Contrasts and Comparisons: 
Three Practices of Forensic Investigation

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Abstract
Forensic DNA practice is about identification and thus about making individuality. Yet in order for this to be possible an individual has to be placed in a population, a precondition which has caused problems for the forensic community. For given the lack of a standard biological definition, what is a population? Meanwhile forensic DNA has come of age, bypassing the problem of population, irrespective of the definition applied, through scale and the availability of technology. This article examines three practices of profiling: 1) “conventional” DNA profiling, 2) inferring visible traits from DNA, 3) and inferring visible traits from surveillance recordings. Their juxtaposing can be read in two ways: as a linear story of the ever-growing role of forensic DNA in criminal investigation or as topological story of different versions of the same practice of DNA profiling.

Keywords
DNA profile, visible traits, race, legislation of DNA evidence, comparability, contrast

On 24 April 2006, I went to University of Gent to present a talk about forensic DNA and, more particularly, about inferring visible traits from DNA traces and the legal and social implications of this new technology. My colleague, who had invited me, picked me up at my hotel and we went for a short dinner nearby. As I was updating him on the content of my talk, he asked me whether I had heard about this murder case in Brussels, which it seems was exercising the minds of all Belgians. The puzzling thing was that surveillance pictures of the suspects, based on closed-circuit television (CCTV) recordings, were being shown by the media around the clock and yet
no one stepped forward to identify suspects. Even more troubling, the pictures showed clearly that the suspects were of Northern-African descent, probably Moroccan, and this was triggering various social concerns and stirring the emotions of many.

At first I tried to dispute the idea that one can tell ethnicity from a picture, but my colleague managed to convince me of the Moroccan-ness of the suspects. The next day, on the train back to Amsterdam, the Belgian newspaper I was reading noted on the front page, accompanied by CCTV pictures, a “Breakthrough in mp3-murder:” “Already one perpetrator in jail”, and, “Perpetrator is a 16-year-old Polish boy” (Het Nieuwsblad 2006:1).

The mp3-murder-case resonated in my mind with some issues surrounding forensic DNA. I found myself taking it as illustrating why forensic DNA profiles are not fully accomplished. Work has to be done outside the laboratory to make it into reliable evidence, into a reliable tool of identification. In addition, the mp3-case points to some of the political aspects of technologies aimed at inferring visible traits of suspects. In a sense the mp3-case imposed itself on my thinking as a unit of comparison to forensic DNA analysis.

This article examines three cases of profiling: “conventional” DNA profiling; inferring visible traits from DNA; and inferring visible traits based on CCTV recordings. In discussing the first, I will go into details of DNA profiles. Both individuals and populations are effects of applications of these technologies, and thus of the very comparisons being established. In discussing the second practice of profiling, I address the legal and scientific aspects of visible traits, and show how race has become relevant again for these novel applications of DNA analysis. The third case, though of a different kind, allows us to consider future applications of visible traits based on DNA and some of its political implications. In addition the process of identification, and the failure to do so, based on CCTV pictures helps us to see that the work of producing profiles is not finished once profiles leave the laboratory. Instead profiles and their reliability as identification tools are produced in an ongoing process of connecting laboratory facts to other evidence material.

In each of these cases identifying an individual is based on drawing comparisons to some population.¹ However, the purposes and effects of

¹ See Scheffer (1997), who demonstrates in his study on passport control and identification in an immigration office that this dual referencing is a situated and cultural inter-activity.
these comparisons differ. I will show that in the first case population is a technology of exclusion. It is a category from which the suspect should be excluded in order to identify him/her properly. In the second and third cases population becomes a technology of inclusion. The suspect is deemed part of the population, but because the identity of the suspect is unknown the whole population is made into a suspect-population.

**DNA Profiling: On Individuals and Populations**

The first DNA profile ever produced was a case of family reunion in the UK. In 1984, Sir Alec Jeffreys showed that a young man living in Ghana was the biological son of his mother, a resident of the UK. Soon this technology found its way into forensic practice, to produce a link between a suspect in a criminal assault and a biological trace found at a crime scene.

In this section we take a closer look at DNA profiling. Identification based on this technique depends on various modes of comparing: Not merely between trace and suspect but also between suspect and some population. By exploring how this is accomplished in scientific practice it will become clear that comparability is not inherent in the entities being compared. Comparability is rather a technologically produced ordering of the objects of interest.

But let us move slowly by raising a question: What is a DNA profile and how is it produced?

Let us assume a fictitious yet almost paradigmatic murder case. The body of a victim has been found in a park. While biological and other traces are being identified and collected by the crime investigator, other policemen are concerned with collecting eyewitness accounts. A few visitors at this park appear to have seen a young woman walking in the park the evening before. She was not alone, but in the company of a man. Different eyewitnesses have given a similar description of this man. On this basis, the police are able to point out a suspect. Among the traces, the crime investigator has found a cigarette butt next to the murder victim, which is sent to a forensic laboratory for DNA analysis. The male suspect is held in custody and forced by the State Attorney to supply a cheek swab as a so-called “reference sample” for DNA analysis.

Once the cigarette butt arrives at the forensic laboratory, a technician will try to retrieve DNA from it. The saliva on such an item will usually...
contain some cell material from its user. Nowadays, even with a small amount of DNA this can be done successfully. This is due to a DNA copying technology which became available at the start of the 1990s, the so-called Polymerase Chain Reaction (PCR). In this machine, DNA fragments are multiplied and made ready for visualization. The aim of visualization is to compare the DNA profile based on the cigarette butt to that of the reference sample (a sample taken from the suspect).

