5-6-2021

The Commercialization of Crime Solving: ethical implication of forensic genetic genealogy

Hannah Lee
University of Richmond

The Commercialization of Crime Solving: ethical implications of forensic genetic genealogy

by

Hannah Lee

Honors Thesis

Submitted to:

Jepson School of Leadership Studies
University of Richmond
Richmond, VA

May 6, 2021

Advisor: Dr. Terry Price

Abstract

The Commercialization of Crime Solving: ethical implication of forensic genetic genealogy

Hannah Lee

Committee members: Dr. Terry Price, Dr. Jessica Flanigan, and Dr. Lauren Henley

With the advancement of DNA technology and expansion of direct-to-consumer DNA services, a growing number of cold cases have been solved using a revolutionary new investigative method: familial DNA mapping. While the technique has been lauded by law enforcement as revolutionizing criminal identification, others are concerned by the privacy implications and impact on the family structure. In this thesis I will draw on communitarian, liberal rights, utilitarian, and social justice arguments for and against the practice. I conclude that this method has the potential to increase security and provide justice for victims and families, but absent comprehensive regulation and privacy protections, serves as a threat to autonomy and privacy rights. Individuals, should they submit their DNA to a company that provides access to law enforcement, *ought* to opt-in to such access, but must be provided comprehensive information to give informed consent.

Signature Page for Leadership Studies Honors Thesis

The Commercialization of Crime Solving: Ethical Implication of Forensic Genetic Genealogy

Thesis presented

by

Hannah Lee

This is to certify that the thesis prepared by *Hannah Lee* has been approved by his/her committee as satisfactory completion of the thesis requirement to earn honors in leadership studies.

Approved as to style and content by:

Dr. Terry L. Price, Chair

Dr. Jessica Flanigan, Member

Dr. Lauren N. Henley, Member

Dr. Crystal L. Hoyt, Associate Dean for Academic Affairs
Jepson School of Leadership Studies

Introduction

On August 21st, 2020, Joseph DeAngelo was sentenced to a combined twelve consecutive life terms, plus an additional eight years, without the possibility of parole for committing thirteen murders and thirteen kidnappings. His identification put a face to the notorious Golden State Killer who is thought to be responsible for these crimes plus nearly 50 rapes and numerous other lesser crimes such as peeping and burglary. His crime spree, which lasted from 1975 to 1986 before going cold, terrorized California for decades and he went uncaught until 2018. Advancements in DNA technology allowed law enforcement to analyze genetic specimens DeAngelo left behind at numerous locations, and a new forensic technique, familial DNA mapping eventually led to the 72 year old's identification and arrest. News of his capture thrust this unconventional form of forensic investigation into the spotlight.

While law enforcement has been collecting and analyzing DNA to aid investigations in some form since the 1980s, recently its use has expanded rapidly as the combined power of advancing technology, science, and creativity in investigative techniques has greatly increased. Among such advancements is the process of familial DNA mapping. This thesis will examine the ethical implications of a very specific type of investigation, familial DNA mapping that uses genetic information from private, commercial DNA databases.

From the outset, I would like to draw a clear distinction between government and commercial databases. A great deal of legal and philosophical literature on the subject of genetic genealogy and familial DNA mapping has focused on the implications of using federal DNA databases as sources of comparison. It has not been until recent years that law enforcement has attempted and been able to access genetic profiles stored in commercial databases. Thus, there is a need for a more robust examination into the arguments for and against the small but ever

growing sector of commercial familial DNA mapping. Mention of access to government-run databases will be made as a point of comparison throughout this thesis, but the ethical questions I am focused on have to do with access to commercial databases.

The focus of this thesis is not one of science but rather one of ethics and philosophy. A thorough understanding or explanation of the science behind this technique is not necessary to fully engage in the ethical debate at hand. With that being said, a basic understanding of how familial DNA mapping differs from traditional DNA forensics is useful. I will continue next with a brief explanation of the process of familial DNA mapping before moving on to an outline of how my thesis will proceed.

Differences in DNA are considered by some to be, at the biological level, what make us "who we are". Because each person's genetic sequence is unique to them, with the exception of identical twins, forensic DNA comparison is a powerful tool for confirming the identity of a suspect. While around 99.5% of genomes are the same across all humans, there are certain loci, or portions of DNA, that are highly variable between individuals. Geneticists have identified such loci and these are the portions of DNA that are compared during the course of an investigation.[1] This testing can determine if "the genetic material found at a crime scene matches the DNA in a potential perpetrator with better than 99% accuracy."[2] In this way, in order for DNA comparison to be used, there must be a sample found at a crime scene that has a high likelihood of belonging to the perpetrator. In rape and murder cases, which comprise the majority of cases we are concerned with in our debate today, we most typically see DNA left behind in the form of blood or semen. When there is a high level of confidence that the DNA left behind in

[1] Jonathan Kahn, "Race, Genes, and Justice: A Call to Reform the Presentation of Forensic DNA Evidence in Criminal Trials," *Brooklyn Law Review* 74, no. 2 (December 1, 2008): 4-5.
[2] James, Randy. "A Brief History of DNA Testing." *Time*, June 19, 2009. http://content.time.com/time/nation/article/0,8599,1905706,00.html.

fact belongs to the perpetrator, law enforcement agents will attempt to obtain a sample from a suspect to confirm suspicions and move forward to trial. Because of the high level of accuracy in these DNA comparisons, once law enforcement obtains a direct match between two samples, they can be highly confident that they have found the actual perpetrator, so long as they are sure that the sample found at the crime scene belongs to the actual perpetrator.[3]

As use of DNA techniques have grown, so have the databases where law enforcement stores genetic information. CODIS, the FBI's Combined DNA Index System is the largest database in the United States, housing over 11 million genetic profiles from "persons convicted of crimes, as well as DNA recovered from crime scenes, unidentified human remains, and relatives of missing persons who volunteer to provide DNA samples."[4] On a state level, regulations vary on whose genetic information is collected and stored. California state law mandates the collection of DNA samples from arrestees[5] while other states will only collect information once a suspect has been convicted of a crime or even more specifically, a felony crime.

