

**'Wonderment and Dread': Representations of DNA in Ethical Disputes about
Forensic DNA Databases**

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Interviewer: There's both wonderment and dread about DNA. How much can someone who has knowledge of our genes really know about us as an individual? How far can they peer into our souls?

Professor Bobrow: DNA has largely to do with chemistry and not with souls. The answer today is that someone who really knows everything about your DNA can predict with some accuracy whether you are very likely to get or pass on one of about a hundred pretty common diseases which are known to be inherited in a very simple way. Beyond that, at the moment, DNA has very limited predictive power

excerpt from 'The Radio 4 Commission' Radio Broadcast

Introduction

The assertion that DNA is 'to do with chemistry and not with souls' is, in the context of the above discussion, to instate a specific set of ideas, about what DNA is and what science can do with it. The interviewer's question about how much a person's DNA can tell us about the fine details of their identity - where the word 'soul' stands to mean aspects of ourselves which are 'personal' and 'unique' – resonates with widespread claims of the informational and diagnostic potential of this essential molecule (e.g. Home Office, 2003a, Home Office, 2003b, Human Genetics Commission, 2001, Human Genetics Commission, 2002, Nuffield Council on Bioethics, 2002). Bobrow rejects the esoteric reference to 'soul' in favour of the exoteric 'chemistry' and explicates the significance of this by emphasising the provisional ('today'), limited power ('with some accuracy', 'limited predictive power'), and restricted scope ('a hundred pretty common diseases', 'very simple way') of the

uses of DNA to identify the propensity that a human being *may* have to develop one of a few known diseases. And, after all, the same may be said of a number of diagnostic medical tests that have been available longer than genetic analysis. Why, then, should we dread the fact that others may have knowledge of ‘our genes’? One reason for concern about the use and retention of our genetic material by others lies in the very phrasing of Professor Bobrow’s final summary remark that ‘*at the moment*, DNA has very limited predictive power’.

It is this image of a temporal dynamic, a trope built into the rhetoric of emerging genetic technologies (and perhaps all technologies), that provides the engine for a range of speculative fears about the informational power of DNA and suspicions that such information could be used – by state or private agents - against its providers in undesirable ways. Such concerns are not limited to DNA. They are regularly expressed about a whole range of data, including biometric identifiers like fingerprints, which are routinely databased. The increased recording of personal information by the state and private enterprise has prompted the expression of a broad set of concerns about privacy, liberty and autonomy, and the desire to limit or regulate the spread and uses of such archival practices. Yet the regular assertion of the ‘extra sensitive’ informational nature of DNA, and thus the extra concerns that we should have about it, mark a significant difference from most other concerns about the collection of personal information. It is these concerns that were recently captured by the Lord Chief Justice of England and Wales’ (2002) comment on the ‘Pandora’s box’ quality of genetic research and its uses for the investigation of crime.

Researching the UK National DNA Database

This paper draws on material collected as part of a larger project on police uses of the UK National DNA Database (NDNAD). The approach we take to analysing the developing uses of DNA and DNA databases in support of crime investigation is

similar to that of Hess' (1997) 'heterogeneous constructivism' insofar as we recognise that scientific and technical innovations are both affected by particular social relations and at the same time, bring into being new forms of social relations. The interrogation of the mutual determination of both technologies and the social networks within which they are realised is essential to understand the ways in which DNA profiling and databasing in the UK has moved from the 'local uncertainties' (Star 1985) of their initial deployment within a small number of serious crime investigations to the 'global certainties' of their routine use for the investigation of volume crime. In the course of the larger project we try to capture this complexity by outlining some of the heterogeneous material, disciplinary and rhetorical resources that are brought together in the forms of coordinated action that make up the NDNAD as a developing socio-technical assemblage (see for example Johnson, Martin and Williams, 2003).

The different knowledges, practices, and routines which together constitute the NDNAD have arisen and been developed within several distinct organizational contexts, but they are each given new inflections through their combination and operational redeployment in the investigation of crime. In other words, separate 'specialist areas' – such as genomic sequencing, forensic science practice, information technology, police investigatory procedures, and governmental expertise – are combined in the form of the NDNAD to effect its construction and deployment in certain ways and with specific aims. Therefore, of particular interest to us are the relations that have come to exist between certain sets of actors within this complex of elements. The interests and resources of these actors are not just passively combined, but rather rely upon and mutually reinforce each other in the course of the construction and continued development of the database and its deployment.

The establishment and use of the NDNAD is a realization of a scientific potential developed in accordance with specific state interests but which, because of its

inculcation with such interests, has itself prospered and grown in other contexts.

Whilst it would be misleading to overstress the notion of a 'governmental drive' which simply steers the development and implementation of such innovations, it is impossible to expunge completely the political ambitions of the state from the development of this scientific technology; it is not simply that genetic profiling 'affords' (Hutchby, 2001) certain socio-political aims, but rather that those political aims have themselves contributed to the establishment of this technology (outside, as well as within, forensic science – such as in the vast market of paternity testing).