A DNA profile consists of a number of such copied DNA fragments: so-called genetic markers. The genetic markers applied in forensic practice are chosen because they vary among individuals. Put differently, only those parts of the DNA that display genetic diversity between individuals are considered for DNA profiling. Variability is thus built in the profiling technology from the start. Because of this variability and because forensic scientists use not one but ten or twelve markers, it is possible to compile a fairly individualized DNA profile.

If the profile based on evidence material (in our case, the cigarette butt) does not match the DNA of the suspect, the suspect can be excluded as the perpetrator. However, in cases where these profiles match, the work of the forensic scientist is not yet done. A match only includes that person as a suspect, but the perpetrator might still be somebody else. In order to individualize the biological trace, that is in order to determine whether this is an exclusive match, a comparison with some relevant population will have to be conducted. The question, after all, is: is a DNA profile unique to the suspect or is it instead rather common across a population? If the latter is the case the perpetrator might well be out there in the population.

Thus, in order to establish an exclusive match and therewith the individuality of a DNA profile the latter must be compared to traits of a main unit, a so-called “reference population”. Such a reference population consists of the DNA profiles of a small collection of samples (e.g. a hundred samples) that are deemed representative of a population. However, as we will see below, the representativity of such a collection of samples might become a topic of debate.² By comparing a DNA profile to the DNA

²) Reference populations are a laboratory product, that is, they are a product of specific sampling strategies and presuppositions about the population on the one hand and the laboratory’s “usual” work on the other (see M’charek 2000). In addition, in forensic genetics and in biology in general, there is no definition of population, or, rather there are many different definitions that are used in research. These might vary from e.g. a definition based on linguistic separation,
profiles of the reference population a matching likelihood probability can be established. This number expresses the frequency in which specific marker information can be found in the reference population. In criminalistic terms it expresses the chance that a biological trace has been left at the crime scene by somebody else (than the suspect) in the population.

Nowadays, given the high number of available genetic markers, due to technological advances in the field of genetics, a matching likelihood number may be as small as $10^{-9}$. To be sure, without a matching likelihood number, a match between a DNA profile of trace materials and a crime suspect cannot lead to admissible evidence in court. This indicates that even though DNA evidence is generally known as a technology of individualization, this cannot be done without knowledge of some population. In forensic practice individuals and populations are thus interdependent.

In the 1990s, this interdependent-ness caused several problems for DNA evidence and its admissibility in court. In its early days DNA profiles had been called DNA fingerprints. This analogy established a link between a novel forensic technology and a much more familiar one, namely dactylography or the analysis of conventional fingerprints. The founding father of the fingerprint was the nineteenth century eugenicist Sir Francis Galton. Galton, who was interested both in statistics and in mapping differences between races, initially studied the engraving of fingerprints with the hope of inferring population characteristics from them. Ironically enough, his findings did not lead to any knowledge about populations. Instead the fingerprint became a powerful technique in the courtroom as a means to identify individuals (Rabinow 1993).

Even though dactylography is still considered a complex technology which requires expertise to apply for crime investigation, it has also become an everyday, mundane technology. Even a layperson can recognize the geographic distance, natural obstacles (such as mountains or rivers), nation-state borders, or family names (see M’charek 2005). This lack of a standard definition indicates that what counts as a “reference population” in a laboratory might differ as well.

3) This may seem self-evident today but Galton and many others of his time (and nowadays, too, but in a different mode) were simply probing almost any kinds of physical characteristics looking for interesting knowledge regarding difference-producing markers: between races, between normal and abnormal, between criminal and civil types, and others). This is the so-called biometrics.

4) For an elegant analysis of conventional fingerprinting, see Cole (1998); for a historical account, Beavan (2002).
significance of a fingerprint. The analogy with fingerprinting thus made it easier for the novel and complicated technology of DNA analysis to enter both courtroom application and public discourse.

However, the analogy has also caused problems for DNA profiling (Lewontin 1993; M’charek 2000). A DNA fingerprint seems to suggest that knowledge about the DNA of one individual is sufficient for identification. As indicated above, identification is dependent on knowledge about some population of which an individual is considered a member. This is important since genetic diversity revealed by markers may be different depending on which population is considered. Given potential genetic differences between populations, a DNA profile may be common in one population and unique in another. The issue that is addressed here is that of representation; the representation of a particular DNA profile in the reference population.

In 1990 a case came up in a Franklin County court in Vermont. Both the victim, found near her house sexually abused and killed, and the suspect were living in an Abenaki-Indian reservation and both were half French-Canadian descent and half Abenaki descent. The suspect, that is, was known to the prosecutor and judge but the question was whether the trace evidence stemmed from this particular person. In the absence of any solid evidence the Public Prosecutor requested DNA analyses of the blood traces found near the victim and of samples taken from the suspect. A match between these could be established. In calculating the matching likelihood probability, however, the laboratory did not have access to the DNA of Abenaki-Indians. It instead calculated this probability on the basis of comparisons to various other ethnic groups. On this basis, the DNA evidence did not pass in court and was dismissed by the ruling judge.

Since sexual assaults are frequently committed by persons who are known to their victims, it was expected this would also be the case in this instance. It was assumed that most friends and relatives of the victim and, by consequence the perpetrator, were of Abenaki-Indian descent. This very line of reasoning suggests that in order to maintain the core proposition of American criminal law, namely that a suspect is presumed innocent, the prosecutor should prove that the perpetrator is not out there, amongst the population of Abenaki-Indians on this reservation.

