problematic to grant access to male inmates because then such access would have to be granted to women, arguing that *'to deny a right to somebody simply on the basis that another person may be denied it does not rationally further the cause of equal opportunities.'* This view of the *Mellor* decision is shared by Livingstone and others, who refer to it as *'a particularly regressive approach to prisoners' legal rights'*, arguing that *'the level of deprivation which is legitimated by a sentence of imprisonment is considerably harsher [in the UK] than in other countries in Europe.'*[23] Indeed, these policies controlling access to AI have been referred to as *'the new eugenics.'*[24] A contrasting view is that presented by Pollybeth Proctor from an American perspective. She argues that close scrutiny of English jurisprudence and societal values, as well as Convention case law and article provisions, provides ample justification for the understanding of the right to procreate as interpreted in Mellor.[25] It must be remembered that the decision is of a discretionary nature and thus only some prisoners are prohibited from access to AI. Both men in these cases were serving mandatory life sentences: it is possible therefore that the courts are drawing a distinction between those convicted of murder and those convicted of other offences.[26]

Research into the collateral consequences of imprisonment for prisoners and their families has documented the stigma and social exclusion of prisoners' family members, especially prisoners' partners.[27] As the research literature documents, it is tempting but too simplistic to argue that since they are not convicted prisoners themselves, prisoners' partners and family members retain all the same rights as other citizens. It is not easy to explain why the partner of a prisoner can lose her own right to found a family as a consequence of being married to a prisoner, since prisoners' partners have not been convicted and imprisoned. It is, however, well-established in the criminological research literature that prisoners' family members are frequently treated as 'guilty by association,' stigmatised and taking on a share of the 'spoiled identity' of the imprisoned family member.[28] In the *Mellor* judgment, Lord Phillips cited the 1975 case of X v. UK[29], a case concerning the denial of conjugal rights, and concluded that *'a lawfully convicted prisoner is responsible for his own situation and cannot complain on that account that his right to found a family has been infringed.'* The courts could, therefore, be applying the same principle to prisoners' partners. In both of these cases the women married serving prisoners, and for both of these married couples the judges referred to the fact that their relationships had not existed outside the prison. The prison service policy suggests that the situation would be different if the marriage had existed prior to the period of incarceration.

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The persistence of the welfare principle and the reproductive autonomy debate

The future welfare of children to be conceived by artificial insemination was a key consideration in *Mellor* and was reiterated in *Dickson*. The Court of Appeal in *Mellor* argued that it was better for the well-being of children to be in contact with both parents and in the *Dickson* cases, the courts questioned the interests of the putative child, the judges stressing the desirability of children staying in contact with both parents in a stable family setting. The adoption of these welfare considerations in this context reflects the principle embodied in Section 13(5) of the Human Fertilisation and Embryology Act 1990 which provides that, in relation to fertility services, a woman should not be provided with treatment services unless account has been taken of the welfare of any child who may be born as a result of the treatment. The welfare of children has been of fundamental importance in legal decision making in family law for many years; however, as Emily Jackson (2002) points out, the welfare principle enshrined in the HFEA 1990 differs from previous formulations such as that under the Children Act 1989 in that it purports to make a child's best interests relevant to a judgment made prior to that child's conception.[30] It is clear from reading the judgments in *Mellor* and *Dickson* that a version of this welfare principle operates in the decision-making process of the Prison Service even though the HFEA itself does not apply in this context.

This application of a welfare principle in relation to pre-conception decision-making in relation to assisted reproduction has been vociferously challenged and less convincingly defended.[31] In an insightful article challenging the primacy of the welfare principle Jackson argues that the inclusion of welfare considerations in the decision in *Mellor* is misguided and that to consider the future welfare of any child a prisoner may conceive is *'too speculative a consideration'* in this context.[32] In referring to the 'best interests of the unborn child' the Court of Appeal in *Dickson* hit a complex philosophical issue head-on: that is, the 'non-identity problem' - the person protected never benefits from this interpretation of their best interests because they are never born.[33] As Sutherland perceptively points out, whilst it is undisputed that the state has obligations to children already born, in terms of promoting their welfare and protecting them from harm, *'in denying the opportunity to procreate it is going a great deal further by policing access to parenthood itself'* [34]. Intuitively one may argue that it is undesirable for someone who has offended against children to be allowed to conceive a child; however, it is difficult to convincingly argue that it is in a child's best interests not to exist. To disallow certain 'unfit' individuals from conceiving is, after all, a eugenic principle, whereas child protection is a legitimate function of government.[35]

A linked question is that of whether the state, and in this situation, the Prison Service, have a legitimate interest in regulating access to resources to aid conception such as AI facilities. When the law in relation to assisted reproduction is being discussed it often relates to reproductive technologies such as in-vitro fertilisation (IVF) which is undoubtedly expensive; however, where prisoners' access to AI is concerned no such technological expense may be necessary. After all, it is possible to accomplish AI simply by a male prisoner handing over an appropriately filled receptacle to his partner during visiting time. Although not explicitly stated in *Mellor*, it is possible that the courts were considering the financial implications of creating a child, assuming that any child would impose a burden on the state. However, Lorraine Dickson argued that she is more than capable of supporting a child financially and there is nothing in these cases to indicate that

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either of the women in these cases would not be capable of financially supporting any child.[36]

The approach to procreation embodied in these cases sets a higher standard of proof of potential adequacy as parents for prisoners than any putative non-imprisoned parent usually has to undergo before conceiving a child. As Roger McIntire discussed in 1973, one does not require a license to be a parent.[37] This 'policing of procreation' is experienced by non-imprisoned couples seeking fertility services, and has been vigorously opposed by critics who argue for greater decisional privacy or, as it has been termed. 'decisional liberty.'[38] It could be argued that the fact of imprisonment removes any right to autonomous decision making as to conception, in that imprisonment entails many manifestations of the loss of privacy; however, it is philosophically and legally difficult to justify the extension of this loss of autonomy to prisoners' unconvicted partners. Couples who cannot conceive naturally are subject to having to satisfy a higher standard of proof to become parents than those who can conceive without assistance; the prisoners' cases confirm that such a standard also applies to detained prisoners. It has been argued that '*we should each have the liberty to shield certain personal decisions from public scrutiny.*'[39] Perhaps most worryingly for those concerned with human rights, the decision as to whether the welfare test is satisfied is not made by a panel of appropriately qualified experts or professionals, as in the case of doctors and the Human Fertilisation and Embryology Authority, but by an administrative department of the Prison Service.

Conclusion

The discretionary nature of the decision to allow prisoners and their partners access to artificial insemination facilities means that there will continue to be potential for litigation especially in the light of ongoing academic debates around autonomy, privacy and rights in relation to personal decision-making. This is especially important in relation to the non-imprisoned partners of prisoners. It is unsurprising that the courts have chosen to interpret the rights of prisoners and their families in this way, since these attitudes reflect the shift towards harsher sentencing and penal policies in the UK and the USA[40]. It remains to be seen, however, whether the principles expounded in the *Mellor* and *Dickson* cases will continue to govern prisoners' and their partners' access to artificial insemination facilities in the future.