In the course of this work we have examined a large number of policy and operational documents produced by the Home Office and individual Police Forces. We have also collected documentary material from a number of other stakeholders including the Human Genetics Commission, the Information Commissioner and a variety of pressure groups who have an interest in the state collection and use of a variety of forms of genetic information. In addition we have carried out more than 60 semi-structured interviews with a range of individuals from organizations directly involved in either using, or commenting upon the use of, DNA profiling in the criminal justice system - the police, forensic scientists, crime scene examiners, legal professionals, legislators, and those concerned with human rights issues – with the aim of providing a comprehensive 'map' of views relating to the use of DNA profiling by the police. Much of this material is currently subject to analysis, but even during our initial inspection of these data we were struck by the great number of different commentaries which express 'concerns', 'worries' and 'fears' about the 'use of genetic material' for the purposes of criminal investigations. Commentaries provided by individuals seem to employ a range of different representations of DNA, or deploy what Jasanoff (2001) describes as the varying 'identities' which are attributed to DNA, and in this paper we explore some of these in a preliminary way. Data are

presented in an anonymized form and we do not assert that the views expressed can be exclusively aligned with particular occupational groups or to particular institutions.

However we will seek to show that different representations of DNA are employed to support alternative ethical assertions about the forensic uses of DNA and DNA databases. Many of the arguments about how, for example, the National DNA Database (NDNAD) should be governed, we argue, arise from differing understandings of the 'behaviour and potential' (Jasanoff, 2001) of DNA. With the rapid expansion of the ways in which DNA can be interrogated and manipulated by the laboratory and informatic techniques of molecular biology, these representations become key rhetorical tokens. There is an essential tension throughout this discursive field between a wonderment of the ability of DNA to identify the perpetrators of crime and a dread about its capacities to erode civil liberties and human rights.

We do not see these 'positions' as distinct and separate discourses which are deployed independently of one another. On the contrary, we would argue that fears and concerns about civil liberties and human rights are imbricated with the established epistemic authority of molecular biology and the modes of its incorporation into the criminal justice system. This is concurrent with our view of the NDNAD as a socio-technical assemblage which, operating through a standardised set of scientific procedures, is accomplished through the negotiated actions of a variety of innovators and users and, because of this, that the trajectory of such innovations are marked by contestation, contingency and adaptation. We are concerned to demonstrate in this paper that an essential feature of this contestation is the different ways in which specific actors comprehend and represent DNA profiling and databasing technologies and, as a result, the types of ethical frameworks they offer for its use. In order to understand how different

representations of DNA emerge it is therefore necessary to situate them within the socio-political context of an expanding NDNAD which now holds the DNA profiles of not just those convicted of crimes but of a large number of innocent persons. In the next section we discuss the recent history of these developments.

Expanding the database: success and concern

The tension between the desire to fully exploit the potential of DNA for the investigation of crime whilst recognising the issues of civil liberties raised by its use is often expressed in another rhetorical trope – of a balance between two alternative goods: the effective use of DNA for the identification of offenders on one side; the protection of individual rights to privacy on the other. A version of this balance has most recently been expressed in a commentary by the Parliamentary Joint Committee of Human Rights on the current Criminal Justice Bill 2003 that is before Parliament as this paper is being written. An amendment tabled in this Bill proposes to extend the power of the police to take DNA samples from criminal suspects at the point of arrest and, regardless of the outcome of that arrest, to retain the DNA sample (and the profile generated from it) indefinitely. Currently the police, under powers granted by the 2001 Criminal Justice and Police Act, are allowed to sample suspects without consent only at the point that they are charged. The new measures would enable the police to collect samples earlier, increasing the amount of databased material by approximately 300,000 individuals per year, and swell the size of a database which the government describe as comprising the ‘active criminal population’. In response to these proposals the Joint Committee on Human Rights stated that ‘the carefully struck balance has been steadily shifted in favour of the police’ and that ‘procedural safeguards have been progressively relaxed’ (Joint Committee on Human Rights, 2003).

When the previous 2001 legislation was considered by Parliament there was only a small amount of media coverage which focused on the issues of privacy and liberty which it raised. Matters of privacy and discrimination, covered by Articles 8 and 14 respectively in the European Convention on Human Rights, have been contended in the High Court and the Court of Appeal (in the case of *Marper & 'S' v Chief Constable of South Yorkshire*). For some civil liberties commentators the 2001 legislation can be seen to fundamentally alter the balance between the individual and the state by moving the line at which the right to privacy is drawn (this is the view publically expressed by, for example Statewatch). And Britain is in the curious position of having the most far reaching legislative provision in the world for forensic DNA databasing whilst, unlike most other countries, being without explicitly formulated government assurances and charters regarding individual rights in the context of police DNA databasing. The new legislation, which affords the police the power to retain the DNA samples and profiles not only of those deemed innocent, but also those never charged with a criminal offence, raises additional ethical issues.