The genetic information that is itself stored is not composed of the entirety of a genetic sequence but rather only 20 specific Core Loci that are used in comparison testing. These core loci were identified and chosen while recognizing "the privacy issues attendant to storing genetic

[3] I will discuss in greater depth in later chapters the danger of overreliance on DNA evidence and the importance of correctly attributing DNA evidence as belonging to a perpetrator rather than an innocent individual who may have left their DNA behind through an innocent act.
[4] William Wells, Ashley K Fansher, and Bradley A Campbell, "The Results of CODIS-Hit Investigations in a Sample of Cases With Unsubmitted Sexual Assault Kits," *Crime and Delinquency* 65, no. 1 (2019), 123, https://doi.org/10.1177/0011128717732506.
[5] Jennifer Lynch, "California Supreme Court Upholds the State's Problematic Arrestee DNA Collection Law," *Electronic Frontier Foundation*, April 2, 2018, https://www.eff.org/deeplinks/2018/04/california-supreme-court-upholds-arrestee-dna-collection-law.

information with ensuring the effectiveness of CODIS to assist criminal investigations."[6] In order to preserve privacy, those loci selected to be Core Loci and serve as the stored genetic profile have "no known association to medical conditions or defects" nor can the genetic information from these loci be used to diagnose any known medical condition or disease."[7]

As this repository for DNA grew, law enforcement began comparing DNA found at a crime scene to all of the profiles stored in the database. These comparisons would sometimes lead to "cold hits" -- rare, but increasing, instances of exact matches.[8] In cases when a search fails to lead to a cold hit, investigators can run a low stringency search in order to uncover a partial match. These matches do not match at all identified loci but are similar. However, these "low stringency searches can generate hundreds or even thousands of partial matches, none of which may be biologically related".[9] In this way, while a high stringency search used to find an exact match may be less likely to identify a match, low stringency searches as they exist now within CODIS' framework do not efficiently or effectively identify viable leads for investigators.

Furthermore, it should be made clear that low stringency searches in CODIS are not analogous to the process of familial DNA searching and mapping that is the focus of this thesis. While some literature uses forensic genealogy, familial DNA mapping, and partial matching interchangeably because both techniques identify non-perfect matches, there are distinct differences between the two techniques. The two systems differ in that "partial matches emerge inadvertently from a routine search of the DNA database, while family searches represent a

[6]Federal Bureau of Investigation. "Combined DNA Index System (CODIS)." Folder. Accessed November 2, 2020. https://www.fbi.gov/services/laboratory/biometric-analysis/codis.
[7] "Combined DNA Index System (CODIS)."
[8] Yun S Song et al., "Average Probability That a 'Cold Hit' in a DNA Database Search Results in an Erroneous Attribution," *Journal of Forensic Sciences* 54, no. 1 (January 2009), 22, https://doi.org/10.1111/j.1556-4029.2008.00917.x.
[9] Emily Niedzwiecki, Sara Debus-Sherrill, and Michael B Field, "Understanding Familial DNA Searching: Coming to a Consensus on Terminology" (National Institute of Justice, April 2016), 2.

second deliberate trolling of the database for close biological relatives after the first search had failed to produce a perfect match."[10] Thus, familial searches are conducted specifically to identify family members of a sample and eventually use this list of possible family members to identify the actual perpetrator.

Familial DNA searching was first used in the United Kingdom in the 2002 identification, arrest, and conviction of Jeffrey Gafoor for the murder of Lynette White.[11] Since then the tool has continued to be used most extensively in the United Kingdom where the process is guided by instituted national protocols and procedures.[12] This technique, instead of simply identifying partial matches, uses specialized software that employs statistical analyses to generate a list of candidate profiles ranked by the likelihood of the two profiles being related.[13] Once likely relatives have been identified, specialists are able to use a variety of other investigative techniques in order to construct family trees for the likely relatives and possible suspects that may be located on their family tree. Two second cousin matches who don't share any DNA (meaning they must come from opposite sides of the suspect's family) are all that is necessary for a skilled genetic investigator to fairly easily conduct an investigation. Once individual family trees for each of the partial matches are constructed, a common ancestor, the top of the suspect's tree that investigators are really interested in identifying, can be pinned down. From there, investigators will identify a list of their descendants and law enforcement or genetic genealogists

[10] Jeffrey Rosen, "Genetic Surveillance for All?" *Slate Magazine*, March 17, 2009, https://slate.com/news-and-politics/2009/03/genetic-surveillance-for-all.html.
[11] Richard Savill, "Nephew's DNA Traps Killer 15 Years Later," *The Daily Telegraph*, July 5, 2003, https://www.telegraph.co.uk/news/uknews/1434910/Nephews-DNA-traps-killer-15-years-later.html.
[12] Niedzwiecki, Debus-Sherrill, and Field, "Understanding Familial DNA Searching: Coming to a Consensus on Terminology," 1.
[13] Niedzwiecki et al, 3.

can begin to of narrow down that list even further using information related to age, sex, location at the time of the crime, and a number of other excluding factors.[14]

This process is severely limited by confining the database that one is searching for matches to just CODIS because of varying regulations that exist state by state[15] and the profiles of those who are included. Furthermore, the technology that CODIS utilizes is ill-equipped to run familial DNA analysis and the backlog of testing means that a sample can wait for months or years to be tested.[16] It is for these reasons that commercial players have the potential to provide a tremendous service and serve as a valuable repository of information for law enforcement. These companies have access to a large number of DNA profiles, profiles who frequently represent a much different portion of the population than those profiles housed in CODIS. The differences in race and class profiles and the implications of these differences will be examined in greater depth in the second chapter of this thesis, but what can be said now is that the voluntary, commercialized nature of these services lends itself to a diverging profile of individuals whose information is collected and stored by federal, state, and local law enforcement agencies.

The two biggest commercial cooperators with law enforcement are GEDMatch and Family Tree DNA. These companies offer their services free of charge and accept DNA profiles that have already been collected and analyzed by other companies. For example, an individual

---

[14] "A New Way to Solve a Murder, Part 2: The Future of Genetic Privacy," *The New York Times*, June 7, 2019, sec. Podcasts, https://www.nytimes.com/2019/06/07/podcasts/the-daily/genealogy-dna-crime-privacy.html.

[15] Maryland and the District of Columbia both prohibit the practice of familial DNA mapping. Formal guidelines exist additionally in California, Colorado, Florida, Michigan, New York, Ohio, Texas, Utah, Virginia, Wisconsin, and Wyoming however these regulations differ state by state. See Niedzwiecki, Debus-Sherrill, and Field, "Understanding Familial DNA Searching: Coming to a Consensus on Terminology." for in depth comparison and analysis of regulations.