1 This issue is, significantly, briefly touched upon by Professor Emily Jackson in her groundbreaking and influential discussions of reproductive governance and autonomy: see, for example, Jackson, E. (2001) Regulating Reproduction, Oxford, Hart and Jackson, E. (2002) 'Conception and the Irrelevance of the Welfare Principle', Modern Law Review, Vol. 65, No.2, pp. 176-203. For a discussion of whether female prisoners should have the right to become pregnant, see Dunn, S. (2002) 'The 'Art' of Procreation: Why Assisted Reproduction Technology Allows for the Preservation of Female Prisoners' Right to Procreate', Fordham Law Review, Volume 70, pp. 2561. It is important to note that although it would be more accurate to refer to the topic under discussion as relating to 'permitting prisoners to *attempt* to become parents" or 'permitting prisoners' family members the opportunity to *attempt* to conceive" the case reports and subsequent articles tend towards an assumption that AI will lead to conception which is, of course, not always the case.

2 For an example of its inclusion and a limited discussion in the context of family law see Diduck, A. and F. Kaganas (2006) Family Law, Gender and the State, London, Hart Publishing.

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3 Goodwin v. Turner 702 F. Supp. 1452 (W.D.Mo.1988); Gerber v. Hickman 273.F.3d 843 (9th Cir.2001). See also Bozzuti, J. (2003) 'Judicial Birth Control? The Ninth Circuit's Examination of the Fundamental Right to Procreate in Gerber v. Hickman', St. John's Law Review, Vol. 77, pp.625-647; Roth, R. (2004) '"No New Babies": Gender Inequality and Reproductive Control in the Criminal Justice and Prison Systems', American University Journal of Gender, Social Policy and Law, Vol. 12, pp.391-424.

4 See Dan Kadison & Murray Weiss, Mob Sperm Bust, N.Y.Post, Dec. 3rd 2002, p.7.

5 Sutherland, E. (2003) 'Procreative Freedom and Convicted Criminals in the United States and the United Kingdom: is Child Welfare Becoming the New Eugenics?', Oregon Law Review, Vol. 82, pp.1033-1065.

6 This provision applies to male prisoners. As far as I am aware no similar applications have been made by female prisoners.

7 Note that the Prisons Ombudsman is not empowered to deal with complaints from families.

8 [2001] 3 WLR 533.

9 (1978) 13 DR 241

10 Williams (2002) 'Have the Courts Got it Right?- The Queen on the Application of Mellor v Secretary of State for the Home Department', Child and Family Law Quarterly, Vol. 14, No.2.

11 The most recent ruling in this ongoing legal dispute is *Kirk Dickson, Lorraine Dickson v. Premier Prison Service Ltd., Secretary of State for the Home Department* [2004] EWCA Civ 1477.

12 R (Mellor) v. Secretary of State for the Home Department, [2001] 3 WLR 533

13 Hull Daily Mail [2003*] 'Let Me Have Killer's Baby'*, September 6 2003, p.2.

14 He killed a man in a fight.

15 Williams, J. (2002) supra.

16 Proctor, P. (2003) 'Procreating from Prison: Evaluating British Prisoners' Right to Artificially Inseminate their Wives under the United Kingdom's New Human Rights Act and the 2001 Mellor case', Georgia Journal of International and Comparative Law, Winter 2003.

17 A vivid autobiographical account of conjugal visits in the US context is given in Bandele, A. (1999) The Prisoner's Wife: a memoir, New York, Washington Square Press.

18 See, for example, Coyle, A. (2002) 'A Human Rights Approach to Prison Management: A Handbook for Prison Staff', International Centre for Prison Studies, London.

19 See Hirst v. United Kingdom (Application No.74025/01).

20 [1983] 1 AC 1

21 [2000] 2 AC 115

22 Coyle, A. (2005) 'On being a prisoner in the United Kingdom in the 21st century. Does the Wilberforce judgement still apply?', Inaugural lecture, International Centre for Prison Studies, King's College London, 22nd March 2005.

23 Owen, T., S.Livingstone & A.Macdonald (2003) Prison Law, Third Edition, Oxford, Oxford University Press.

24 Williams, J. (2002) op. cit.; Sutherland, E. (2003) 'Procreative Freedom and Convicted Criminals in the United States and the United Kingdom: is Child Welfare Becoming the New Eugenics?', Oregon Law Review, Vol. 82, pp.1033-1065.

25 Proctor (2003) supra.

26 Other inmates serving long sentences have been granted access to AI on the grounds that their wives would be too old to conceive on their release, including in one case, a drug smuggler serving a 17-year sentence (see Sunday Times (2002) 'Prisoners take up their right to father children from prison', December 15, p12.)

27 The literature on this is extensive and documents a range of challenges faced by prisoners' partners and children both during the offender's custodial detention and also afterwards. A detailed discussion of this research is beyond the scope of this article, but for an informative summary see Murray, J. (2005) 'The effects of imprisonment on families and children of prisoners' in Liebling, A. and S. Maruna (eds.) The Effects of Imprisonment, Cullompton, Willan.pp.442-462.

28 Social Exclusion Unit (2002) Reducing re-offending by ex-prisoners, London, Social Exclusion Unit: Codd, H. (1998) 'Prisoners' Families: the 'Forgotten Victims,' Probation Journal, Vol.45, No.3 pp.148-154: Codd, H. (2000)'Age, Role Changes and Gender Power in Family Relationships: The Experiences of Older Female Partners of Male Prisoners,' Women & Criminal Justice, Vol. 12 Issue 2/3.pp.63-93: Codd, H. (2002) 'The ties that bind': Feminist Perspectives on Self-Help Groups for Prisoners' Partners, Howard Journal of Criminal Justice, Vol.41, No.4, pp.334-347. Codd, H. (2003)

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'Women Inside and Out: Prisoners' Partners, Women in Prison and the Struggle for Identity', Internet Journal of Criminology. http://www.flashmousepublishing.com.

29 (1975) 2 D&R 105, cited in the Mellor judgment (supra).

[30] For a more detailed summary of the welfare principle in relation to children see Diduck and Kaganas (2006) ibid. pp. 301-334.

[31] Jackson (2002) ibid. For an attempt to challenge the view that decisional privacy ought to be respected, see Laing, J. & Oderberg, D. (2005) 'Artificial Reproduction, the 'Welfare Principle' and the Common Good', Medical Law Review, Vol. 13, p.328.

[32] Jackson (2002) op.cit., p.201.

33 See Robertson, J. (2004) 'Procreative Liberty and Harm to Offspring in Assisted Reproduction', American Journal of Law & Medicine, Vol. 30, pp. 7-40.

34 Sutherland, E. (2003) 'Procreative Freedom and Convicted Criminals in the United States and the United Kingdom: is Child Welfare Becoming the New Eugenics?', Oregon Law Review, Vol. 82, pp.1033-1065.

[35] See Jackson (2002) ibid. p. 188. It can be argued that there are also aspects of government policy which can have an impact on reproductive decision-making, such as the laws on sexual behaviour and prohibited marriage within certain degrees of familial relationship, which, in addition to child protection, are a legitimate function of government.

36 Of course, if prisoners earned realistic wages for their work or were eligible for at least the statutory minimum wage then a proportion of those wages could be paid as child maintenance.

37 Although his article discussed this possibility in a tongue-in-cheek way: see McIntire, R.(1973) 'Parenthood Training or Mandatory Birth Control: Take Your Choice', Psychology Today, October, p. 34.

[38] See Jackson (2001) and (2002) op.cit.: Harris, J. (1998) 'Rights and Reproductive Choice' in J.Harris and S.Holm (eds.) The Future of Human Reproduction, Oxford, Clarendon Press.