5) The depiction of this case is based on Lewontin (1993).
In terms of DNA evidence this means that in order to determine the exclusiveness of the match between the profile of a suspect and that of the biological traces found at a crime scene, the DNA profile has to be compared to a relevant population, in this case that of a population representative of Abenaki-Indians. Since the laboratory did not have any access to their representative DNA, the ruling judge dismissed the DNA analyses presented in this case. The problem of the representation of a reference population and the possible bias of genetic markers generated a genuine scientific controversy (Lewontin & Hartl 1991; Chakraborty & Kidd 1991; NRC 1992; NRC 1996).

The core question was whether genetic markers applied to produce a DNA profile are neutral, in the sense that they reveal the same amount of genetic diversity in all populations. If the genetic markers are neutral, that is if the diversity revealed in populations is comparable, than the “reference population” produced in laboratories can be considered representative of any population, and therewith applicable to any individual profile. This controversy almost jeopardized the use of forensic DNA because it became clear that the genetic markers at issue are not neutral (NRC 1992).

In 1993 Chakraborty and his forensic geneticists colleagues published a paper in which they acknowledged the population differences revealed by available genetic markers, and therewith the bias of these markers. This was significant in that they had been first to adopt the opposite view in the controversy. Now they helped to end the controversy on quite different grounds, namely by arguing that population differences will only be diluted, as it were, if one simply applied more and more genetic markers. Whereas differences between populations can be observed on the basis of five to seven markers, these differences disappear when more markers are applied (Chakraborty, Srinivasan & Daiger 1993).

Moreover, by the mid 1990s twelve markers selected for new commercial marker kits, so-called Second Generation Marker (SGM⁺) kits, were introduced into forensic laboratories and deemed neutral: equally variable in any population. The SGM⁺ kits are now standard in forensic laboratories.

For a similar case about a Turkish suspect in the Netherlands, see M’charek 2000.

Also contributing to the resolution of the controversy, a second report by the US National Research Council on forensic DNA suggested a different statistical method, the so-called ceiling principle, to calculate matching likelihood probability. This method is conservative, always favorable to the suspect in strictly statistical terms (NRC 1996).
To conclude, we may note four points. First, despite a variety of problems that surfaced in the early history of forensic DNA, this technology has been highly successful. It is today contributing to convicting perpetrators, to excluding potential suspects and to exonerating the wrongly accused (Ossorio & Duster 2005).

Second, the various measures taken to overcome these problems, some described above, underline the technically mediated nature of comparisons. As we have seen, identification was based not only on comparing biological trace evidence and a reference sample taken from a suspect. In order to determine exclusiveness of a match, a comparison also has to be made to profiles of a reference population. The genetic markers selected in these comparisons were invested with the specific goal of identification. They were selected because they reveal a diversity among individuals and because they a neutral, equally diverse in any population.

Third, the fact that DNA profiles are composed of just tiny fractions of DNA, and that these markers have to meet specific requirements, indicates that in forensic genetics neither individuals nor populations are “natural” categories. Both are made. Both are effects of the comparative mode to which they have been subjected.

Fourth, as seen above, in this type of DNA profiling, population is a technology from which a suspect should be excluded in order to identify him/her as the perpetrator. Comparisons to a population are a method to confirm that trace-evidence stems from a particular suspect, such that the perpetrator is not out there.

In the next case of inferring visible traits from biological traces we will see a dramatic change in the aims of comparison. Comparison is not aimed at excluding a particular suspect from some larger population but rather at determining the population in which a suspect can be included.

**Inferring Visible Traits: A Legal and Scientific Practice**

One of the important arguments contributing to social acceptance of DNA evidence in criminal investigations has been the fact that DNA profiles are not based on “coding DNA,” that DNA responsible for an individual’s phenotype. An argument often used in political debates was that the information stored (the DNA profiles) is not privacy-sensitive
precisely because it does not reveal anything about the physical or observable identities of individuals.

Meanwhile, given the success of DNA evidence in court and in criminal investigation, on the one hand, and the availability of novel technologies, on the other, there is a tendency to take these profiles more literally. DNA databanks all over the world consist of a section called “traces databanks.” These DNA databanks contain evidence material (found at crime scenes) not yet identified – evidence material in search of suspects.

Is it technically possible to convert these DNA traces into faces, into individuals’ visible identities? In other words, is it possible to infer what suspects look like? As we will see below the technology to do so is not yet at hand, but it is in the making.

Moreover, the Netherlands has already regulated this specific type of DNA profiling, in order to encourage its use in criminal investigation. Giving that such “avant-garde” regulation of (future) technology is quite exceptional and given that the Netherlands is at the moment the only country in the world that has implemented such a law for future application, we will take it as an example with which to explore both the legal and scientific aspects of inferring visible traits from DNA.

The Netherlands has never been slow in changing legislation addressing DNA profiling. In 1994 it was also the first country in the world to introduce a special law regulating the use of DNA evidence and its admissibility in criminal investigation. This legislation, however, was rather conservative: it restricted the role of the prosecution and focused on protecting the rights of suspects. Nowadays however, Dutch legislations are tumbling over one another, successively aimed at broadening the use of this forensic evidence. Within a decade the Netherlands has thus moved from a politics of restriction to one of promotion. Given our interest in the inference of visible traits I will focus on the first three of six regulations that have been passed: the law of 1994 and an amendment of 2001 which preceded the current law regulating DNA analysis of visible traits, passed in 2003.