[16] Information from the National Institute of Justice indicates that even as resources are dedicated to reducing the DNA backlog that plagues CODIS and state databases, increasing demand for DNA analysis and testing had continued this backlog. Year End backlog reports showed that year-end backlog cases increased from 30,000 in 2005 to 95,000 in 2008. See
Mark Nelson, "Making Sense of DNA Backlogs - Myths vs. Reality," *National Institute of Justice*, July 15, 2010, https://nij.ojp.gov/topics/articles/making-sense-dna-backlogs-myths-vs-reality.

may send a physical sample of their DNA to Ancestry DNA or 23andMe (two services who actively do not cooperate with law enforcement) and take their analyzed sample and upload them to GEDMatch. GEDMatch was created in order for amateur genealogists to find further biological matches and uncover more information than they otherwise would by only using the website who conducted the initial analysis. Because different genealogy websites keep their information separate, an individual might miss out on valuable insights if other family members who they wish to connect with used a different service than they did. By adding one's information to GEDMatch, individuals increase their opportunity to uncover more information without incurring any greater cost.[17] Thus, these services offer a tantalizing opportunity to get the most out of my DNA analysis at no additional cost.

This is the specific arena of familial DNA testing that we will be examining here. As of January 2021, over one hundred murders have been solved using forensic genealogy.[18] The process presents clear positives: the possibility of solving a large number of cases, reducing DNA backlogs in CODIS, and even equalizing the playing field of who can be identified by these investigations by including the profiles contained in commercial databases in addition to the profiles stored in commercial databases. The technique also poses significant ethical concerns for many bioethicists and those concerned with civil liberties. Murky governmental regulations and the lack of transparency on behalf of some commercial cooperators has caused concern among those fearful of government overreach and the possibility of genetic surveillance. In this way, we can see that a tension exists between the great possibility of good in the form of increased security and potentially equality, and the competing privacy and civil liberties

[17] "A New Way to Solve a Murder, Part 1: The Genetic Detectives," *The New York Times*, June 6, 2019, sec. Podcasts, https://www.nytimes.com/2019/06/06/podcasts/the-daily/dna-genealogy-crime.html.
[18] Jacob Stern and Sarah Zhang, "The Victims Left Behind by Genetic Genealogy," *The Atlantic*, January 27, 2021, https://www.theatlantic.com/science/archive/2021/01/genetic-genealogy-race/616171/.

concerns that should be actively considered and protected. These competing ethical dilemmas are the foundation of my thesis and serve as the beginning of my discussion. As such, throughout my thesis I will examine the philosophical arguments both for and against forensic genealogy as well as ethical considerations of effective implementation and use of the tool going forward.

My thesis is constructed in three chapters. In the first chapter I will examine the arguments against the process of familial DNA mapping. These arguments are rooted in liberal rights and communitarian arguments. In this chapter I will look at privacy and autonomy concerns as well as the possibility that this technique will deteriorate familial and social relationships. Throughout this chapter I will establish a perspective that many of the concerns that often plague this technique are not nearly as serious as we may be led to believe, and are in many cases, not unique to this specific forensic tool.

In the second chapter I lay out two arguments in favor of using the process. The first of these two arguments are consequentialist or utilitarian in nature and the second is social justice oriented. The utilitarian argument focuses on the benefits incurred to the individual and society by maximizing security through identifying and apprehending violent criminals. The social justice argument outlines the way that using commercial databases in particular will provide law enforcement access to a large portion of the white population whose DNA would be otherwise be unreachable. This access is significant given the current racial disparities in all levels of our criminal justice system which trickle into racial representation in government DNA databases. By creating more equal representation in DNA databases, we take one step in correcting long-standing injustices in the United States criminal justice system.

In the third and final chapter I will articulate my belief that after weighing all of these arguments for and against the process of familial DNA mapping, it is a valuable tool that law

enforcement should still be able to access. However, I qualify this statement by saying that as the process stands now, without comprehensive regulation and oversight, it runs serious risk of misuse. In this chapter I outline some specific, but not exhaustive guidelines that should be implemented in order to ensure ethical law enforcement access. These guidelines will attempt to protect user privacy and autonomy. I will also outline the tools that governments and companies can use to encourage individual participation in commercial databases, such as nudges and framing, and the bounds that must be set in place to prevent manipulation. Furthermore, I argue here that there are strong moral reasons that an individual should allow law enforcement access to their DNA for the purpose of solving crimes, especially if they have already had their DNA analyzed by a service like AncestryDNA or 23andMe. However, while there is a strong moral argument that an individual *ought* to do so, there is no strong duty for them to do so, and an individual may have personal and compelling reasons not to. It is for that reason that a government or company cannot compel an individual who has not been convicted of a crime or who is not a suspect of a crime to provide their DNA for comparison and storage.

Chapter 1: The Argument Against

Introduction

In this chapter I will be examining two perspectives that can lend insight to reasons why some believe we should not use commercial familial DNA mapping as a method for solving crimes. These two perspectives stand at two ends of a philosophical spectrum in terms of the value that is placed on the individual and their place in a society. The liberal rights argument will focus on the relationship between autonomy and privacy and the potential violations of both autonomy and privacy that can occur during the course of an investigation like this. These arguments center on the individual and how individual rights may be violated.

On the other hand, the communitarian argument that I will also examine rejects the idea of an individual that can be separated from its societal attachments. This view is especially relevant in our case given that familial biological relationships are a fundamental feature of this process. The question and issue we are looking at necessarily involves relationships that stretch beyond an individual to their biologically related family members. In many senses, the individual cannot be solely accounted for as this process affects not just one person who is identified or who contributes DNA, but all of their biological relatives that can now be identified through a search. To bridge the gap between the two perspectives I briefly consider a non-traditional definition and view of autonomy and privacy: relational autonomy and privacy. While this term refers to an umbrella philosophy that contains a number of individual perspectives, views from this camp are better able to account for both the individual in themselves and the social web they inhabit.

Some of the concerns I examine throughout this chapter have legitimate basis and require us to critically evaluate the regulations that are put in place in order to protect consumers from

misuse from companies and/or law enforcement. Among such concerns are obtaining adequate informed consent and respecting an individual's decision to deny law enforcement access. These regulations will be addressed in greater depth in the final solution chapter of this thesis. Furthermore, while I want to give as much careful consideration to fears that stem from privacy, autonomy, and communitarian concerns as possible, I ultimately will reject a number of these fears as legitimate basis for not using familial DNA mapping or individually contributing to a law-enforcement accessible DNA database. In reality, many of the objections to this process are not as serious as some may believe nor are they unique to this forensic process.