[39] Jackson, 2002: p. 178.

40 See, for example, Pratt, J., Brown, D., Hallsworth, S., Brown, M. and W. Morrison (2005) The New Punitiveness: Trends, theories, perspectives, Cullompton, Willan.

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End of Life Decision-making, Policy and the Criminal Justice System: Untrained Carers Assuming Responsibility [UCARes] and Their Uncertain Legal Liabilities[1]

HAZEL BIGGS & ROBIN MACKENZIE

Abstract

This article will explore some previously unrecognised legal and ethical issues associated with informal care-giving and criminal justice in the context of end of life decision-making. It was prompted by a recent case in Leeds Crown Court, which raises important issues for the people who care for their loved ones at home and for the criminal justice system more generally. Government figures estimate that over 5.2 million Britons are responsible for the care of relatives or loved ones. In order to evaluate some of the ways in which they might find themselves exposed to unexpected criminal liability we have characterised this group as untrained carers who assume responsibility (UCARes).

Introduction

The relationship between genomics, genetic disabilities, and legal liabilities has been most commonly explored in relation to choice in reproduction and services provided for the impaired and their carers.[2] The intersection between genomics, genetic impairment and the criminal justice system has remained relatively unexplored. This article seeks to bring to public attention problematic situations which are likely to impact upon an increasing proportion of the population. In 2001 Government figures estimated that approximately 5.2 million people were providing informal care in England and Wales, which amounts to one in ten of the population. These figures exclude parents caring for non-disabled children. Such informal carers are not care-workers or staff employed to provide care, but people who look after relatives or friends needing care and support due to age, infirmity, physical or mental illness or disability. They may be elderly or unwell themselves or possibly even under the age of 18 and providing care for an older family member.[3] Another way of looking at this is that at least another one in ten of the population is being informally cared for by an untrained voluntary carer. Such untrained carers who assume responsibility for the health and well-being of familial or emotional relationships (UCARes[4]) form the focus of this article.

Inevitably, more of us will be involved in these types of relationships as a higher proportion of the population is made up of the elderly. In addition, in general British people are tending to live for longer in better physical health, but remain subject to mental infirmities induced by genetic susceptibilities, such as Alzheimers. Evidence of genomic vulnerabilities and the part played by inherited factors in illness suggests that many of us with chronic complaints and impairments, as well as the increasing number of number of elderly demented, may be regarded as being genetically compromised and in need of continuing care. This matters because, while the responsibilities and legal liabilities of professional carers are generally well understood, if things go wrong in the informal care setting the cared for may be inadequately protected and UCARes may

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find themselves exposed to unforeseen legal consequences.

In the UK there has been a long tradition of non-professional caring which today is further encouraged by health policy and economics. Care of the elderly, the infirm and children, has always taken place within the home, relying on the good will and fortitude of genetically related emotional carers.[5] UCAREs have traditionally been women, but demographic and social changes, such as the increased involvement of women in the workforce, have disrupted both the assumptions that underpin the traditional approach and the physical resources to provide adequate care. As a result recent decades witnessed a growth in institutional care for some types of cared for people, most notably the elderly. The proliferation of care homes generated a need for regulation of staff and institutions, resulting in increasing costs, which ultimately has led to a rising charges for the families concerned. Inevitably tensions have developed between the need for outside care and the means to pay for it. In many cases emotional carers find themselves financially burdened by the costs of providing institutional care while others seek to avoid the financial cost by shouldering the physical responsibility themselves by becoming UCAREs.

In the context of end of life decision-making this article will explore some previously unrecognised legal and ethical issues associated with informal care-giving and criminal justice. Drawing on recent court cases[6] involving the care of people with debilitating inherited medical conditions we will consider a detailed hypothetical scenario involving Alice and Benjamin to illustrate some issues associated with UCAREs, end of life decision-making and the criminal justice system.

Alice and Benjamin: UCAREs and end of life decision making

Alice is caring for Benjamin who suffers from motor neurone disease (MND),[7] which is a degenerative and ultimately fatal inherited condition. In the terminal phases of this condition people often suffer the effects of suffocation and diaphragmatic failure while their mental abilities and awareness remain unimpaired. Benjamin does not wish to die in this way. Ideally he would choose to be assisted to die before he reaches the terminal stages of illness and considers several alternative options, active voluntary euthanasia, assisted suicide or suicide. Each will have an impact on the manner of his dying and the likely criminal justice implications for Alice as his UCARe.

Active voluntary euthanasia is defined as the intentional killing of another person who has requested it and in this case Benjamin might ask Alice to deliberately kill him, to spare him further suffering and the pain and distress of the dying process. Out of compassion many UCAREs have helped their carees to die in this way,[8] but the law is not sympathetic and mercy killing is clearly prohibited in order to protect the vulnerable. Even in the case of medical professionals who have agreed to help their patients to die ‘the law does not leave it in the hands of doctors, it always treats euthanasia as murder’.[9] Some commentators[10] have recommended legal reform to include a new defence of mercy killing where a carer has been charged with murder for allegedly killing a patient at her or his request, but to date the law remains unchanged.[11]

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Benjamin's condition is such that eventually he will be unable to physically commit suicide himself and may require, and seek active assistance from Alice. For example, Alice might simply hand Benjamin an overdose of medication or may prepare a fatal potion at his instigation because he no longer has sufficient motor co-ordination to do so himself. However, at present assisting suicide is contrary to the Suicide Act 1961, which makes it a crime to 'aid, abet, counsel or procure the suicide of another'.[12] This means that any action Alice takes to help Benjamin commit suicide could result in criminal prosecution which, if she is convicted, is punishable by up to 14 years imprisonment. Diane Pretty (also an MND sufferer) recently challenged the United Kingdom's prohibition on assisted suicide in the European Court of Human Rights but was unsuccessful, despite the fact other European jurisdictions have a more liberal approach to assisted suicide.

In the wake of Diane Pretty's death the Assisted Dying for the Terminally Ill Bill 2005 has been introduced to the House of Lords as a Private Members Bill. When originally presented in 2004, the Bill included a provision for active voluntary euthanasia in certain circumstances but its amended form will allow only assisted suicide. Should it become law patients seeking assisted suicide under the Bill will have to meet stringent qualifying criteria and a variety of safeguards are incorporated.[13] However, at present the Bill is still undergoing Parliamentary scrutiny and is by no means guaranteed to reach the statute books. It will therefore not help Benjamin if he seeks assisted dying.

While assisted suicide remains illegal in the United Kingdom it is legally permitted elsewhere in Europe, most notably in the Netherlands, but people from other parts of the world may not lawfully take advantage of this. However, the law in Switzerland allows citizens from outside the country to avail themselves of assisted suicide services. To date in excess of 70 British nationals have done so and, were he well enough to travel Benjamin could join their ranks. Were he to take this option it is likely that he would ask Alice accompany him and that she would wish to do so, which might expose her to criminal liability.

After Reginald Crewe travelled to Switzerland for assisted suicide accompanied and assisted by his wife and daughter the Crown Prosecution Service (CPS) deliberated for eight months before deciding that their prosecution would not be in the public interest. Thereafter the Director of Public Prosecutions was called upon to issue new guidance on whether and when prosecutions should be brought in these circumstances, but it is reported that there are currently no plans to do so. None the less, it was recently reported that the family (UCARes) of Dr Anne Turner, who also travelled to Switzerland to receive assisted suicide, have been questioned by police about their involvement. No charges have yet been bought.