In fact, the concern to ensure that the use of DNA within the criminal justice system is balanced and proportionate was apparent before the existence of the National DNA Database (NDNAD). Consideration of the ethical nature of taking samples from individuals (with or without consent) and the presentation of that information as evidence in court was debated by, for instance, the Scottish Law Commission (1989). It should also be remembered that the initial introduction of DNA into criminal proceedings was often received with great enthusiasm precisely because it was seen as a technology capable of ensuring a fair balance (between public interest and individual liberty) in criminal investigation. In the 1993 Royal Commission on Criminal Justice the central feature of DNA profiling was noted to be its 'objective' capacity to provide safe identifications, using high statistical levels of certainty, which could be used to exclude innocent people from criminal suspicion. This commission reported

at a time when public confidence in the criminal justice system was low and the use of the, then novel, technology of DNA profiling was viewed as a powerful tool in re-establishing trust in the safety of criminal convictions based on forensic evidence. Indeed, the first application of this technology in the UK was used to eliminate a prime suspect who had confessed to crimes he had not committed, and subsequently to assist in the conviction of Colin Pitchfork for those murders.

The Pitchfork case marked the introduction of this highly specialized scientific technology, developed by Alec Jeffreys and others in the mid 1980s, into selected criminal investigations. What we have witnessed since then is the significant shift from the application of DNA profiling to individual casework targeted at serious crime to its routine use in volume investigation, incorporated into the daily practice of crime scene examiners, and its laboratory and informatic automation into a searchable and matchable database technology. Thus, technological, political and policing changes have enabled DNA profiling to become established as a central element of criminal investigation. The commitment to further this 'scientification of police work' (Ericson and Shearing, 1986) has been outlined in the recent *Police Science & Technology Strategy 2003-2008* (Home Office, 2003b). We have outlined elsewhere (Johnson, Martin & Williams, 2003) the historical narrative of this process, its central features, and the ways in which governmental aims have been implemented in changing policing practice.

Widening the scope for the police to collect DNA samples has served the central aim of expanding the collection of profiles contained on the NDNAD. With the ambition of capturing a discrete population of 'active criminals', and placing them within a closed circuit of surveillance (Williams & Johnson, 2003), the government's desire to expand the operational capabilities of the database has been met. Increasing the volume of profiles contained on the database has vastly amplified the chance of obtaining a

match between a crime scene sample and the profile of a databased suspect (figures provided by the Forensic Science Service in their annual reports show that between 1997/8 and 2001/2 the database had increased its matches from roughly 20,000 to nearly 60,000). Placed alongside several high profile cases, where DNA evidence has contributed to the detection of serious offenders, the success of the NDNAD has been assured. Yet the expansion of the NDNAD has been undertaken at a time when growing public interest in the real and imagined potential of DNA has been complemented by increased expert commentaries and widening public awareness of the ethical issues of DNA databasing and their governance (Martin and Kaye, 2000). Criticism is also regularly made that the government's legislative programme is seeking to establish a universal database 'by the back door' (a view expressed by members of Standing Committee F who debated the 2001 Criminal Justice and Police Bill in the Commons).

Responses to the expansion of the NDNAD clearly echo reactions to perceived developments in DNA technology in general. Thus there is both excitement about its potential and fear regarding its use. Each step in the expansion of the database has temporarily renewed debate about, and increased consciousness of, the ethical and social implications of the existence and uses of the NDNAD. However, there are some central differences between the debates surrounding the use of DNA by the police and those that arise in discussions of DNA databasing for medical purposes. For the most part that is because of the differing circumstances under which DNA samples are obtained (most notably in the way that they are 'given' from medical 'donors' but 'taken' from 'suspects') and used. These differences influence the ways in which the debates, about consent, privacy, and autonomy, are presented in the two contexts.

Representing DNA in ethical discourses

Debates about the essential 'nature' of DNA, and ethical concerns about its use, have proliferated in the context of the increased use of DNA by the police, and the extension of legislative provision to enable the expansion of the database through sampling the DNA of criminal suspects. These concerns are regularly expressed through questions about the types of information that is contained in DNA samples and profiles, the governance of any research based on these retained materials, and the future uses to which they may be put. Whilst we discovered that there is a core of central ethical questions acknowledged by the key groups that we have talked to we have also found that differing representations of DNA are employed in raising, considering and responding to the elements that make up this core. Using some examples from documents and interviews with these stakeholders we outline below three characteristic ways of representing DNA, and we show how these serve to enclose and shape ethical assertions about the legitimacy of a number of its forensic uses.

We distinguish three such representations: first, a 'genetic exceptionalism' which stresses the unique character of genetic material; second a 'genomic minimalism' which emphasises the mundane character of forensic uses of non-coding sequences of DNA; and third, a 'biometric pragmatism' which distinguishes between different sources of DNA material and what may legitimately be done with DNA obtained from these sources. Each position asserts fundamentally different ontological images of the 'essence' of DNA and uses these to legitimate claims that would either further, or limit, the use of DNA and the NDNAD in support of criminal investigations.