The Liberal Rights Argument

Autonomy

In this section I will describe the closely related ideas of autonomy, privacy, and consent and the role that all three of these values play in our discussion of forensic genealogy. Many lines of philosophical thought consider autonomy to be of the utmost importance for personal well-being and freedom. To be autonomous is to govern one's own decisions and to be free from outside interference. Or to be autonomous means that "every agent has an authority over herself that is grounded, not in her political or social role, nor in any law or custom, but in the simple fact that she alone can initiate her actions."[19] Autonomy grants an individual the ability to make decisions for themselves, to act as a free and rational agent. Furthermore, autonomy serves as the basis for a number of other widely held individual rights. In his description of the relationship between human rights and autonomy, David Richard states that "the idea of human rights

[19] Sarah Buss and Andrea Westlund, "Personal Autonomy," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Spring 2018 (Metaphysics Research Lab, Stanford University, 2018), https://plato.stanford.edu/archives/spr2018/entries/personal-autonomy/.

expresses a normative attitude of respect for the capacity of ordinary persons for rational autonomy."[20] In this way, human rights, or individual rights, in many cases, are derivatives of the idea of autonomy. In what follows next I will lay out a common conception of personal autonomy, the relationship between autonomy and consent, the relationship between autonomy and privacy, and the important role that autonomy and consent play in the realm of commercialized forensic genealogy.

While a number of accounts of personal autonomy have been raised, one of the most commonly ascribed to views is a "coherentist" account of autonomy. In this definition, an individual "governs her own actions if and only if she is motivated to act as she does because this motivation coheres with (is in harmony with) some mental state that represents her point of view on the action."[21] This mental state is often referred to as a higher order desire or desires that govern other desires. For example, I am acting autonomously if I decide to drive my car and my desire to drive my car is free from outside influence or is otherwise controlled. A contrasting example could be the example of an addict, particularly an addict who is attempting to get clean. While they may make a decision to use a drug by themselves (specifically, someone else does not force them to take their drug of choice), their higher order desires may not be in alignment with their desire to take the drug. In other words, their higher order desire is to not take the drug, and to quit taking their drug entirely, but their addiction is in conflict with this desire. In the end, their decision to continue using the drug is governed by their addiction, not their higher order desires. In such a case, many argue that an individual is not acting autonomously as their higher order desires are not in alignment with the decision, they end up making.[22]

---

[20] David A. J. Richards, "Rights and Autonomy," *Ethics* 92, no. 1 (1981), 9.
[21] Buss and Westlund, 2018.
[22] I make this point here to articulate the idea that an individual's autonomy may be undermined in ways other than the obvious example of coercion. Certainly, it is the case that when an individual is forced to act in a way that is

Autonomy, as articulated before, is a concept that runs through a number of political and moral philosophies. Importantly, "the conception of the autonomous person plays a variety of roles in various constructions of liberal political theory."[23] Furthermore, the idea of autonomy forms the foundation for a number of other concepts that are held to be important for human function and well-being. It is here that the idea of consent and its relationship with autonomy becomes particularly important and salient. Consent is the way that we can act in accordance with an autonomous agent's wishes. As Hedi Hurd puts it in her article *The Moral Magic of Consent*, consent "turns a trespass into a dinner party; a battery into a handshake; a theft into a gift; an invasion of privacy into an intimate moment."[24] In this way, consent has the power to turn an action that violates autonomy into one that respects autonomy. In order to respect an individual's autonomy when an action involves another person, adequate consent must be obtained.

The idea of consent filters through our daily actions in the ways that Hurd outlines, but becomes particularly important in the field of bioethics. Autonomy is thought to be the backbone of ethical patient care: doctors and researchers must treat their patients and/or subjects as autonomous, rational, individuals when performing medical treatments or subjecting individuals to scientific studies. There are a number of other values that a medical professional or researcher may consider and weigh during the course of research or patient care such as beneficence or justice. Flanigan, however, argues that autonomy is the most important value for these actors to consider and that competing values cannot outweigh the importance of autonomy. In her own

---

contrary to what they wish to do that qualifies as a coercion that their autonomy is not respected and such an action is not acceptable. However, an individual's autonomy can be undermined or eliminated through other methods that create conflict between higher order and lower order desires and actions. This will be discussed at greater length later in my discussion of manipulation.

[23] Buss and Westlund, 2018.

[24] Heidi M. Hurd, "The Moral Magic of Consent Special Issue: Sex and Consent, Part I," *Legal Theory* 2, no. 2 (1996): 123.

words, "autonomy sets limits on the extent that public officials can permissibly promote other values."[25]

As articulated before, autonomy is violated when consent is not obtained. And while consent appears frequently in our daily lives, seemingly in all of our normal interactions, consent can become more complicated and important when we examine complex and important decisions. Thus, a more rigorous idea and definition of consent has evolved and remains especially important in the field of bioethics. The standard of informed consent has been shaped by this field because of its importance in ethical problems that plague the medical and scientific context, but the importance of informed consent is not limited to these kinds of decisions. I move now to describe the requirements of informed consent, why it is important, and its relevance to our topic which lays outside of the field of medical or research bioethics.

Informed Consent and Autonomy

Informed consent is thought to be the process by which an individual provides consent for a particular procedure under the conditions in which they have been made fully aware of possible consequences and ramifications of the procedure. Informed consent is key for decisions in which the possible consequences are severe, and the procedure or activity is complex, or one cannot be expected to understand without the help of an expert.[26] Informed consent is in agreement with the ideas of liberalism which promote the treatment of each human being as an autonomous agent with the right to control their own body. By fully informing someone about the possible consequences of an action that they would otherwise potentially be unaware of, one

[25] Jessica Flanigan, "Why Autonomy Remains the Most Important Value," Cato Unbound, July 24, 2017, https://www.cato-unbound.org/2017/07/24/jessica-flanigan/why-autonomy-remains-most-important-value.
[26] Nir Eyal, "Informed Consent," September 20, 2011, https://plato.stanford.edu/archives/fall2020/entries/informed-consent/#WhyInfCon.

is treating the other with respect and dignity, and giving them the tools and abilities they need to make a rational decision for themselves. Furthermore, Machado and Silva argue that by requiring informed consent in collection of genetic material or tissue samples, one "seeks to respect an individual's bodily integrity" and thus one's bodily autonomy.[27]

In the context of commercial forensic genealogy, obtaining informed consent is key to using these tools ethically. However, obtaining adequate informed consent is not always straightforward and the process can present its own ethical dilemmas. Questions of informed consent, or consent at all really, are not considered in the context of government-run databases that store the genetic profiles of criminals. Consent is not thought to be required in these cases because criminals are not granted the same rights as ordinary citizens.[28] In other cases, such as when an investigation is still in process and DNA is collected in order to pursue or verify leads, the principle of informed consent is somewhat murkier. When DNA is collected as a result of a court ordered subpoena, again, consent, or informed consent, is not considered necessary. In this case, "consent is not required when taking a sample from individuals who have committed a crime or who are criminal suspects, as these persons are considered to hold diminished rights taking into consideration the broader rights of society."[29]

When individuals are asked to voluntarily submit a DNA sample (either as a suspect in the absence of a subpoena or for some other reason) it is reasonable to expect that individuals be

---

[27] Helena Machado and Susana Silva, "Informed Consent in Forensic DNA Databases: Volunteering, Constructions of Risk and Identity Categorization," *BioSocieties* 4, no. 4 (2009), 337, https://doi.org/10.1017/S1745855209990329.