Given the possibility of exposing Alice to the rigours of the criminal justice system if he involves her in either active voluntary euthanasia or in assisting his suicide, Benjamin might instead decide to take his own life before he becomes too infirm to do so. Here UCARes may unwittingly find themselves in a precarious legal position which has hitherto been unrecognised. The remainder of this article will address this issue.

If, in this hypothetical scenario, Benjamin does decide to commit suicide there are a range of situations that might give rise to criminal liability for Alice. For instance, any

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involvement Alice has in Benjamin's decision to end his life could mean that she will be implicated for assisting his suicide as discussed above. Depending on the circumstances however, there are other ways in which she could be found criminally liable and it is these we now seek to explore.

R v Anderson: UCARes and uncertainties in the law

The recent case of *R v Anderson* (unreported) Leeds Crown Court April 2005 exemplifies the position that Alice might find herself in with regard to the application of manslaughter by omission involving UCARes. There, like Benjamin, the husband was suffering from a debilitating but not immediately life limiting condition, the difference being that the husband in *Anderson* had M. E. or chronic fatigue syndrome. He had 'abnormal chronic anxiety'[14] about his health, had made repeated suicide attempts and been admitted to hospital for treatment on two previous occasions as a consequence. Respecting her husband's wishes, his wife, his UCARe, deliberately failed to call the emergency services despite knowing that her husband had taken an overdose of morphine with the intention of ending his life. After he died she was tried and acquitted of his manslaughter. During the trial it emerged that she had stayed with him throughout the night and only summoned help some two hours after his final breath. The central issue in court was whether she had a legal duty to act in these circumstances, as the existence of such a duty that she had neglected to perform could render her criminally responsible for his death. Alice, and other UCARes could encounter a similar scenario if their loved ones inform them of their intentions and their desire to commit suicide in order to hasten their deaths and to avoid terminal suffering.

In the context of unqualified carers supporting adult dependants at home the junction between end of life decision making and manslaughter by neglect is fraught with difficulties over the just assignment of legal responsibility. A string of criminal cases has addressed a range of factual situations involving UCARes with a variety of charges and outcomes.[15] Other commentators have identified a certain lack of precision and perhaps inconsistency in the application of the law in this area[16] but, despite this wide ranging academic debate, the uncertainty remains in relation to the group we have characterised as UCARes. In addition recent high profile cases concerning medical decisions at the end of life,[17] may add to the uncertainty of a UCARe over how to respond should their charges purposefully put their lives at risk while insisting that they would also reject life saving medical intervention. In medical law the autonomous rights of competent patients to refuse care[18] is revered but in this environment it conflicts with the aim of the criminal law to protect vulnerable people from abuse through the offence of manslaughter by omission. The tensions between these two related areas of law are likely to be beyond the comprehension of an unqualified carer.

It is of course essential that the state protects the interests of those who are unable to look after themselves, and manslaughter by neglect is in general an appropriate mechanism through which to achieve this. More specifically, where the wrong doer is a professional person whose duty to the patient is readily established, criminal sanction is the most appropriate response when conduct falls very far below an accepted standard.[19] Similarly, where a non-professional carer has intentionally caused the death of a vulnerable person in their care through deliberate omission,[20] a murder charge may

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even be appropriate.[21] Alice is not in this position, but she, and other UCARes, may still be unjustly exposed to the potential of criminal conviction because they have assumed a responsibility to care for a loved one.

If a UCARe like Alice declines to take action and their charge dies the nature of any criminal liability and how far it extends turns on whether or not the UCARe had a legal duty to act in the circumstances. There are various ways in which such a duty can arise.[22] The most likely roots of obligation here are associated with the special relationship between spouses and the fact that by her conduct in providing support Alice will have assumed a duty to care for her infirm husband. The duty arises under the civil law. If the duty is neglected, resulting in death, it gives rise to criminal liability. As Lord Mackay explains;

> *'…the ordinary principles of the law of negligence apply to ascertain whether or not the defendant has been in breach of a duty of care towards the victim who has died. If such a breach of duty is established the next question is whether that breach of duty caused the death of the victim.'*[23]

However, in addition to this, we argue that it is possible to regard UCARes as owing a duty to those they care for over and above the ordinary duty of care, that is, a moral duty to respect the autonomous wishes of their caree. This moral duty may conflict with the established legal duty to preserve life if the cared for person desires to die and declines assistance. For example, in *Anderson* the UCARe asserted that she felt obliged to respect her husband's wish to die and therefore decided not to call an ambulance.

> *'I searched my conscience and the act I did that night was for him, not me, he wanted to go… what I did that night was an act of love and an act of kindness … it was very difficult to face a prosecution for loving someone, because that's all I did that night.'*[24]

In this way Jill Anderson reveals that she believed she owed a higher moral duty to her husband, which led her to act in the way she did.[25] Nonetheless authorities demonstrate that legal liability has been imposed in similar situations in a number of cases despite the defendants' appeal to a higher moral duty.

UCARes and their duty of care

In *Nicholls*,[26] the first case that decided such a duty could arise in the absence of a contractual relationship, Bret J directed the jury that,

> *'if a grown up person chooses to undertake the charge of a human creature helpless either from infancy, simplicity or other infirmity, he is bound to exercise that charge without (at all events) wicked negligence; and if a person who has chosen to take charge of a helpless creature lets it die by wicked negligence, that person is guilty of manslaughter.'*

The direction was followed in an array of subsequent cases[27] establishing that a duty may arise in these circumstances without clearly specifying the parameters of when the duty arises and how far it extends.

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More recently *Smith*[28] confirmed that a husband had a duty to care for his wife's health. In this manslaughter prosecution it was questioned whether a failure to call a doctor in the face of the wife's refusal amounted to a 'reckless disregard' of the duty of care. As in *Anderson*, Smith was aware that he would be subjecting his spouse to a serious risk to her health if he failed to get help but none the less he acceded to her wishes, resulting in her death. In the *Anderson* case, and in our hypothetical, it is questionable whether the UCARe is guilty of 'wicked negligence' in these terms because, at least at the outset, the caree might not be regarded as a helpless creature. Rather, the cared for person could be regarded as an autonomous person refusing future medical intervention.

Assuming that the UCARe becomes aware of the suicide attempt before the caree actually succumbs, there is likely to be a point in time where loss of consciousness renders them as a helpless creature. It seems clear that ordinarily, even if it could be argued that there was no duty in existence up until this point, a duty would arise once the caree becomes so ill that death is inevitable in the absence of medical treatment. In *Smith* the judge questioned whether a person who becomes desperately unwell ought always to be regarded as a helpless creature for these purposes, even where the ill person has objected to medical intervention. However, the matter was left for the jury to determine with regard to whether the deceased person could be supposed to have the capacity to decide to refuse treatment. Subsequent cases in the medical law arena,[29] where it has been held that even an irrational decision must be respected if the individual has capacity, have clarified the role of autonomy and self-determination.