1. genetic exceptionalism

The term genetic exceptionalism is already established in the bioethics literature. Used by Murray (1997) and others, it places particular stress on the 'special

character' of the information derivable from genetic material and therefore of the necessity to regulate carefully its production, use, and dissemination in a range of contexts including medical diagnosis and treatment, insurance and employment, as well as its forensic applications. From this perspective, genetic material is seen as special not simply because of its seeming capacity to tell us so much about any individual whose genome is interrogated, but also because of what that interrogation may reveal about their blood relatives. These possibilities – of exceptional information richness – it is argued, raise new kinds of questions about consent and information sharing amongst both users of genetic information and between genetically related individuals.

A modulated version of this position recurs in considerations of forensic DNA analysis and databasing. Whilst the issue of blood relatedness may be less prominent, the idea of the distinctively informative potential of genetic data – of DNA as a powerful biological catalogue of information - suggests the necessity of very particular and perhaps equally powerful protocols to limit its collection and uses. Some limitations already exist but others are still in the process of development. One important limit, which the UK government is currently unable to concede, is described in the *Draft of the UNESCO Outline of the International Declaration on Human Genetic Data* written by the International Bioethics Committee and currently in circulation within the genetic research community. The third article of this Declaration asserts that human genetic data constitutes a special category of information of a scientific, medical and personal nature of lifelong relevance to the individual, the family and the 'whole group' to which the person belongs. The Declaration does not distinguish between different types of genetic information, the different contexts of its application, or the principle of consent in different circumstances. In the forensic context the document appears to assert the necessity

for individualised judicial authority to be given for every instance of DNA sampling – including both crime scene stains and suspect sampling.

Even if we assume that such protocols would have to be redrafted - in order to allow the continued collection of DNA without consent for the legitimate purpose of criminal investigation - the exceptionalist position would maintain that the regulative framework appropriate for the sampling, profiling, interrogating, retaining and using genetic material raises problems for the police not previously encountered by their collection, retention and use of less sensitive forms of forensic material (such as fingerprints). In fact, regulation and governance, one UK human rights group asserts, may be a 'red-herring' because 'extremely sensitive personal data' will still be held on a database. Unlike the collection and retention of fingerprints by the police, this group asserts that 'there's a great potential [to use DNA] which we consider to be quite dangerous':

Human Rights Group #1: An awful lot of things could be said to be [useful] for the prevention of crime. You know, say there was found to be a gene which predisposes people to criminality, somebody could say in the future 'well, you know, you're allowed to pick up those people' or 'we're allowed to sort of go through the database identifying these people because it will help us prevent crime because then we will know which people it is that are likely to commit crime' [...] I'm not saying that, you know, even in the future the police would want to do that but if you are talking about legislation where people's civil liberties and human rights are engaged you want to be very, very careful to limit the potentiality for legislation and that doesn't seem to be done here.

The potential for the legislation to allow the implementation of a future technological development in behavioural genetics that could isolate the 'criminal gene' and exploit that genetic test for the purposes of criminal detection is a common concern. It is one of several possible future trends that, although seemingly extreme or unlikely, are regularly expressed. The position described above is not unique and fears about the retention and use of genetic material are shared by a variety of human rights groups in the UK and elsewhere. A member of another human rights organization, for example, told us that concerns about the use of genetic material, as opposed to other biometric identifiers, by the police are far greater because of the 'more powerful' nature of DNA:

Human Rights Group #2: If you have an identification [technology] like iris recognition or whatever then you would only be using that in specific places [...] whereas something like DNA does give you the potential to follow people around and test glasses they've been drinking from, and also to identify other sensitive information, like if they've got a genetic disorder or if they've got a child they didn't know they had, so there is a slight expansion. I'm not saying that the issues are totally new but I think there is a slight expansion of concern.

What characterises the positions of both of these respondents is that, although they express differing concerns, they focus on the special nature of DNA as a powerful information source that requires additional safeguards to prevent excessive or unauthorized use (these safeguards being necessary to prevent currently unknowable consequences). The first response expresses the dread that DNA could be used to predict, not simply medical, but character disorders and to diagnose the types of 'dispositions' that we have. Of course such a technology could never be

applied to predict an individual disposition to crime if one subscribed to the view that criminality is a social, not a biological, product (a view which most human rights groups do subscribe to). Yet the concerns are not as far-fetched as they first appear. Several current governmental apparatuses, particularly those associated with 'risk management' and crime, are directed to particular individuals to supposedly diagnose their potential for offending. The point here is not that there 'really' could be a criminal gene that could be isolated and known but that the idea of a genetically predisposed criminal could establish itself with enough rhetorical force and, legitimated with the objectivity of 'science', produce dangerous recursive effects (Nazi Germany, or the worst practices of eugenics, are often cited as examples of this). Viewed from this position DNA possesses an inherently dangerous capacity and the state's right to retain and use it should be limited.