[28] This is not to say that criminals retain no rights, but rather that after committing a crime, they are thought to sacrifice that other citizens retain. For example, while involuntary imprisonment of an individual who is not convicted of a crime would be considered unjust and in violation of their autonomy, the case is not the same for a convicted criminal. These individuals are thought to sacrifice some rights when they break the law. In this way, the requirement to obtain consent to collect and store a genetic profile does not exist in the same way for convicted criminals as it does for an individual not charged or suspected of a crime.

[29] Machado and Silva, "Informed Consent in Forensic DNA Databases: Volunteering, Constructions of Risk and Identity Categorization," 337.

informed on the conditions of their DNA collection. Will their DNA be used just in this one instance, stored for the duration of the investigation, stored indefinitely, or stored only if they are convicted? Who will have access to this DNA, and can it be used beyond the scope of what investigators initially say it will be used for? If the sample is not a match to that of the crime at hand but is found to be a match to an entirely unrelated case, can that be used to prosecute and convict? It may be the case that in many jurisdictions, there are no clear-cut rules or answers to these questions, but in the case when an individual is voluntarily providing genetic information, it is reasonable to ask that these questions be answered so one can make a fully informed decision on whether or not to submit to a voluntary request.

Informed consent is similarly necessary in the commercial context. Individuals may be using a service with goals entirely different than aiding law enforcement in catching a violent criminal. In fact, it seems to me that there are very few people who originally spend money to have their DNA analyzed with this goal in mind. Given this fact, as well as the fact that many people are still likely unaware that law enforcement even has the ability to access some privately stored genetic information, individuals should be provided with comprehensive information about the process and the possible implications of allowing access to their information. This requirement is not satisfied by merely stating that a website cooperates with law enforcement and that their information, should they choose to upload it, could be accessed. This is especially the case if such a statement is buried in a terms and conditions statement that many know will go unread. Rather, companies must clearly and explicitly state what kind of information law enforcement will have access to, the risks of allowing access to law enforcement, and the potential benefits that can also be incurred. A more detailed description of what this informed

consent should include and avoid will occur in the solution chapter when I make specific recommendations to commercial and government leaders.

Outlier Examples: When Autonomy Can be Violated

Skeptics of the growing use of forensic genealogy frequently voice privacy concerns. These concerns also apply to, and are often heightened by, the role of commercial databases in this sphere. While this is just one of the issues at the heart of the debate surrounding forensic genealogy, the general public typically sets potential privacy costs against whatever benefits might be gained in terms of public safety. I will continue on in this chapter to discuss the theoretical value of privacy, it's relationship with autonomy, and specific privacy issues that are at play here. However, before doing so, I believe it is helpful to outline clear instances of privacy or autonomy violations. In the vast majority of cases, I do not believe it can be said that commercial forensic genealogy constitutes a meaningful violation of autonomy. My reasoning is that DNA information concerning familial relatedness does not reasonably fall within the scope of personal informational privacy. There are some circumstances, however, that may arise if we continue and expand the use of this process that would qualify as violations of privacy and/or autonomy.

The first circumstance is if an individual's DNA is submitted to a direct-to-consumer (DTC) provider[30] or database without their knowledge or consent. If a family or friend collected my DNA and submitted it to a DTC company on my behalf, this would be a legitimate violation of my autonomy. This violation would be compounded if it was accessed and used in a police investigation. This violation of autonomy occurs because no consent, let alone informed consent,

[30] Direct-to-consumer provider is the general label for any service that analyzes a DNA sample or provides a genetic genealogy service. AncestryDNA, FamilyTreeDNA, GEDMatch, and 23andME are all examples of direct-to consumer provider.

is obtained by the individual whose DNA is sent in and then used as informant DNA. There is minimal evidence that this is something that occurs frequently, if at all. However, because DTC providers do not require proof that the DNA that is being submitted belongs to the submitter, a situation like this occurring is certainly in the realm of possibility and constitutes a credible threat to autonomy that is made worse by police access.

The second circumstance is the case in which an individual submits DNA to a DTC provider under a false name or someone else's DNA under their own name. This case is similar to the previous case. DTC providers do not ensure that the DNA that is sent actually belongs to the person whose name it was submitted under. Therefore, an individual could hypothetically submit another's DNA as their own or assume a false identity with the DNA they have submitted. This certainly poses problems for the other person who is involved in the misidentification and is another reason why DTC companies should implement better protocols to ensure the true identity of the individual who is submitting DNA that they claim to be theirs.

The third and final circumstance which I see as being the most widespread is the case in which consent for use in police searches is not obtained or an individual has opted out of police searches but is included anyways. These violations constitute serious breaches of autonomy and consent and must be treated as such. The final chapter of this thesis will address policy failings so far which have not adequately protected against such misuse. In this grouping of recommended policies, I argue for strict consequences for companies and law enforcement agencies that violate the wishes of users who do not choose to be included in searches or fail to obtain adequate informed consent from users.

Thus, as long as the person who is submitting the DNA is the true owner of the DNA and they are submitting it under their own name, without impersonation, and as long as consent is

being properly obtained and respected by a company and law enforcement, it appears to me that law enforcement access to DNA would not constitute a meaningful violation of autonomy. All of these requirements are, in my eyes, necessary for the ethical implementation of these services. As I go forward and continue to examine the value of privacy and how it is related to the case at hand, I will do so under the assumption that I am referring to a normal submission and access of DNA. In other words, I will articulate that so long as an individual is themselves freely and willingly submitting their own DNA and have consented to law enforcement access to their DNA, their privacy and the privacy of their family members who are implicated cannot be considered to be meaningfully violated.