In the late 1980s evidence DNA had been applied a number of times in The Netherlands on a voluntary basis in criminal investigation. However, in 1990 in a rape and murder case near the city of Maastricht the suspect was not willing to supply a blood or saliva sample for DNA analysis. This case was taken to the Supreme Court and led to the so-called “saliva-decree” (Hoge Raad der Nederlanden 1990). The Supreme Court ruled
that article 11 of the Dutch Constitution protects the integrity of the human body and that forcing a person to contribute bodily samples constitutes a violation of this basic right (Toom 2006).

Thus, a change of law was required in order to force a suspect to contribute material for DNA analysis. To this end, the Minister of Justice appointed a committee to review the Criminal Code and suggest new legislation. In September 1994 the first DNA law was implemented (Besluit DNA-onderzoeken 1994).

Given the weight placed on the integrity of the human body by the Supreme Court this law was largely directed towards protecting the rights of suspects. Given this, DNA analyses could be requested only in severe criminal cases (e.g. rape or murder), those which could lead to eight or more years of detention. Only the Examining Magistrate could request DNA analysis and compel a suspect to submit a blood sample.

On the other side, the suspect had a right to so-called “counter expertise” to challenge expert testimony. Moreover, in cases with very little evidence material, such as those in which evidence material does not permit a second DNA analyses, the suspect also had a right to decide which laboratory should conduct the one and only analysis. This choice was constrained however in that only two laboratories were mandated legally to produce DNA analyses for forensic purposes: appointed by the Minister of Justice and certified by a board of accreditation.8

Quite soon after this DNA law’s implementation various actors started to criticize it for being too restrictive. Forensic scientists, police investigators and some politicians argued for broadening the use of DNA evidence. Yet it took seven more years before amendments were passed. Central to the amendment of 2001 was a broadening of uses of forensic DNA to so-called high volume crime, such as burglaries, and thus to cases that could lead only to custodial sentencing (Besluit DNA-onderzoeken in Strafzaken 2001).

This change in the law was prompted not only by the success of DNA evidence in the Netherlands but even more by the success of large DNA databanks in other countries, particularly the UK. In addition, PCR-based

8) The author has conducted participant observation and worked as a junior population geneticist in one of these laboratories (see M’charek 2000, 2005, 2006).
methods and second generation multiplex marker kits (SGM+) had made it possible to produce trustworthy DNA analyses on the basis of much smaller amounts of bodily materials. Saliva instead of blood became feasible as the standard method to produce DNA profiles from reference samples (samples taken from suspects). These technological advances thereby paved the political ground for broadening applications of DNA evidence. Taking a swab from an inner cheek is considered far less invasive than drawing blood.

This second legislation seems to be on a par with that of 1994 in terms of upholding bodily integrity. However, in the first legislation bodily integrity spanned both the taking of samples and the genetic information retrieved from them. Revealing genetic information was also considered a bodily violation. In the second legislation this aspect of bodily integrity was back-grounded, thereby placing in the foreground the technical achievements which made saliva sampling viable and the invasiveness of blood work redundant. In addition this law decreed that if necessary, cell material may also be “diddled” from a suspect, for example by offering this person a cup of coffee. The cup carrying traces of saliva from the suspect can thus be used for DNA analyses.9

Broadening the range of application of forensic DNA has led to another change: in storage. Not only were DNA profiles (digital information) to be stored in databanks but also DNA samples (biological material). However, even though DNA profiles are based on non-coding DNA (DNA that does not contribute to a person’s phenotype), the availability of the DNA as such makes it possible to retrieve phenotype information about an individual. Given this risk, the Dutch legislature has stated that both the information derived from DNA analysis and the DNA itself are personal information, and thus regulated under the Privacy Law.10 In order to guarantee individual rights in this light, the Netherlands Forensic Laboratory (where DNA databanks are based) is subjected to an annual external

9) The Minister of Justice noted in 2001: “If the taking of cell material is not feasible because of considerable objections of the suspect (or because the suspect is heavily protesting) it is possible to use cell material that was not actively taken, such as hair or saliva on a coffee-cup” (Ministerie van Justitie 2001).

10) This regulation is crucial in terms of privacy and differs, for example, from regulations
Where the period between the first DNA law and the amendment of it had taken more than seven years, the next change in legislation was introduced within only two years. The amendment of May 2003 deals with “visible external personal characteristics,” and thus regulates inferring visible traits from DNA (Besluit DNA-onderzoeken in Verband met het Vaststellen van Uiterlijk Waarneembare Persoonskenmerken 2003). Physical traits according to this amendment are those “overtly visible to anybody” and of which “it can be stated with certainty that the individual involved is aware of them” (Besluit DNA-onderzoeken in Verband met het Vaststellen van Uiterlijk Waarneembare Persoonskenmerken 2003). Consistent with this, the legislature explicitly excludes so-called disease genes, including Down syndrome, from visible traits.