Where the alleged victim has caused his own predicament, as would be the case where someone like Benjamin deliberately takes an overdose in order to kill himself, he may not represent the archetypal helpless creature and the duty on his wife may therefore be different. In this case, Benjamin would appear to be acting on a settled wish to die and to expect that his wife would not overrule that autonomous choice. In accordance with this, and because of her relationship with her husband, once Alice became aware of the inevitability of his death, her refraining from summoning medical assistance would seem legitimate if her overriding concern were to be to respect his wish and allow him to die and release him from suffering. As the defendant in *Anderson* claimed,

> *' … of course, I never thought of the consequences for myself, I only thought about him.'*[30]

If the UCARe's duty is constructed according to the ordinary objective criteria and Benjamin is categorised as a helpless creature it is plain that Alice would be obliged to call for assistance. But, if the surrounding circumstances of their particular relationship and his intention to die are factored into the equation, then subjectively her duty is more ambiguous. A charge of manslaughter is appropriate where the conduct of the accused falls so far below what was expected that a severe breach of duty has occurred, but a UCARe like Alice is not necessarily in that position. Instead, in omitting to seek medical assistance this carer could be said to have acted according to a higher moral obligation owed to the person cared for.

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UCARes: the criminal justice system

The criminal justice system is concerned with safeguarding against evil intent and protecting the innocent and helpless. There are many cases involving manslaughter by neglect where clear evidence of evil wrongdoing and deliberate infliction of harm to a helpless victim have resulted in appropriate conviction. For example, in *Bonnyman* the husband of a drug addicted woman acted to prevent proper medical examination and treatment of his emaciated wife who was described in court as 'as helpless as a person could be to deliver herself from this pit into which she had fallen.'[31] The husband claimed that he was prevented from seeking help because his wife was 'stubborn and would not let him help her' but the court found this incredible on the facts and rightly determined that 'the plain duty of the appellant was to have given her aid and treatment which he withheld'.[32] Bonnyman's false assertion that his wife refused medical intervention could not excuse his deplorable conduct because she was clearly in a helpless state and deserved to be cared for by those who owed her a duty.

Although, like *Bonnyman*, cases involving UCARes concern deliberate decisions not to seek medical assistance, they may be distinguished because of the lack of evil intent. Here the UCARe acts according to what they regard as a higher moral duty to respect the wish of their charge and allow them to die. In addition, as we have argued the 'victim' is not a 'helpless creature' but is regarded by the UCARe as a person capable of making a rational choice to die and acting upon it. We would suggest therefore that where the person is self-determining and committing a rational suicide the ordinary principles do not apply. This is in accordance with a view previously promulgated by Glanville Williams when commenting on a review of potential reform of the law of manslaughter. Confirming that the duty of care is generated by helplessness he stated that, 'the person to whom the duty is owed must be unable to perform it himself …'[33] and also that,

> *'[Secondly] the code should preserve the caree's right of autonomy (self determination). No-one should be criminally liable for failing to provide an adult with a service he does not want – still less for failing to force it on him.'*[34]

The case of *Robb*[35] examined similar issues in a case concerning a hunger striker and confirmed that where an adult of sound mind refuses all treatment and nutrition those wishes must be respected, regardless of whether the reasons for doing so are rational or irrational. The rule applies where the individual is being cared for by professionals since the person's autonomous refusal will absolve the professional carer of responsibility. In other words, the carer will be released from any duty owed to the caree. This has particular resonance for UCARes who feel a specific responsibility to respect the wishes of those they care for, and further informs our claim that the duty of care should be interpreted subjectively in these cases. In the fraught medico-legal environment where a UCARe fails to summon medical assistance because their charge has declined such intervention the position is complex. The UCARe becomes the guardian of the caree's wishes so that the carer is not simply released from the obligations of care but sees the omission as actively fulfilling their higher duty. The carer would then be effectively saving the charge from the harm associated with overriding their autonomy.

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In normal circumstances the criminal law would assume that by failing to intervene and save a person like Benjamin from the consequences of his suicide a UCARe has caused harm. Yet if the caree had a genuine wish to die he would perceive an intervention to keep him alive as harmful.[36] Those whose autonomous desire not to receive medical treatment has been wrongfully overridden have received damages in recognition of the harm done to them.[37] For some people ignoring their wish to die amounts to a harm worse than death,

> *'In most instances of homicide death is the harm caused by the conduct of the accused. With euthanasia, the indignity of a living death in a persistent vegetative state, or the protracted dying process associated with terminal disease can appear more harmful than death itself.'*[38]

Aside from these issues associated with the establishment of a legal duty of care, before a criminal conviction can be secured the prosecution would also need to ascertain that Alice's conduct had caused Benjamin's death. It was confirmed in *Adomako* that once 'a breach of duty is established the next question is whether that breach of duty caused the death of the victim.'[39]

In the criminal law there is 'considerable uncertainty over the relationship between causation and omissions.'[40] On one reading of the facts in this hypothetical scenario, if Benjamin dies after Alice omits to seek assistance that could rescue him following his suicide, her conduct appears to directly result in her husband's death. *But for* her failure to arrange medical intervention, he would not have died. However, an alternative interpretation suggests that if a duty arises at all, it does not arise until Benjamin becomes a helpless creature, by which time his death is inevitable and her failure to act has no influence on the chain of causation.

Alternatively, in the context of a UCARe who is responding to the autonomous wishes of a person in their charge it is interesting to consider what might happen if Alice had summoned help. If Benjamin were to be admitted to hospital before becoming unconscious he may well decide to refuse treatment. If, in these circumstances he was regarded as competent to make such a decision then, following dicta in recent medical law cases,[41] his wish would have to be respected. The result would be that he would have died. Alice would not have *caused* his death and would not be liable. A different outcome can be anticipated however if Benjamin were to be taken to hospital in an unconscious state. Then it is most likely that he would receive emergency treatment with the health professionals acting in keeping with their professional and legal duty to treat him according to his best interests as the extremity of the situation dictated.

Conclusion

One way of looking at these facts suggests if a UCARe like Alice prevented the administration of medical assistance that could save life they would have caused the death and thus be susceptible to criminal sanction. However, from another perspective the issue is not so straightforward. Either no duty arises or it does not arise until the caree becomes helpless, by which time death is unavoidable and then causation is not an issue because her omission, or failure to act, could have no impact. Clearly, as there are

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so many alternative legal constructions that might apply in this context UCARes can be forgiven for confusion surrounding how far their duty extends towards those they care for and perhaps for neglecting their duty given this uncertainty. UCARes are not benefited by the training or institutional support available to medical professionals and are consequently exposed to a greater risk of criminal liability, which leaves them vulnerable to charges of manslaughter by neglect. This seems inappropriate given the reluctance to bring prosecutions in various situations like death tourism and the possible legalisation of assisted suicide for the terminally ill, both of which evidence a shift in contemporary notions of what is justifiable.

The concerns raised in this paper may initially appear to be of limited relevance and focused on a very narrow point of law, but as they potentially affect around one fifth of the population they cannot be regarded as insignificant. Whereas ignorance of the law is no defence to criminal liability, uncertainties within the law must be resolved before criminal justice system sanctions come into play. The penalties associated with assisting suicide, manslaughter and breaches of the duties of care are clear in relation to healthcare professionals. Yet the lawful boundaries between UCARes' duty of care, our right to refuse medical treatment and the higher moral duties we feel in relation to our loved ones are inchoate and uncertain. Equally, the need for the criminal justice system to preserve 'helpless creatures' vulnerable to the intolerable cruelties of uncaring UCARes is clear. These issues need to be considered in the volatile context of end of life decision-making, death tourism and calls for the legalisation of assisted dying to ensure that both UCARes and those they care for are adequately and appropriately protected.