Privacy

In what follows next, I will introduce the idea of the intrinsic value of privacy and traditional conceptions of the right to privacy. I will then examine the substantial threats to privacy that private DNA databases pose more generally and the particular threat to privacy that occurs when law enforcement is granted access to this information. Finally, I will lay out a few alternatives that argue that private DNA databases and law enforcement access to them are not violations of privacy and within the legal and moral scope of traditional views of privacy.

Privacy's Scope and Value Generally

Despite the fact that most Americans consider privacy a fundamental right and element of modern day life, there seems to be "no historical consensus, in philosophy, politics, or law" that privacy is "a right or value to be protected by the law."[31] Negley states that "Few philosophers

[31] Glenn Negley, "Philosophical Views on the Value of Privacy," *Law and Contemporary Problems* 31, no. 2 (1966), 319.

would argue that privacy is a 'natural' right or that the intrinsic value of privacy establishes it as a legal right.[32] However in 1960, legal scholar William Prosser identified four privacy rights that are widely acknowledged and accepted. These privacy rights included protection from:

1. Intrusion upon a person's seclusion or solitude, or into his private affairs.
2. Public disclosure of embarrassing private facts about an individual.
3. Publicity placing one in a false light in the public eye.
4. Appropriation of one's likeness for the advantage of another.[33]

These privacy rights are what are commonly defended in law, and Moore argues that what binds these four disparate rights together is the idea that "they each concern access and personal information control."[34] However, if we are to agree with most philosophers and believe that these privacy rights are not "natural" rights in the same way that Locke and others have viewed life, liberty, and property, then from where does the right to privacy originate and how great is its value? Edward Bloustein argues that what connects all of these aspects of privacy is that all four serve as a barrier protecting against intrusions that would demean personality and against threats to human dignity.[35] Thus, at the individual level, a right to privacy protects our human dignity and that is the individual value it holds.

The idea of privacy is intimately linked to the right of autonomy, a value that stands at the core of liberal rights philosophy. In fact, philosopher Mary Allen has argued that "privacy is required by the liberal ideals of personhood, and the participation of citizens as equals."[36]

---

[32] Negley, 319.
[33] William L. Prosser, "Privacy," *California Law Review* 48, no. 3 (1960), 389. In text reference has been edited for more general context to exclude the word "plaintiff" in exchange for "one".
[34] Adam D. Moore, "Privacy: Its Meaning and Value," *American Philosophical Quarterly* 40, no. 3 (2003), 219.
[35] Edward J. Bloustein, "Privacy as an Aspect of Human Dignity: An Answer to Dean Prosser," *New York University Law Review* 39, no. 6 (1964): 962–1007.
[36] Judith DeCew, "Privacy," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Spring 2018 (Metaphysics Research Lab, Stanford University, 2018), https://plato.stanford.edu/archives/spr2018/entries/privacy/.

Privacy acts to preserve autonomy: by maintaining a reasonable degree of privacy, it is thought that an individual is better able to serve as a fully autonomous human being. Moore argues that "controlling access to ourselves affords individuals the space to develop themselves as they see fit. Such control yields room to grow *personally* while maintaining *autonomy* over the course and direction of one's life."[37] On these grounds we can argue that privacy holds value for the individual. If it is true that privacy protects and furthers autonomy, then we as humans have a general interest in protecting the right to privacy. The role of privacy in preserving autonomy is just one way that privacy appears to have value in an individual's life. In addition to explicating this connection between autonomy and privacy, Moore also argues that privacy plays an independent role in human flourishing. She argues that individuals or societies that do not acquire control over access to information will be impacted negatively in a number of ways.[38] Privacy, like social relationships, health, and education, is an equally essential element to well-being.

Furthermore, a right to privacy may very well have value beyond just the value to an individual. Priscilla Regan argues that privacy holds a common, public, and collective value, and for those reasons, is of value not just to the individual but society as a whole. She argues it is a **common value** in that in the sense that everyone places, at least to some degree, a value on privacy. Regan describes privacy as a **public value** in that it is not value to just the individual or all individuals but also to a democratic political system. In her final description of privacy's **collective value**, she states that this value originates "in that technology and market forces are making it hard for any one person to have privacy without all persons having a similar level of

[37] Moore, "Privacy: Its Meaning and Value," 216.
[38] DeCew, "Privacy."

privacy."[39] In this way we can see that while a right to privacy may not be held in the same regard as natural rights which are seen as inalienable, the right to privacy is nevertheless far reaching in scope and value.

What Information DNA and Twenty First Century Technologies can Reveal

As we continue to discuss the scope of privacy and the where genetic information falls in the scope of privacy, it is helpful to briefly note what exactly our DNA can reveal about us, as well as the increased threats to privacy that new technologies of the twenty-first century pose. Furthermore, given that discrepancies exist between the kind of information that government databases and private DNA databases store, a clear distinction about what else law enforcement has access to when they receive a familial match in a private database should be made.

As scientists continue to learn more about genetic information and how it works, it has become increasingly clear that DNA can reveal a great deal about an individual. It is also clear that we are far from uncovering all of DNA's secrets. Researchers are still learning what certain genes do and what else DNA can reveal about humans and their behavior. The great power that DNA holds in revealing information about an individual has caused some to feel wary about the increasing use of private genealogical services and subsequent police access to them. As detailed in my Introduction, CODIS, the federally run DNA database stores genetic information at a limited number of locations. This genetic information that is stored and used for comparison does not serve the function of coding for proteins like other portions of our DNA do and have been specifically selected to avoid genes that code for revealing things like disease

[39] Priscilla M. Regan, *Legislating Privacy : Technology, Social Values, and Public Policy*, Book Collections on Project MUSE (Chapel Hill: The University of North Carolina Press, 1995), xv-xvi, https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1592&site=ehost-live.

predisposition and physical traits.[40] This noncoding DNA has traditionally been thought to reveal little about an individual and serve as a minimum invasion of privacy. In this sense, while there may be reasons to argue that the increasing scope of whose DNA is included in CODIS is troubling, the actual content of that information which is stored is a comparatively low invasion of privacy.[41]

This is not the case for genetic information stored in private genealogy databases. While CODIS stores the minimum amount of information to accurately return matches, Ram states that "the scope, type, and intrusiveness of the data revealed in genealogical genetic sampling is far greater than that revealed in traditional law enforcement genetic analysis. The genetic data stored in non-law enforcement databases differs in the scope of individuals reachable through the database."[42] This is a necessary and unavoidable part of private genealogy databases: in order to provide the services that these companies promise, they must sequence and analyze a greater breadth of DNA. And in the case of 23andMe and other companies that offer insights into genetic predispositions for diseases, the information they analyze and store is exactly that which federal databases avoid for privacy concerns. Thus, it is not just that genealogical DNA testing is more revealing than CODIS information because of the greater amount of genetic data that is stored and compared, but the very type of genes that are stored pose more serious threats to privacy than that which is in CODIS.