The second response raises two issues: first, that DNA gives the police the power to increase levels of surveillance; and second that the material can be used to derive 'sensitive' information about individuals. The concern that genetic material can be, like some other biometric identifiers, collected covertly but that, unlike other biometrics, be used to generate very sensitive personal information is not an uncommon view. The central idea here is that genetic samples constitute 'personal' material and that the information taken from them is 'sensitive'.

For some it is the genetic sample, which the police take from criminal suspects, and not the subsequent profile which is loaded onto the NDNAD, that generates the most serious set of concerns. Whilst genetic exceptionalists are no doubt uncomfortable with the retention of genetic profiles it is the retention of bodily samples which attracts most controversy. Yet, it is interesting to note that, from the perspective of the Information Commissioner (the organization which is responsible for overseeing the Data Protection Act), what counts as personal information is not so straight forward.

For the commission, the sample does not constitute personal data – indeed the sample does not constitute data at all; it is only the information derived from the sample that constitutes personal data.

Such a nuanced construction of the ‘personal’ nature of DNA tells us something about the representations of genetic material at the heart of these exceptionalist arguments. Centrally, this is a position which stresses the informational potential inherent in the genetic substance itself, rather than simply the technologies which use it or the contexts in which it is applied. Certainly those aspects are important but the exceptionalist position stresses the special ethical concerns surrounding DNA because it points out the special, and importantly the unknown but potentially knowable, qualities of genetic material. Some commentators see a flaw in this position, whilst sharing some of the concerns which arise from it. One university-based ethicist told us:

I suppose I think of [DNA] as more powerful information, even though I know some of that’s the hype and not the actual reality [...]
I don’t think the hype is the media, I think the problem is that the hype is often the researchers because they see something like the gene for aggression [and] if you read the articles in things like Nature you find that they refer to the homosexuality gene, the aggression gene, in the actual reports, it’s not just the media hype [...]
You know, I don’t think the public are stupid and that they latch onto it wrongly, I think it’s the way it’s reported and this idea of genes for behaviour I *am* worried about.

However, not all exceptionalist views rely on what is designated here as ‘hype’; the concerns expressed by some civil liberty groups are legitimate fears about individual

privacy and autonomy in the face of state power. But the basis of these concerns is often more general fears about the *use* of information by the state rather than the real or actual properties inherent to DNA. As Martin Richards (Richards, 1999) argues, the genetic exceptionalist case often reiterates general concerns about civil liberties which are no different from those made in other contexts. The concern should not, Richards argues, be about the special 'nature' of genetic material but about the general balance of our right to withhold any information about ourselves from the state and to limit the use to which information, once provided, is being put. This balance, in principle, does not require any exceptional concern about genetic material as such.

II. genomic minimalism

In a recent discussion with civil servants whose work is focused on the criminal justice system, we expressed an interest in the shifting balance between individual privacy and autonomy and the right of the state to hold genetic information without consent. In stark contrast to the types of representations used by human rights groups, these individuals, as one might expect, had a different way of talking about, and representing, DNA. In this particular case they used a visual representation in the form of a string of numbers written down on a piece of paper. This, they explained, was a 'genetic profile' and, as we could see by simple inspection, it 'contained no sensitive information about an individual'. Such a formulation in which a genetic profile is reduced to a set of numbers (signifying no more than is signified by a car number plate, as it was described in this context) constitutes what we refer to here as genomic minimalism. This perspective emphasises the very limited informational capacity of the loci normally used for forensic identifications and, therefore the consequent unformativeness of the retained profile (an analogy to fingerprints is often made).

This sense of informational sparsity is reinforced by the use of the term 'junk DNA' to describe the regions of DNA which are sequenced during STR profiling. The subsequent genetic profile, it is argued, is much like a barcode in that it contains very little information other than its capacity to uniquely identify an individual. In the United States it is conventional for proponents of CODIS, the national system used to search for DNA matches across state collections, to remind us that their choice of specific STR markers was made precisely because they were originally thought not to code for any known matter of medical or phenotypic relevance. This again stresses the importance of this specific way of profiling which uses 'uninterpreted DNA' or 'uninformative DNA'. Sometimes the central term for describing the DNA profile becomes the even less suggestive term 'STR marker'. During a recent presentation of our research, to a group made up largely of those working in biomedicine, we encountered this view a number of times: one person told us 'I couldn't care less who has my STR's' and another said 'having my STR markers is no more than having my photograph'. If the genetic profile made up of such STR markers is not considered to be data rich then it can be deemed to be akin to any other biometric identificatory source collected, held and searched by the police.