Article 151d, section 2 of this legislation reads as follows: “DNA research can only be applied to determine the sex, race or other externally visible traits to be pointed out through an Order in Council” (Besluit DNA-onderzoeken in Verband met het Vaststellen van Uiterlijk Waarneembare Persoonskenmerken 2003:1–2). Below we will go into the definition of race proposed in this Article. These “other externally visible traits” debated within parliament include: hair, eye and skin color, age and facial shapes. In parliament it was the Green Party in particular which requested the inclusion of statutory language regarding “other externally visible traits.” Such traits were viewed as a means of individualizing a DNA “profile,” and thus of preventing lumping large groups of individuals into suspected populations. The Green Party argued that without this added statutory language the regulation could be suggesting some linkage between race and incentives to commit crime (Tweede Kamer 2002:5772).

A commonly heard complaint is that politics and legislation always lag behind technical developments. Here however, we had full-fledged legislation for technologies that did not yet exist. As we will see below, except for sex-differences and genealogical descent, the genetics of all other phenotypical characteristics of human beings is hardly understood.

in the US where DNA samples can be used, for instance, in research for improving forensic techniques (Ossorio & Duster 2005:125; for an ethical discussion, see Nuffield Council on Bioethics 2007).
Given that technologies for inferring visible traits from DNA are not currently available, the 2003 regulation is put in the form of so-called “window-legislation.” This means that once technologies do become available they can be implemented through an Order in Council, without additional parliamentary proceedings.

This Dutch legislation was received, to put it mildly, with some surprise. Not only is it a legislation that regulates virtual technologies, these technologies are associated with issues that are highly controversial. To give an example of the unexpected character of this legislation, consider this comment by German forensic scientist Mark Benecke in June 2002, while the 2003 legislation was being debated in parliament: “In Europe it will be impossible to check for genes in criminal investigations; our laws will simply prohibit this for years to come.”\textsuperscript{11} Yet the legislation revolves around a rather naïve idea of going from stripes and peaks on a laboratory computer screen to a “composition drawing” of a suspect on a TV-screen.

Regardless, in various branches of genetics, racial and other markers are being targeted which could be used in forensic practice, including skin pigmentation, genetic ancestry and genealogy, and iris colour (Shriver et al. 2003; Walsh 2004; Tully 2007; Kayser et al. 2008). In addition, the forensic community itself is taking the lead in such genetic research. In the UK, for example, the Forensic Science Service (FSS) and associated researchers have identified various mutations in genes which code for red-hair colour and which have been used to compile the Read Hair Prediction Database within the FSS.

FSS researchers based at the Galton Laboratory of the University College in London are currently studying linking facial shapes and characteristics to DNA. That is, red hair genes were discovered first and now other research on face genes is ongoing. Gillian Tully, a FSS molecular biologist, states: “All facial characteristics are on the agenda. . . . Within 10 years we might be looking at genetic tests for the basis of the main facial characteristics” (Watson 2000).

Similar initiatives can be found in other countries, including the Netherlands. To be sure, most of this work is in experimental stages. But here is what a US company, DNAPrint Genomics, has to say about externally

\textsuperscript{11} For an overview of similar controversies in the US, see Ossorio (2007).
visible traits. In a brochure titled “Racial Identification and Future Application of SNP’s,” it promotes a kit called DNAWITNESS 2.0.

This new test provides important Forensic Anthropological information relevant for a wide variety of investigations. When biological evidence is gathered, an investigative team can use DNA WITNESS 2.0 to construct a partial physical profile from the DNA and in many cases learn details about the donor’s appearance, essentially permitting a partial reconstruction of their driver’s license photo. How many times have you wished an unknown suspect left his driver’s license at the scene . . .? […] DNA will effectively offer an objective “witness” […]. Other non-DNA based investigative work tends to rely on less scientifically robust methodology, for example on “eyewitnesses.”

This test of DNA-Print Genomics is rather controversial (e.g. Ossorio 2007). It obviously promises more than it can deliver. “The current state of technology gives no indication that it is likely to develop quickly” (Nuffield 2007: 87). Thus the composition drawing which can be produced today is based on determining the sex of suspects (based on the presence or absence of the Y-chromosome) and estimating suspects’ genealogical descent (based on statistical analysis of the Y-chromosome or mitochondrial DNA).

One expert on genealogical descent in the Netherlands is forensic geneticist Peter de Knijff. He provided an important precedent for the 2003 law in the so-called Vaatstra-case of 1999.

Marianne Vaatstra, a young girl, was sexually assaulted and killed in the Frisian village of Kollum. A center for asylum seekers from the Middle East, predominantly Iraq, soon became the object of attention by locals, who suspected that one of its members committed the crime. Due to the social and ethnic tensions this incident generated and the lack of useful leads in the police investigation, the attorney general of Friesland decided to consent to an analysis of the evidence material, in order to gain insights about the genealogical descent of the suspect.

Based on genealogical analyses of the Y-chromosome Peter de Knijff argued that the haplotype detected is rather rare in the Middle East whereas it is common in the northwest Europe. Even though the making public of

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this knowledge helped to relieve tensions, it was considered unlawful by the Supreme Court. Thus, the results could not be used as part of the criminal investigation of this case. Hence the political urge to develop legislation to permit employing such investigative means. However the law did not merely regulate research on genealogical descent. As article 151d quoted above shows, it also referred explicitly to race as a visible trait to be considered.