---

[40] Natalie Ram, "Genetic Privacy after Carpenter," *Virginia Law Review* 105, no. 7 (2019), 1378.
[41] It should be noted that with research developments scientists are learning about the increasingly important role of noncoding DNA. Thus, while it may be that the genetic information stored in state and federal databases is seen now as "junk DNA" that reveals no personal information about an individual, it very well may be that advances in research will reveal the importance of some of the seemingly noncoding strands and CODIS will be forced to alter which genes it sequences and stores. For example, Ram states that "researchers have uncovered links between noncoding regions of the genome and a host of genetic disorders, including certain neurodegenerative disorders and mental retardation syndromes." See Natalie Ram, "Genetic Privacy after Carpenter," 1379.
[42] Ram, "Genetic Privacy after Carpenter," 1376.

It is this difference of type and amount of DNA that makes genealogical databases highly attractive to law enforcement. This extended access gives researchers the ability to identify a greater number of extended relatives with a greater degree of accuracy. So-called "genealogical detectives" like those involved in the Golden State Killer case are able to identify second and third cousins and are able to accurately differentiate between different degrees of separation. On the other hand, in those state jurisdictions where familial identification is permitted[43], the information stored in CODIS is "largely limited to identifying first order relatives -- parent-child or full sibling relationships"[44] Thus, the fact that these databases store more detailed and revealing information is what makes this process both more powerful in identifying suspects and more dangerous to privacy.

Similarly, to the increase of information that has been made available as scientists uncover more about our DNA, with advances in technology have come an explosion of data available on individuals and increased concerns over privacy protections. The phones that most individuals carry with them almost everywhere they go are constantly collecting information: from locations, to weather, to exercise data. Every time an individual enters something into a search engine that search is logged and stored for later. Much of this information is then sold to companies who mine said data for lucrative insights: insights that have a wide impact on things like what is marketed to us. The *New York Times*, after accessing a commercial dataset, was able to locate the identity of one of the individuals who provided the data: data that was supposed to be anonymous. Intrusions like this one, which defy our expectations of anonymity can be unsettling. The individual identified, Lisa Magrin, said she found "the thought of people finding

[43] While formal regulation at the federal and state level of familial partial-match searches within CODIS is disturbingly lacking, at least one state, Maryland, has expressly banned intentional familial partial match searches in state-run databases. See Maryland Code, Public Safety §2-506.
[44] Ram, "Genetic Privacy after Carpenter," 1379.

out those intimate details that you don't want people to know" disturbing after learning all of what the New York Times was able to piece together from their investigation.[45]

The 2018 Cambridge Analytica-Facebook scandal went further to highlight the dangers that modern technology and data farming pose today. After obtaining user information under the pretense of a psychological survey, the information from the survey as well as the information from associated Facebook accounts were used to design political advertising algorithms. Kimberlee Moran sees troubling similarities to this particular case in the sphere of forensic genealogy. Like Facebook accounts provide information about friendships, one's genetic information provides insight into familial relationships. And like information from Facebook and the psychological survey were sold for purposes other than users initially agreed to or expected, "the DNA databases compiled through individuals curious about their family tree have become products sold to big pharma and others interested in health data."[46] Thus, companies now have access to not just our locations or our search engine histories, but to our genetic information: genetic information that has the power to reveal a great deal about a person.

These privacy issues are troubling enough as is, but the added component of the strength of security measures protecting these databases give reason to pause. The sheer amount of data that is contained in databases like Ancestry DNA or GEDMatch and the necessary collaboration of individuals across the globe in order to make these services function means that the raw

[45] Jennifer Valentino-DeVries et al., "Your Apps Know Where You Were Last Night, and They're Not Keeping It Secret," *The New York Times*, December 10, 2018, sec. Business, https://www.nytimes.com/interactive/2018/12/10/business/location-data-privacy-apps.html.

[46] Kimberlee Sue Moran, "Damned by DNA — Balancing Personal Privacy with Public Safety," *Forensic Science International* 292 (November 1, 2018), e4, https://doi.org/10.1016/j.forsciint.2018.09.011.
For more, see Danielle Hernandez, "Ancestry.Com Is Quietly Transforming Itself Into A Medical Research Juggernaut," *Huffington Post*, December 6, 207AD, https://www.huffpost.com/entry/ancestrycom-medical-research-juggernaut_n_7008446.

genetic information that these companies hold is increasingly frequently stored in the cloud.[47] This method of storage is significantly less secure than hardware storage. And already we've seen the security of data stored in these sites compromised: in July of 2020 GEDMatch confirmed that two data breaches had occurred. During the course of these data breaches, all user settings and preferences were changed so that law enforcement had access to all profiles and all user profiles were available to the public.[48]

Furthermore, tests done at the University of Washington show just exactly how much seemingly private information can be discovered during the course of a planned hack. Peter Ney, postdoctoral researcher in computer science at the University of Washington, designed "attack" DNA files to be uploaded to GEDMatch alongside target DNA profiles he created. After comparing the files, "he found that with a dozen attack files he could infer nearly all the actual DNA markers of the target profile, even though these are meant to be private."[49] In other words, because GEDMatch functions by a user uploading an already analyzed sample of DNA rather than the raw sample that is typically required by other commercial genealogy websites, hackers can "invent" these profiles with certain characteristics that they are looking to confirm or deny in the samples they compare them with. These characteristics are those that may be looked for in a 23andMe search such as predisposition to a disease but are expected to remain private.