These minimalist positions express a view of genetic profiling which reduces the information capacity of the profile to a mundane identifier – an empty signifier. This does not mean that one could not be fundamentally concerned about matters of privacy and liberty from a minimalist position – after all, turning the body into a barcode and recording it may constitute a breach of privacy – but the emphasis here is on the essentially mundane nature of DNA as opposed to its special qualities. Describing DNA in this way allows for the NDNAD to be presented in a number of different forms. Most obviously it can be presented as an identity register, akin to our current system of registering births and deaths, but one which is far more reliable. There may still remain the question of who should be on this register, and who may

have access to it and for what purpose, but the material on the register is not viewed as requiring special concern. Such genomic minimalism is therefore often employed to encourage trust in some aspects of the forensic uses of DNA because there is less need to worry about data which is limited in its information capacity.

Genomic minimalism often prefigures debates about privacy concerns by serving to reduce or negate their legitimacy. This can be seen in the view propounded by the current Home Secretary when he asserts that ‘there is nothing to fear from our own identity being properly acknowledged and recognised’ (Guardian, July 3rd 2002). In the Home Secretary’s view the recording of our identity – whether it be in the form of a DNA profile or an identity card – does not violate our privacy because it is simply a record of our existence. Even where privacy may seem to be breached by the retention of genetic profiles of the innocent, as for example in the recent ruling by the Lord Chief Justice mentioned above (2002) this invasion is described as ‘modest’ and justified as proportionate in relation to the broader social benefits it allows. This idea of a ‘modest invasion’ of privacy is fundamentally linked to a representation of DNA which stresses minimalist concerns. When this ‘modest’ invasion is considered in relation to the spectacular success stories of the NDNAD the government are able to present the forensic use of DNA as a low risk-high benefit solution to criminal detection. Indeed, one of the arguments forwarded by government is that the use of a NDNAD can offer a non-invasive form of policing and that ‘usual suspects’ benefit from having their DNA retained so that they can be eliminated from suspicion ‘remotely’. This, it may be said, increases autonomy and privacy rather than diminishing it.

Minimalist views of DNA are deployed by those who argue for the extension of the database to the whole population. It is also a view that has been expressed in a recent meeting of members of the Human Genetics Commission on the grounds that

'the establishment of a universal database of this kind would serve to solve the discrimination inherent in the current situation'. Solving discrimination created by the database (between those 'groups' who are on the database and those who are not) with an appeal to the establishment of a universal database relies, in this case, on the idea that the database itself does not contain information of a highly sensitive nature. And often these arguments are tied to other ideas about the social benefits of database expansion – for instance, the potential for the identification of otherwise unidentified victims of homicide or major accidents where identity could not otherwise be determined.

However, not all minimalists are universalists. In a recent paper on DNA, Etzioni (2001) discusses what he regards as the minimally intrusive character of forensic DNA profiling and commends legislative changes in the United States which would permit the routine collection of DNA from criminal suspects. Arguing that there are legal mechanisms which serve to constitute an individual as a suspect (he includes both arrest and stop and search processes), he suggests that this categorisation is sufficient to licence the diminution of the right to privacy that is appropriate to the 'innocent-innocent' citizen. He also argues that the results of these tests should be retained for a certain period of time in cases when no conviction follows and then be expunged or 'sequestered'. But crucially he argues that to collect DNA, other than through mass screenings, from all citizens would be to treat them as if were suspects. Something, he argues, which would result in public opposition.

III biometric pragmatism

Forensic work comprises the collection and analysis of physical materials found at scenes of crime. In UK law, bodily fluids and tissues left at a crime scene have the

legal status of abandoned property and can therefore be legitimately seized by the police for analysis and use in support of crime investigations. The collection of such materials is a routine and mundane part of the work of scene examiners. Thinking about the collection of DNA in this way, as the gathering of abandoned material that could be found at any scene of crime, is the starting point of a third perspective that we are encountering during our current research and which we term 'biometric pragmatism'. This perspective characterizes DNA as an especially powerful biometric identifier but treats it, and the issues which its use raises, in common with all such identifiers found at crime scenes. The difference which separates this perspective from the two outlined above is that it combines an acknowledgement that DNA can enable the generation of rich information without the necessity to classify that information as requiring unique ethical treatment.

This approach is often taken by investigators, some criminal prosecutors, and some academic commentators on forensic identification. It begins by asserting the necessity to distinguish between the different practical circumstances under which genetic material may be collected, interrogated, stored and subsequently used in the criminal justice process. It recognises the potentially informative nature of DNA and it seeks to exploit this fully on a case-by-case basis for the purposes of criminal investigation. It argues that the restriction of DNA criminal databases to the sequencing of genetically uninformative loci is appropriate since the technique preserves as much information as required for crime investigation, but it distinguishes between the potential for crime scene DNA analysis and the construction of forensic DNA databases. It is therefore neither minimalist nor exceptionalist but stresses a pragmatic perspective about the legitimate contexts and arrangements for the use of DNA by the police.