Although race is at the heart of inferring visible traits in forensic science, it is surprising to find this concept in the Dutch Criminal Code, because the Code outlaws this. The initial draft of this text had included both the concepts of race and of population. But the former Minister of Justice argued the following while deciding “simply” for race in the proposed law:

The Dutch Law does not have a definition of the notion of “race.” This notion is primarily applied to assess cases where citizens should be protected against discrimination. To do so the notion is – in accord with the International Treaty to eliminate all forms of race discrimination and with jurisprudence – broadly described and includes also: skin color, ancestry, national or ethnic descent. Given this broad interpretation of the notion, “population” is a species of the notion “race.” For reasons of coherence in terminology it seems to me right to comply with the usual explanation of the notion of “race.” The aim of the present regulation, namely to find out about the identity of a potential suspect of a severe criminal assault, also justifies the broader interpretation. I have therefore decided, by government amendment, to abandon the observable physical trait ‘population’ and to content with the broader notion of “race” (Tweede Kamer der Staten-Generaal 2002:7, emphasis added).

Ironically enough, in order to define race for the purpose of criminal investigations, the legislature makes use of specific legal distinctions which were developed to protect citizens against racism. Obviously this is a paradox of putatively anti-racist politics. The regulating of what should be understood legally as racism, discrimination based on skin color, ancestry, national or ethnic descent, provides the legal basis for the legislature to install biological races in the law and to make this an object of forensic research.

In a Dutch documentary broadcast of March 2000 on visible traits and forensics, Peter de Knijff, the forensic scientist mentioned above, brought attention to the added value of genealogical/ethnic inference for criminal investigations:
An important application of this technology, in my opinion, is that it helps excluding social groups that are being accused of sheltering a perpetrator of a heavy crime: for example, if the rapist is deemed to be part of the Turkish population, and if you could show – based on the DNA profiles of the sperm cells found on the victim – that it is not a Turkish Y-chromosome. In such a case you can in fact alleviate the burden for the whole Turkish population that has been stigmatized. And I think that this is an application that the police would be happy to make use of (Noorderlicht, March 7 2000, translation of transcript by author and emphasis added).

The police, in its role of overseeing and maintaining social order, might indeed be pleased with this use of DNA technology, if it works as de Knijff indicates. The problem is that the potential gains of excluding the Turkish population in a criminal investigation might be limited in some societies, such as the Netherlands. That is, Dutchness or whiteness does not usually make an interesting population for police investigation. The investigation of the Vaatstra murder, having turned by DNA analysis from Middle-Easterners to northwest Europeans, remains unsolved.13

The quotation from de Knijff above alerts us to another aspect of inferring visible traits from DNA analysis. Although Dutch law is aimed at researching the externally visible traits of the suspect, the technology does not individualize. It instead lumps together large groups of individuals, thereby turning them into suspect populations. This means that a stigmatized population must now fear more than just a loss of privacy by particular members.

When discussing the practice of conventional DNA profiling, I argued that population is a technology from which a suspect should be excluded in order to identify him as the perpetrator. But now in the second case under discussion, the practice of inferring visible traits from DNA, population in the form of race has become a technology that includes a suspect. Since the suspect is unknown, a whole population is made into a suspect population which conceals the real perpetrator.

13 Given the probabilistic nature of the phantom sketch, “[m]aking an ethnic inference may lead police to narrow the focus of their inquiries prematurely in expectation that the offender will come from a particular racial or ethnic group” (Nuffield Council on Bioethics, 2007:81). In addition, the use of phantom sketches may jeopardize police investigations by generating too much information (see Innes 2003:241–249).
To make clear the effect of this move, we examine briefly the murder case referred to at the beginning of this paper, namely the mp3-Murder case in Belgium in 2006. As indicated earlier, the tracing of the suspects was based not so much on DNA but rather on a technology more sophisticated in identifying visible traits, namely closed circuit television (CCTV). The mp3-Murder case calls into question, therefore, whether there will ever be an immediate and complete identification that some geneticists are seeking. This case offers an interesting analogy to inferring externally visible traits from DNA because the information density of CCTV pictures in terms of individualizing characteristics is much greater than anyone can possibly credibly expect from DNA profiling. In a sense CCTV recordings provide investigators with the ultimate “silent-witness,” namely with pictures of what suspects look like visibly. It is instructive, therefore, to see how those pictures help, or fail, to categorize suspects as part of ethnic groups.

The Mp3-Murder Case: You Know a Moroccan When You See One

On 12 April 2006 in the central hall of Brussels central railroad station, a seventeen-year-old, Joe van Holsbeeck, was murdered. Two boys about the same age were pushing van Holsbeeck to hand over his mp3-player. Perhaps because he kept refusing, one of the boys stabbed him five times with a knife near the heart. A number of people in the central hall witnessed the two suspects running away. Observation cameras registered these events, both within and outside the central hall. The police released a phantom sketch (based on eyewitness accounts) asking the public for assistance. Meanwhile, the prosecutor immediately asked the court for permission to publish CCTV pictures and videos, and permission was granted one week after the murder.15

14) “It must be at least theoretically possible to be able to look at someone's DNA and determine what they look like. In the next five maybe ten years I think from looking at an individual's DNA we ought to be able to tell the hair colour, the eye colour and to some extent the color of their skin” Ian Jackson in Documentary Verborgen Identiteiten 2000.
Thus, images of the two suspects were soon displayed around the clock: in newspapers, on national television, and on the Internet. On the basis of the CCTV recordings, police suggested they were looking for two young men of North African descent. Quite soon, North African became Moroccan especially since most of the 215,000 people of Moroccan descent in Belgium, which is two percent of the entire population, live in Brussels. In addition, the Moroccan-ness of the suspects seemed to have been established also by received, publicly stated ideas about the disposition of young males of Moroccan descent to commit “high volume crimes” such as burglary. Additional culturalist knowledge only buttressed these prejudices: about what clothes they wear, how they move, how they behave, etc. (Werdmölder 2006).