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[1] The authors would like to acknowledge the very helpful comments of Dr Matthew Weait on an earlier draft of this article, along with those of the anonymous reviewers of Genomics, Society and Policy.

[2] R. Mackenzie. From Sanctity to Screening: Genetic Disabilities, Risk and Rhetorical Strategies in Wrongful Birth and Wrongful Conception Cases. Feminist Legal Studies 1999; 7: 175-191; J. Robertson. Procreative Liberty in the Era of Genomics. American Journal of Law & Medicine 2003; 29: 439-487.

[3] Caring about Cares, http://www.carers.gov.uk/ last accessed on 11th March 2006.

[4] Untrained Carer Assuming Responsibility.

[5] For example, unpaid support of the elderly is an accepted part of modern family life, See M. Brogden, 2001. Geronticide: Killing the Elderly. London, Jessica Kingsley.

[6] Similar issues have been discussed in *Pretty v UK (Application 2346/02)* [2002] 2FCR 97, *R (on the application of Burke) v General Medical Council* [2005] 3 WLR 1132, *R v Wragg* December 2005 Lewes Crown Court, unreported and the recent case of Dr Anne Turner.

[7] In the USA this is known as amyotrophic lateral sclerosis.

[8] There are numerous examples of UCARes acting in this way, the most recent reported case being that of Maureen Messent who has admitted killing her elderly aunt 40 years ago. See http://news.bbc.co.uk/1/hi/england/4692320.stm last accessed 12th March 2006.

[9] H. Palmer. Doctor Adams on Trial for Murder. Criminal Law Review 1957; 365 at 375.

[10] R. Leng,. Mercy Killing and the CLRC. NLJ 1982; 132: 76- 79; H. Biggs. 2001 Euthanasia, Death with Dignity and the Law. Oxford: Hart.

[11] So-called mercy killings also occur where a UCARe deliberately ends the life of a person in their care who either does not or cannot request it. Frequently such cases involve children with terminal or incurable genetic conditions, as in the case of Andrew Wragg, *supra* n. 5, but these cases are outside the focus of this article.

[12] Suicide Act 1961, s2 (1).

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[13] For more detail on the Bill see H. Biggs, The Assisted Dying for the Terminally Ill Bill 2004: Will English Law Soon Allow Patients the Choice to Die? European Journal of Health Law 2005; 12: 43-56.
[14] BBC News, 'Widow on Trial for Manslaughter' 20th April 2005.
[15] *Pattmore* (1789) OB Sessions Papers 214, *Smith* (1826) 2 C & P 449, *Shepherd* (1862) 9 Cox 123, *Nicholls* (1874) 13 Cox 75, *Smith* (1880) 14 Cox 398, *Smith* (1865) 1 L & C 607, *Instan* [1893] 1 QB 450, *Gibbins and Proctor* (1918) 13 Crim. App Rep 134, *Hall* (1919) 14 Crim App Rep 58, *Chattaway* (1922) 17 Crim App Rep 7, *Bonnyman* (1942) 28 Crim App Rep 131, *Stone and Dobinson* [1977] QB 354, *Smith* (1979) Crim LR 251.
[16] A. Ashworth. The Scope of Criminal Liability for Omissions. Law Quarterly Review 1989; 105: 424-458; A. Ashworth. 2003 Principles of Criminal Law (4th ed) Oxford: Oxford University Press; P. Glazebrook. Criminal Omissions: the Duty Requirement in Offences Against the Person. Law Quarterly Review 1960; 56: 386-411; A. Norrie. 2003. Crime Reason and History a Critical Introduction to Criminal Law. London: Butterworths; G. Williams. What Should the Code Do About Omissions?' 7 Legal Studies 1987; 7: 92-118.
[17] *Re B (Adult Refusal of Medical Treatment)* [2002] 2 All ER 449, *Pretty v UK* (2002) 35 EHRR 1.
[18] *Re T (adult refusal of medical treatment)* [1992] 4 All ER 649, *Re C (adult refusal of medical treatment)* [1994] 1 All ER 819, *Re MB (medical treatment)* [1997] 2 FLR 426, *Re B (adult refusal of medical treatment)* [2002] 2 All ER 449.
[19] *R v Adomako* [1994] 3 WLR 288, *R v Misra and Srivastava* [2005] 1 Crim App Rep 21
[20] Examples might include situations where the defendant has deliberately exposed the victim to the harm which subsequently arose due to the neglect as in *R v Sogunro* [1997] Crim App. Rep. 2 (S.) 89 where the victim was locked in a room by the defendant and subsequently deprived of food.
[21] *Gibbins and Proctor* (1918) 13 Crim. App Rep 134.
[22] For example, by virtue of a contract, *Pitwood* (1902) 19 TLR 37, because there is a special relationship, *Smith* (1979) *Crim Law Rev* 251, through the voluntary assumption of a duty, *Stone and Dobinson* (1977) 2 All ER 341, by statute *Lowe* [1973] 1 All ER 805, and, where the defendant has created a dangerous situation, *Miller* [1983] 1 All ER 978.
[23] *Adomako* [1995] 1 AC 171, [1994] 3 All ER 79 at 86-87.
[24] Jill Anderson cited in BBC News 10th May 2005, http://news.bbc.co.uk/1/hi/england/north_yorkshire/4534857.stm
[25] Her comments are redolent of those put forward by women activists who damaged a hawk fighter jet in protest against arms dealing. The women claimed in their defence that they had a higher moral duty to protect those in East Timor who would become innocent victims had the planes been exported. They were acquitted. See, H. O'Shaughnessy, '£1.5m Hawk Attack Women Freed' *The Independent*, 31 July 1996, and an article written by one of the protestors, A. Zelter. Civil Society and Global Responsibility: The Arms Trade and East Timor. International Relations 2004; 18: 125-140.
[26] *R v Nicholls* (1874) 13 Cox 75.
[27] *Instan* [1893] 1 QB 450, *Hall* (1919) 14 Cr App R 58, *Chattaway* (1922) 17 Cr. App. R. 7.
[28] *R v Smith* [1979] Crim L R 251.
[29] *Re T* [1993] Fam 95, *Re C* [1994] 1 All ER 819, *Re MB (Medical Treatment)* [1997] 2 FLR 426, *Re B (Adult Refusal of Medical Treatment)* [2002] 2 All ER 449.
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[31] *Bonnyman* (1942) 28 Crim App. Rep. 131, per, Caldecote L Chief Justice at 133.
[32] *Bonnyman* (1942) 28 Crim App. Rep. 131, per, Caldecote L Chief Justice at 137.
[33] Glanville Williams, op.cit. note 15, p.105.
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[41] *Re T* [1993] Fam 95, *Re C* [1994] 1 All ER 819, *Re MB (Medical Treatment)* [1997] 2 FLR 426, *Re B (Adult Refusal of Medical Treatment)* [2002] 2 All ER 449.

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Forensic uses and misuses of DNA: a case report from Norway

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Abstract

New technology generates fantastic possibilities which challenge traditional distinctions between good and bad. Genetic analysis of DNA for forensic purposes is but one example of this. Here society's need for convicting criminals can conflict with the same society's need to assure the confidentiality of information about its members and their trust in its institutions. In order to illustrate the complexity of such challenges, a case report from Norway is presented. The point is to reflect on the way we handle trailblazing health technologies in general and on cases where law and order is gained by means that can be conceived of as immoral in particular. The case calls for careful ethical reflection.