The central element of this pragmatic approach is the distinction drawn between the different contexts of crime scene examination and databasing. DNA analysis of crime scene stains, legally obtained through appropriate search and seizure protocols, need not, it is argued, be subjected to ethical constraints that differ from those that govern criminal investigations in general. The DNA analysis that is undertaken is no different from any other kind of forensic analysis that is applied to crime scene material. Certainly the donor of this material can claim no ownership rights or claim an invasion of privacy. It is stressed that the initial analysis of all such crime scene stains is carried out using probes that collect information only about the database STR markers (the uninterpreted segments of DNA) and, if a crime scene profile matches a database profile, no further molecular interrogation would be necessary – a minimalist assertion. However if the DNA profile does not match on the database then further interrogation of the scene stain should be allowable. The techniques for allowing this further interrogation are limited but research is underway to develop them – exceptionalism is recognised, but as a resource rather than a restraint.

From this pragmatic position the concerns of exceptionalists need not be applied to the analysis and the exploitation of the informational capacity of crime scene samples. Nor can the willingness to collect and interrogate such rich DNA sources be understood as part of a minimalist position. The minimalist position often ignores research currently underway to increase investigators' ability to exploit DNA for the sort of information which exceptionalists deem to be of special significance. Indeed, one outcome of this ongoing process is the Forensic Science Service (FSS) commitment to further develop technologies aimed at defining the 'commonplace characteristics' of individuals from genetic samples. Identifying 'commonplace characteristics', it can be argued, provides important information that allows the police to target a particular pool of suspects. Currently two services are offered to the

police by the FSS to analyze samples collected from crime scenes which do not subsequently match any profile on the database. The FSS offer a 'red hair test', which looks at differences in the coding regions of genes that influence physical characteristics, and an 'ethnic inference service', which uses the differences found in STR markers across the whole population to infer from the profile the ethnicity of the individual from which the sample came. Leaving aside the inherently problematic nature of such an inference – after all, ethnic 'categories' arise as mundane *social* practices of designating differences amongst people on the basis of ordinary visual distinctions (and thus relying upon, and reiterating, all sorts of nuances and subtleties which are less than scientifically objective) – this service does, regardless of its accuracy, explicitly seek to exploit a data-rich information source. How, then, can this be justified in a minimalist way as an activity which does not constitute a breach of privacy or exploit sensitive information?

We put this question to two research subjects, both of who are civil servants involved in the development and expansion of the database. During the interviews we conducted with them they were keen to present genetic information as data sparse and thus dispute the exceptionalist concerns expressed by human rights organizations. However, a different representation emerges here:

#1: You're talking about being able to identify from a sample [...] for instance facial characteristics, and things to do with gender and ethnicity in general, but anything else that goes with it. Well, again, isn't that helpful, useful in terms of the investigation of crime? You know, to be able to go to...you lift a crime stain, there's no match on the database, but you can tell the police 'well, you know, the probability is that it was somebody, you know, a male, six foot six,

with red hair and green eyes'. You know, it sort of narrows the field down.

#2: It's much better than what we used to have in the past where people would give you a description and it may not be that person [...] where this will provide some useful information and [...] it's only for intelligence, you have the legislative clause that says it can only be used for the investigation and prosecution of a criminal offence.

What is interesting about this account is how DNA shifts from being represented as a number plate or bar code to become as a highly data-rich molecular substance. Effectively it becomes re-presented in a manner in accord with the exceptionalist position. Yet the emphasis here is on the legitimate and justified use of DNA within specific contexts and, crucially, within the parameters of legislation which ensures that its use is regulated and confined to the investigation of crime: it is '*only* for intelligence'. The purpose to which genetic material is put, and the way in which it was obtained, does inevitably allow for these claims to be made. A DNA sample obtained for fluid or tissue left at a crime scene is unlikely to be deemed worthy of protection under any appeal to the privacy of personal information. This is central to the pragmatic argument and it poses a serious problem to those who hold exceptionalist views and would argue for limits on the analysis of all genetic material. The pragmatic view stresses the mundane and routine aspects of police investigations and the need to exploit any available crime scene source for intelligence. With the aim of detecting an offender how is it possible to argue against the use of DNA for such a cause?

This question, and the examples provided above, show the ways in which the representations that we have discussed are inevitably implicated within, and reflect,

differing socio-political attitudes to crime and policing. For instance, genetic exceptionalist representations of DNA are often brought into play to question the legitimacy of the expansion of the database to store the samples and profiles of the unconvicted. However, we can find no evidence to suggest that human rights groups, or others who take an exceptionalist position, dispute the right of the police to hold the samples and profiles of those convicted of an offence – that use of DNA, it seems, is agreed to be in accordance with the ‘balance’ of civil security and individual freedoms. Similarly, there is no evidence to suggest that exceptionalism is used to argue in principle against any kind of genetic profiling (including the interrogation of ‘coding regions’) of crime scenes stains. In fact in relation to DNA samples recovered from crime scenes there is a convergence of opinion regarding the use of just these potentially information rich properties in support of criminal investigations. It is noticeable then that the pragmatic position serves to accommodate both the exceptionalist and minimalist positions in relation to those uses of molecular biology which focus directly on criminal actions and indirectly on unambiguously criminalised identities.