Given the ethnic characterization of the suspects, the murder quickly became an object of racist and xenophobic discourses. On one side, the Belgian extreme rightwing party, Vlaams Belang, stepped into the debate with standard litanies about a “battle of cultures.” On another side, the parents of Joe van Holsbeeck immediately responded by insisting they did not appreciate the murder being used in political propaganda against Arabs and Muslims. On still other sides, more “mainstream” politicians took their chances. For example, a senator of the liberal party, Jean-Marie Dedecker, treated the murder in a newspaper article as a community problem, declaring that it was a result of a “civilization deficit” among immigrants due to “a criminal tolerant policy towards foreigners” (Dedecker 2006:26). A link was thus made between criminal behavior and the alleged conservatism of a community which did not want to assimilate Moroccans into Belgian society.

The situation became increasingly grim because, despite the constant replaying of images on national television, nobody stepped forward to help identify the suspects. The idea grew that “these closed Arab communities” were protecting murderers. Immigrant communities nonetheless openly condemned the murder. During Friday prayers in mosques, imams urged followers to help identify the suspects. Fouad Ahadir, a member of parliament of Arab-Moroccan descent, took the initiative to organize a silent march in which 80,000 people participated, including the parents of the victim.

Meanwhile, since the public airing of the CCTV recordings did not generate much information, police investigators called upon schoolteach-
ers to help. One teacher indeed recognized one of his pupils, but only after being presented with qualitatively better photos. The next day the police arrested this 16-year-old boy of Polish descent. A few days later a second suspect was tracked down in Poland, on the basis of tracking his Mobile phone. The news that the suspects were not of Arab descent came as a shock and caused a lot of dismay in Belgium. Although even today the suspects are predominantly referred to as Polish, at one instance a further specification of their identity was made, in terms of ethnicity. They were reported to belong to the Polish Roma population.

Instead of reflecting on the problems of inferring ethnic descent from CCTV pictures, the prosecutor used the fact that the suspects belonged to the Polish Roma minority as an excuse for “misreading” the pictures. While this inference is based on commonly shared ideas about immigrants and how they may look like, it reminds us – as does the entire case – that there is no firm ground from which to assess race but rather that racial identities are made in specific contexts. The suspect might as well have been simply Belgian. For how does a person from Belgian descent look like?

For obvious reasons boundaries of nation states do not correspond to cultural or ethnic boundaries (see e.g. M’charek 2005). The mp3-case also reminds us that technology is not value free; it is not merely a facilitator of crime solving (or crime prevention). Technology is active, producing categories such as individuals and populations as well as the relations (including tensions) between them. Initially the CCTV pictures were taken to speak for themselves: “the pictures show clearly that it is about two boys from Northern-African descent.”

broader racial discourse about specific minorities, including hypotheses about cultural make-ups and dispositions.

Finally the fact that the actual identification of the suspects did not cause racial and xenophobic comments on the Polish minority in Belgium, indicates that some individuals are more easily lumped into populations or ethnic groups, whereas others maintain their individuality.

Discussion

We have moved above through space and time into different locales, thereby producing contrast and comparability across the three cases. Consistent with a central claim of this special issue these cases together brought about more insight than if we considered each in isolation. Before articulating some of these insights, let us briefly revisit the cases.

In the first case, that of conventional DNA profiling, we have seen that DNA evidence is based on a comparison between the DNA profile of a biological trace and that of a suspect. In addition, to determine the exclusiveness of a match a comparison has to be made to a reference population, in order to determine the probability that other individuals in the population at large have the same DNA profile. Comparing an individual to a population, as we have seen, is not without technical interventions, and sometimes problems. Since such comparisons are based on genetic markers, the latter’s neutrality is critical. In the meantime a commercial kit consisting of markers that are said to be neutral has been introduced and become standard in most laboratories.

In this first case, DNA profiling is a technology used to identify a suspect. In the second case, however, it has become a technology to generate a suspect where there is none: the inference of visible traits. Based on current

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18) To be sure, who will be made into a race or into an individual is also a matter of where you are in the world. Although the suspects could remain individuals in Belgium, in Poland their belonging to the Roma people was used as a method to purify the Polish and to save their good reputation in other European countries (Werdmölder 2006).
technology it is possible to determine the sex and to discern statistically the genealogical descent of an individual. Other visible traits are highly complex and still an object of research. Yet, as we have seen, the Netherlands has enacted a law promoting the use of technology to infer visible traits in criminal investigation. The Dutch case has also shown that race is at the heart of this novel application of forensic DNA.

The third case, the mp3 murder case, did not deal with DNA. The information density of CCTV pictures is much greater than that of any DNA-based phantom sketch (inference of visible traits). The role these pictures came to play and how they helped to categorize suspects as part of an ethnic group is therefore instructive for the future of forensic DNA. Even these pictures do not convey a one-to-one representation of a suspect. Who a suspect is, is, in a sense, who (or what?) he is made to be in some specific context. In the mp3 case the suspects were made part of an ethnic group as well as part of a debate on crime and the incentive to commit crime by members of this group. What the pictures represented was thus mediated by vested ideas about crime and immigrants in society. The mp3 case also showed how this use of technology might interfere with criminal investigation, putting it on a wrong track.