Introduction

Forensic use of DNA provides us with a powerful tool in the struggle for justice. At the same time it may imply profound moral challenges. On the one hand there is a legitimate search for truth in criminal cases in order to convict guilty persons. On the other hand we have to protect the confidentiality and privacy of individuals. This delicate balance can become subject to substantial stress, in particular in cases of brutal crime.

Where biological material which is gained by diagnostic and therapeutic (or research) means in health care is used for other purposes, the trust which is the basis of health care services is at stake as well.
The following interesting case from a brutal robbery in Norway is but one example of this. It highlights both the profound challenges and the complexity of such cases. Hopefully, considering the case can make us better equipped to face such challenges in the future.

Early Monday morning, April 5 2004, the Norwegian Cash Service in Stavanger – a branch of the national bank of Norway – was robbed brutally. The robbers, shooting their way into the building with machineguns, killed one police officer and got away with 57 million Norwegian Kroner (about seven million Euro). This well planned and brutal robbery shocked the whole country and significant resources were provided for the subsequent investigation.

As part of their work the police found DNA on a balaclava. The analysis did not show any identifiable match in the police's registers, but turned out to match DNA on a sledgehammer from another unresolved brutal robbery in Oslo in October 2003.
After a repeated search the police found a match with DNA on a mouth guard from a third robbery in Hemsedal 2002. By interrogating one of the suspects in the Hemsedal robbery, this led them to two brothers, one a famous Norwegian boxer and the other a Norwegian kick boxer. At this time the boxer drowned in a boat accident (May 2004). As there existed biological material from the autopsy, the police wanted it analyzed,

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and this was supported by the state attorney. The DNA analysis showed that the DNA found on the sledgehammer (from the robbery in Oslo in 2003) and the balaclava (from the Stavanger robbery 2005) did not stem from the boxer, but that it had significant similarity. This directed the suspicion against the older brother, the kick boxer. None of the brothers had earlier been convicted, and thus were not in any criminal DNA-register.[1]

This case and subsequent similar cases fuelled fierce debates on a series of issues: Can biological material collected for one purpose, e.g. a medical purpose, such as autopsy, be used for another, e.g. a forensic purpose? According to the Norwegian Biobank Act to use material in diagnostic biobanks for other purposes, such as research, requires express informed consent. However, the Health Personnel Act allows for communicating health information under certain conditions.

Can DNA acquired in one case (e.g. the forensic autopsy of a suspicious death: the drowned boxer) be used in another case (Oslo, Hemsedal, or Stavanger robbery)? Even more: can DNA acquired from one person (the boxer) be used in order to find out if another person is involved (the kickboxing brother)? To what extent is DNA that the police have collected their 'property' free for use? The DNA-register regulation restricts the use of DNA, however, how much is disputed.

Can DNA be collected, e.g. from a coffee cup or from the garbage bin in a private garden without a person knowing. This material has a different status than biological material found on a crime scene, as the identity of the person is known. However, it does not qualify for entering the criminal DNA-register. According to Norwegian law, entry in the criminal DNA-register is only permitted in the case of persons convicted for serious crimes. Suspects are not allowed in the DNA-register.

- What should an independent institute for forensic medicine do when the state attorney supports a request for DNA analysis, but when it is not clear whether such a request is legal?

- Furthermore, can material collected in a disputed or even illegal manner be used as evidence in a serious case as this?

- How are we to face the fact that the DNA collected and stored by the police constitutes a 'biobank' that does not fall under the Biobank Act?

- Can DNA from dead persons be collected or registered, as they cannot be suspected or prosecuted? According to Norwegian legislation DNA can be collected only if there is ample suspicion. DNA from dead persons cannot enter DNA-registers, because they cannot be convicted. Furthermore, what respect do dead persons deserve? How should we respect the relatives?

- How to handle consent with respect to biological material from dead persons, e.g. if a family member consents to analysis of DNA from a dead person in order to clear the person out of a case? Proxy consent is not common in Norway, but the Health Personnel Act says that information on a dead person can be passed on if it is in the interest of the person, his or her family or society. But if

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> health care information about a dead person can be passed on, why can DNA from dead persons not be passed on under similar circumstances?

These questions touch upon profound ethical issues. For one it challenges trust, being the moral basis of social institutions, such as health care, police, and (legislative branch of) parliament. Second, the case raises issues of autonomy, privacy and confidentiality. Third, it challenges the relationship between biological material and clinical information, and on the status of biological material: what is the biological material in relation to the person it stems from. Moreover, we are challenged with respect to the moral and legal status of a dead person, and what respect relatives deserve on behalf of a dead person.

As a result of the debate, the Institute for Forensic Medicine University of Oslo concluded that they should have required a court decision before performing the DNA analysis of the dead boxer. At the time, they claimed, they had not reflected on the legal basis of the requested analysis. As it was asked for by the police, they assumed it would be legal. However, the heated debate made them refuse to perform analysis in a subsequent case (where they were put under pressure by the Faculty of Medicine at the University to perform the analysis).

As a result of the debates, another university hospital refused to give biological material from a diagnostic biobank for analysis in the same case (in Stavanger). This made the prosecutor bring the case all the way to the Supreme Court who decided that biological material gained for medical purposes could not be used for forensic purposes. This was based on the Biobank Act requiring consent for extended use of biological material, and, as consent was not given by the dead person (or his family), the DNA analysis could not be performed. Hence, the consent clause of the Biobank Act, which has been extensively criticised for being excessively restrictive (and even research hostile), turned out to protect the individual against altered use of biological material collected for diagnostic (or therapeutic) purposes.

One of the key issues in this and the subsequent similar cases has been how to balance a society's need for investigating crime and convicting criminals on the one hand and protecting the individual's interests on the other. Behind this lures the question of how to preserve trust in society and its institutions.

New technology generates fantastic possibilities, which can be used for good and bad. However, the balance mentioned above makes it difficult to discern the good from the bad. Additionally, new technology creates new space for human action (and agency) that are not covered by existing law. On the contrary, it generates 'lawless spaces', which urges moral awareness and ethical reflection.

[1] The prosecution of the Stavanger robbery is not finished yet and the information in this case report stems from public sources only.

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Book Review

Wrestling with Behavioral Genetics. Science Ethics and Public Conversation.
Erik Parens, Audrey R. Chapman and Nancy Press (eds).
John Hopkins: Maryland, 2006

MAIRI LEVITT

This book is one outcome of a project undertaken by the Hastings Center and the American Association for the Advancement of Science with an interdisciplinary group including social scientists, geneticists, lawyers and journalists. A project report is available at www.thehastingscenter.org. As indicated in the title there are three sections: the science; ethical and social concepts and problems; and public conversation, in the media and with 'lay' publics. With the first five articles covering the science, there is scope for greater complexity than the usual first chapter in ELSI books. The first two articles by Schaffner use a question and answer format with an imaginary judge for part of the discussion and this proves useful rather than irritating. Among the points addressed are why we are told humans are 99.9 percent identical in their DNA but fraternal twins 'have only about 50 percent of their genes alike' (p.17), reasons for inconsistent results in association studies (of genes and behaviour) (p.42), and the lack of correlation between behaviours that are identified as having high heritability in twin studies and the susceptibility genes that have actually been identified (p.49). Having been told that 1000s of genes each with small effects (QLTs) may be interacting to produce traits or disorders (p.49), Beckwith, in the next article, argues that we need to explore the assumptions underlying this research, including the assumption that identical and fraternal twins share equal environments and separated twins experience different environments. He looks at the complexities of quantifying and comparing aspects of home and outside environments (p.82). Turheimer points out (chapter 4) that twin studies have been used to measure the effects of genes and environment without measuring anything about either of these, but simply making assumptions about twins (p.102). The last paper in the section is by Hyman, a former director of the National Institute for Mental Health which had been previously criticised for involvement in studies of genes and violence and under his leadership gave priority to research concerned with illness rather than non-disease phenotypes. With this new focus 'the political problems of NIMH literally melted away'! (p.123).