Conclusion: future possibilities and pragmatic solutions

The positions that we have outlined above are continually implicated in, and are actively configuring, debates about the present use and future development of the NDNAD. Different representations of DNA are employed to make arguments about how best to manage, govern, and regulate DNA databases in the UK and elsewhere. It is clear that representations arise out of social and political considerations about the particular categories of persons, such as ‘criminal’ and ‘innocent’ individuals, that are implicated in this management. And it is also apparent that, in relation to those individuals and the particular aims of either protecting or detecting them, representations and arguments sometimes change.

Sometimes these representations are configured in surprising ways. For instance, as part of the widening debate about the universalisation of the NDNAD Alec Jeffreys announced to the 2001 annual conference of the British Association that a universal database would be a more ethical way of databasing DNA. Jeffreys sees the solution to concerns about discrimination and privacy in the establishment of an expanded population database. The exceptionalist view on expansion typically stresses its dangers because of the potential for such a wide database to become misused, but Jeffreys' vision is one which imagines a universal database governed by an independent public body and where access, by the police or other state agencies, is administered through judicial control. This would not allay the fears of those exceptionalists who favour curtailing the right of the state to retain genetic information in the first place. For them the ability to gain any information (such as phenotypic characteristics, or the ability to make ethnic inference) means that any allowed retention should be strictly delimited.

If the main ethical concerns about the retention of human tissue, by the FSS and other forensic laboratories, is their capacity to carry out research on those samples then practical questions about what types of research will be undertaken in the future are important. Genetic research using current forensic databases is, we would suggest, unlikely. Besides the FSS having a very low research budget (£3.7Million in 2001-2002), the growth of offshoots from the human genome project and the rapid expansion of bioinformatic research elsewhere dwarf the capacity of the research capacity of the FSS and its limited database. Any developments in genetic research which are important for forensic use are bound to arise elsewhere in the genetics community. Yet even if developmental research by the FSS furthers the predictive capacities of DNA analysis the results are unlikely to be integrated into a forensic *database* of suspect samples. Such predictive capacities remain irrelevant to the vast majority of criminal investigations in which current STR sequencing is sufficient for

establishing identification of suspects through the use of the NDNAD. Predicting phenotypic characteristics of people currently on the database is made redundant by the fact of their inclusion in the first place. Full STR profiles, generated from crime scene samples, will match those profiles on the database without further analysis and recently in the UK, even partial matches are increasingly being used to provide lists of individuals who may be genetically related to criminal suspects. When no STR match can be made between a NDNAD profile and a crime scene sample profile, then other information derivable from the database would be of no help. It is for this reason that forensic DNA databases are likely to remain genomically minimalist in character unless the technology platforms for their construction are changed for reasons of expense.

However, it can be argued that even this genomic minimalism needs to be assured by an external governing agency or independent body. Further, that the case can also be made for the destruction of genetic samples once satisfactory profiling has been accomplished. For the human rights groups we talked to in the course of the study, this destruction/retention combination is highly desirable. In several European countries (for example, Belgium and Germany) different criteria are applied to the retention of samples and profiles with Britain being unique in having the blanket provision to retain both indefinitely. The benefits of retaining samples, it can be argued, is threefold: samples can be used in quality assurance programmes; they can enable future challenges to errors in the original DNA profiling; and, importantly, they can allow re-profiling in the event of scientific advances. If the retention of samples is deemed to be of crucial significance then, from an exceptionalist position, samples themselves should be separated and stored by an independent authority where access to them is limited.

The NDNAD, we suggest, will inevitably remain minimalist in its construction since the *storage* of individual genetic information by the police, other than as the current kind of STR markers, is largely irrelevant to the investigation and detection of crime. Yet, what will remain problematic, under the current legislative provision, are the contested principles of privacy and discrimination which inevitably arise from the expansion of the database to include the unconvicted. The extension of powers proposed by the Criminal Justice Bill 2003 will deepen that problem since the database will significantly be increased by the profiles of those never charged with any recordable offence. The solution to this problem, we would suggest, is not to be found in either the exceptionalist or minimalist position, but with a pragmatic approach. With appropriate regulation of research on genetic samples, and with adequate provision for police access to speculative searching of STR profiles, the database could satisfy those with both exceptionalist and minimalist concerns. This approach would follow a pragmatic approach to the existence and use of an established database but recognize that the legislative and governing framework needs considerable revision. However, one solution to the problems inherent in the current provision for the database, with its limited scope for STR matching and the otherwise inevitable need to develop further research to analyze crime scene material, would be the construction of a population database. Such a database could be minimalist in the information it stored and, because it would produce automatic matches between crime scene and databased profiles, effectively end the need for further research on gene sequencing in forensic contexts. How long will it be before the government argue that the only way to protect our genetic privacy is to construct a universal database in this way?

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