Let us now view the three cases together and consider additional results. Obviously the cases represent a kind of evolution in the use of forensic DNA. There is an evolution in the development of science and technology, in legislation and in the kind of profiles that can be produced.

In terms of scientific development the cases could indeed be read as representing past, present and future. They can be read as an ongoing struggle with novel technologies that are eventually mastered and tamed to make them apt for the next step forward in profiling. Politics and conflicts that emerge upon the introduction of technologies fade away once science arrives at their standardization and routinization.

Past, present and future also seem to hold for legislation. The Dutch case displays a development from conservative regulation centered round the rights of suspects to rather progressive regulation for technologies not yet available, therewith jeopardizing the rights and privacy of the many. Based on the three cases and in light of the prevailing post 9/11 mode of politics – tough on crime and with crime as an omnipresent concern of the public – one gets the impression that Dutch legislation, like that elsewhere, loses sight of the constitutional state.
Finally, the cases also articulate a politically charged evolutionary change of the profile. One could say that the profile started out as discrete genetic information aimed at identification. Then, aiming for more security and crime control, it became a racialized tool of criminal investigation. In this line, the mp3 case represents a version of sociobiology, where appearance, descent, and behavior are linked in one fatal conglomerate. The other side of the coin of this evolution is the argument made above about population. We first encountered this as a technology from which a suspect has to be excluded, then as a technology in which a suspect is included and finally as a biologically defined race of generalized suspects.

Although these storylines are real and relevant they also suggest linear progress, improvement and accumulation of science and technology. In this they also obscure some aspects of forensic practice. For example, the practices we encountered in the cases do not supersede each other, but exist next to one another. Their effects may thus be contingent, urging us to be “deliberate” about comparisons (Strathern 1991).

Following this approach the UNESCO document on race (UNESCO 1951) does not essentially belong to a different place and time, say, science and society in a post-War era. Rather, the concerns embodied in it are with us now. To be sure, this is not a rehearsal of lessons not well learned in the past. This is instead an effect of durable knowledge and knowledge objects from previous places and times that circulate in laboratories today. The normativities that these (knowledge) objects carry with them are not necessarily left behind. They may still act upon current practices. In addition, nineteenth century criminology is not an erstwhile science. In the context of visible traits, phrenology and craniology remain with us, but now investigated on the novel basis of genetics. All this indicates that there are shifts and changes, as exemplified by Dutch legislation. A legal protection against racism appeared as not to be far away from an incrimination based on racism, while at the same time a basic shift took place from an approach that is individual-centred to one that is “population” oriented.

This mode of ordering disparate objects is akin to a topological method, the science of nearness and rifts. It is explicated by French philosopher and mathematician Michel Serres:

If you take a handkerchief and spread it out in order to iron it, you can see in it certain fixed distances and proximities. If you sketch a circle in one area, you can mark out nearby points and measure far-off distances. Then take the
same handkerchief and crumple it, by putting it in your pocket. Two distant points suddenly are close, even superimposed (Serres & Latour 1995:60).

Topology, then, embraces the metaphor of space to arrive at an anti-essentialist mode of ordering and comparing. A CCTV picture can indeed be compared to a DNA profile, and it may become instructive in the profile's future application. The CCTV-picture and DNA profile are not deemed to belong to an essentially different class or species. In addition history and present are not separated by Euclidian time. Knowledge or technologies from former times may become relevant and put to work in surprising ways, articulating (hidden) resemblances between practices now and then. The relevance of nineteenth century criminology is a case in place, but the same holds for population genetics in general (see M’charek 2005, especially chapter 1).

Given the anti-essentialist nature of the topological approach, the “entities” or objects compared can be seen as extensions of one another (see also Strathern 1991). Objects co-construct, enhance one another, through the comparison. They thus help enact one another, due to the specific links created by comparison, in novel ways.

For example in the m3-murder case the profiles of the suspects in CCTV recordings were not accomplished or fully contained in the pictures. Moroccan-ness was not simply read from them. Various additional cultural markers were mobilised to make the profiles pass as Moroccan. Moroccan-ness was a relation established between what could be seen in the pictures and what was mobilized outside of them, such as: the clothing and behavior of the suspects based on eyewitness accounts, ideas about crime and their prevalence among specific groups, ideas about good citizenship, national identity and otherness.

This is not fundamentally different from the everyday practice of DNA profiling. These profiles are not singular objects, which represent what is out there: the identity of suspect, perpetrator, or, individual. DNA profiles are instead mediated by a variety of technologies in the laboratory, in the courtroom or, more broadly, in society. They are products of relations between different objects and knowledges that can be made or unmade (e.g. Law 2002).

For example a DNA profile without a convincing probability number does not pass; neither scientifically in the laboratory nor legally in court. Yet, even with a convincing probability number, a DNA profile can only
pass in court when it can be linked to other pieces of evidence, or, at least fitted into a scenario (a possible narrative) of what happened at the crime scene. Only then can it become evidence for pinpointing the perpetrator “beyond reasonable doubt”. Thus along the way a DNA profile undergoes various “translations” (Callon 1986) as it is connected to a variety of other knowledges, objects, techniques and procedures in order to count as identification (M’charek 2000; Lynch & McNally 2005).

Finally, with the mp3-case we travelled to the present futures of DNA profiling. Comparing it to the two other cases, the mp3-case showed that scientific inferences do not escape politics; they are part and parcel of contexts of social, political and cultural tensions.

References


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