In looking at ethical and social issues Nancy Press discusses social constructionism, as a critique and a method. Behavioural genetics focuses on socially constructed (and so inconstant) phenomena from leadership to attention deficit and shyness. These have to be reified as bounded entities in order to be investigated by geneticists. She argues that variations in these behaviours then become seen as problematic or pathological through the process of medicalization. The reason this matters is the harmful social effects. Duster's chapter develops these arguments by looking at the way links between crime, violence and race are explained. He looks at the socially specific nature of definitions of 'race'and 'anti-social behaviour' and concerns about the bias of forensic DNA databases towards particular ethnic and social groups. The result is that 'erroneous inferences' may be made, by geneticists using these databases, about the link between

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criminal behaviours and particular ethnic groups. Edgar discusses the thorny issue of the implications of behavioural genetics for legal responsibility, focussing on impulsivity. Early on he concludes that there will be no impact on responsibility in criminal law but that there might be some influence on sentencing. He then moves on to consider the question, what if all or nearly all behaviour was 'compelled' by the interaction of genetic make-up and environment? He points out that the debate about free will 'exaggerates the law's interest in punishing offenders [only when it is just] as against shaping broader behaviour' (p.183). Among other arguments he points out that 'the law should be toughest precisely when the impulse to violate it is strong', giving the example of the execution of wartime deserters (p.190). Dan Brock considers the potential effects of genetic advances on equality and argues that the moral objection is to selective access to enhancement technologies rather than to the technologies themselves. The danger is that the gap between the enhanced and un-enhanced might become so wide that they would no longer identify with each other. In the last chapter of this section, Kaebnick returns to the question of free will and argues that philosophical theories do not need to be rethought because of behavioural genetics, since empirical data cannot refute philosophical argument. Like the environment, genetics will usually predispose a person to act in a particular way but not determine action. Kaebrick goes on to consider different philosophical positions on free will and ends by setting out a neo-Kantian position, with a touch of Wittgenstein, in which we consider that determinist talk of behavioural genetics belongs to a different language game from talk of free will

The final section considers why we need a public conversation about behavioural genetics and how to create it. Flick suggests addressing the public policy issues raised by the methods of public reason derived from Rawls. This involves developing public reasons 'to justify value-laden public policies' that are independent of particular religions or philosophies and acceptable to all 'liberal citizens' (p.267). As an example he identifies six relevant public interests in mandatory genetic testing; privacy, liberty, justice/protection of fair equality of opportunity, social harm, invidious discrimination and personal responsibility. Of course, the devil would be in the detail of how these are defined and balanced. Condit and Harris use empirical research with laypeople to explore how they incorporate ideas of genetics into their thinking on human behaviour. The results are not new but worth reiterating in the light of assumptions made in previous papers about the lack of public understanding and media hype. They conclude that the public do not simply absorb messages from the media and 'lay accounts are in some ways more comprehensive and complex ' than those of scientific experts in the area (p.306). In the final paper Weiss comes up with some rules for journalists reporting in the field of behavioural genetics, while acknowledging that scientists themselves can engage in hyping of their research in the name of accessibility. He cites the 'cute names' given to genes and gene-altered animals.

Although there is some overlap between chapters this is not a run-of-the-mill edited collection with no overall coherence. Rather, the book reads as the product of a fruitful multidisciplinary project in which each author addresses the issues from within their own discipline but with evidence of the conversations that took place between project participants. The whole makes a thought provoking contribution to the area.

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Hazel Biggs was appointed Professor of Medical Law at Lancaster University in April 2005, prior to which she was Director of Medical Law at the University of Kent. The focus of her research is Medical Law and Ethics with the main emphasis being end of life decision-making, human reproduction and clinical research and she has published widely in these areas.

Helen Codd is a Principal Lecturer in Law at the University of Central Lancashire. Her current research focuses on prisoners' families, law and policy and incorporates interdisciplinary socio-legal and criminological perspectives. She is also interested in prisoners' rights, gender and criminal justice.

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Nita Farahany, M.A., J.D., is a fellow and instructor of law at Vanderbilt University Law School, Nashville, Tennessee. She is completing her Ph.D. in Philosophy of Biology at Duke University. Her dissertation explores the intersection of behavioral genetics and criminal law. She is the co-special editor of an upcoming issue of the journal Law & Contemporary Problems on The Impact of Behavioral Genetics on the Criminal Law.

Susanne B. Haga, Ph.D. is a Senior Policy Scientist at the Institute for Genome Sciences & Policy at Duke University. Her interests lie in the translation of genetics/genomics research to practical applications, particularly in medical practice, and related specifically to the legal/regulatory, ethical, and social implications.

Bjørn Hofmann is an adjunct professor at the Section for Medical Ethics at the University of Oslo where he is also a post doctoral research fellow on an international research project on research biobanks. His main interests are concepts of health and disease, the relationship between technology and values, as well as autonomy and informed consent. Hofmann is also an adjunct professor at the University College of Gjøvik.

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Mairi Levitt is a deputy director of CESAGen. A sociologist, she has a long standing research interest in the sociology of the new genetics, including public engagement on science and technology and the interface between sociology and bioethics.

Robin Mackenzie is Director of Medical Law and Ethics at the University of Kent. She has taught law in New Zealand, Scotland and the United Kingdom and has published in the field of medical law and ethics as this applies to reproduction, genetics, death and dying, intellectual property and feminist thought.

Ozan Onay is an undergraduate student of Science and Law at Sydney University. During the course of his studies he has undertaken some independent research under the guidance of members of Sydney University's Unit for the History and Philosophy of Science.

Ken Pease was Professor of Criminology at the University of Manchester, and Head of the Police Research Group at the Home Office. He also sat on the Parole Board. Now retired, he remains a member of the Home Office's Science and Technology Reference Group, and Visiting Professor at the University of Loughborough.

Chloe Smith was a Research Fellow at the JDI for four years, working on an eclectic range of projects before specialising in the role of design in crime towards the end of her time at the JDI. She now works as a Project Manager for IFF Research.

Floris Tomasini is a Research Associate at CESAGen, Lancaster. He is a continental philosopher by training and manages a European project (INES). His current interests – including the role of children in genomics – involve genomic ontology, identity and bioethics within the human enhancement and public health debates.

Michael Townsley is a Senior Research Fellow at the UCL Jill Dando Institute of Crime Science. His main research interests include crime analysis with a view to the prevention of crime. Current work involves considering ways in which forensic data can be employed in a more proactive manner beyond the resolution of individual criminal incidents.

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