Yaniv Erlich, chief scientist of another genealogy company, MyHeritage, went as far as to describe the privacy implications of such an ability to hack as a threat to national security. He

---

[47] Amy Gutmann and James W. Wagner, "Found Your DNA on the Web: Reconciling Privacy and Progress," *Hastings Center Report* 43, no. 3 (May 1, 2013),16, https://doi.org/10.1002/hast.162.
[48] Zack Whittaker, "GEDmatch Confirms Data Breach after Users' DNA Profile Data Made Available to Police," *Tech Crunch*, July 22, 2020, https://techcrunch.com/2020/07/22/gedmatch-investigating-dna-profile-law-enforcement/.
[49] "The DNA Database Used to Find the Golden State Killer Is a National Security Leak Waiting to Happen," MIT Technology Review, accessed November 18, 2020, https://www.technologyreview.com/2019/10/30/132142/dna-database-gedmatch-golden-state-killer-security-risk-hack/.

said in response to the tests run by the University of Washington that "with raw data you could come up with even better algorithms. You can identify spies or do genetic surveillance."[50] Not only does it seem as if there are serious privacy concerns in the domestic scope, but also the risk of an international attack on a website that contained a million-plus profiles at the time of the breach in July of 2020.

Even absent an outside hack, additional reports of police misuse of the site have indicated that while all profiles uploaded by law enforcement for use during the course of an investigation are supposed to be tagged as relating to law enforcement in order to exclude individuals who have not opted into police access, police have found workarounds for this requirement. Police have ignored such directives in order to gain access to the full database instead of just that subsection that has consented to law enforcement cooperation. Without substantial safeguards in place and systems of accountability, it appears that individuals who choose to have their profiles protected from law enforcement will never achieve the level of privacy they agree to and expect.

In this way, we can see how with the advent of new technologies, and advancements in what we can learn from DNA and the scale in which DNA can be analyzed, privacy is constantly being challenged. Just like our smartphones can reveal a map of where we've been which subsequently can reveal far more than we would ever expect, access to our genetic information and what it can reveal about us creates challenges concerning what we can reasonably expect to be kept private from the world at large, from private companies, our employers, and from law enforcement or other government entities.

[50] "The DNA Database Used to Find the Golden State Killer Is a National Security Leak Waiting to Happen."

Forensic Genealogy and Privacy

Now that I have established the general nature, scope, and value of privacy as well as the kinds of information that can be revealed through analyzing DNA, I move now to narrow my discussion of privacy to the specific issue at hand. Questions of privacy violations apply to a number of different types of individual in any given familial DNA search. For the sake of clarity going forward, it is helpful for us to assign names to each such individual who is involved in the investigation. Throughout the course of this discussion, I will be referring to the individual who originally submits their DNA to a database and allows law enforcement to access it as the "informant". Individuals who are identified through the process of building a family tree and generating a list of potential suspects will be called "targets". Further distinction will be made between "guilty targets": those who after further investigation are positively identified as the perpetrator of the crime and "innocent informants" who, after further investigation, are determined to be unrelated to the crime.[51]

Privacy of the Informant: Constitutional Privacy and the Third-Party Doctrine

In the midst of this discussion seems to be the question of what kind of information we consider to be within the scope of privacy, and what kinds of information the government can access without our explicit consent. In other words, what kind of personal information can we reasonably expect to be kept private? Because this is both a practical and moral debate, it is useful to look to how the Courts have ruled on privacy in the past. The idea of privacy, while not explicitly articulated in the Constitution, has been ruled on by the courts in a number of instances. Whether this be in the context of abortion and contraceptives or personal data and

[51] Adapted from Sonia Suter's conception of privacy stakeholders in forensic genealogy. See: Sonia M Suter, "All in the Family: Privacy and DNA Familial Searching," *Harvard Journal of Law & Technology* 23, no. 2 (2010), 309.

DNA, the Court has ruled on a number of cases that shed light onto the kinds of information that we can reasonably expect to be kept private.

Four Supreme Court cases have ruled on the topic of privacy are especially relevant to the specific topic at hand. *Smith v. Maryland* and *United States v. Miller* both ruled on the sacrifices to privacy that we make by supplying information to third parties and largely established the idea of a Third-Party Doctrine. *United States v. Carpenter* rolled back some of the strong language used in these two cases, ruling that there is in fact some information that we provide to third parties that we can reasonably expect will remain within our scope of privacy. Finally, *California v. Greenwood* dealt specifically with privacy rights concerning genetic information. In this case, the court ruled that the collection of discarded genetic information was not considered a violation of privacy as we do not have a legitimate expectation of privacy over trash left in a public space. It is likely that if courts have to rule on the privacy issue at play in the issue of commercial forensic genealogy, they will have to look to all of these cases (plus others not examined here) for precedent and decide which case of commercial forensic genealogy most closely resembles.

Smith v. Maryland and *United States v. Miller* worked together to establish the Third-Party Doctrine. The Third-Party Doctrine is the idea that an individual has no right to privacy to information that has been voluntarily given to a third-party.[52] As the court stated in the Supreme Court case *Smith v. Maryland*, in cases where you have voluntarily supplied a third-party with information, you have no "legitimate expectation of privacy."[53] We can still argue that this doctrine aligns with a liberal rights philosophy and the scope of privacy outlined before. After

[52] John Villasenor, "What You Need to Know about the Third-Party Doctrine," *The Atlantic*, December 30, 2013, sec. Technology, https://www.theatlantic.com/technology/archive/2013/12/what-you-need-to-know-about-the-third-party-doctrine/282721/.
[53] *Smith v. Maryland*, 442 U.S. 735 (1979)

all, few would argue that we have a right to absolute privacy. There is no way, while living amongst other people, to expect or guarantee absolute privacy. Furthermore, we frequently consent to sacrificing privacy for some other good. One may sacrifice privacy in their home by letting in a plumber so that they do not have to fix a toilet themselves. One may sacrifice online privacy when signing up for and posting on a social media platform so that one can stay connected with friends and family.

Similarly in *United States v. Miller*, the Court stated that bank records were not considered private, and police could lawfully subpoena bank documents. Their ruling stretched far beyond the scope of bank records though as the opinion stated that an individual "takes the risk, in revealing his affairs to another, that the information will be conveyed by that person to the government."[54] Thus we can see the prevailing attitude that individuals cannot expect to retain absolute privacy when they reveal information to third-parties; whether that third-party be another individual that could turn them in and provide information on them or if the third-party is a bank or private business. The court went even further in this ruling that an individual still has no Fourth Amendment protection over information provided to a third-party even "if the information is revealed on the assumption that it will be used only for a limited purpose and the confidence placed in the third-party will not be betrayed."[55] This was the logic surrounding privacy for most of the twentieth century: that any information that you voluntarily provided to a third-party no longer laid within the scope of privacy protection. We have reasons to doubt the validity of this claim however, and the Court later revised this information in *United States v. Carpenter*.

[54] *United States v. Miller,* 425 U.S. 435 (1976)
[55] *United States v. Miller,* 425 U.S. 435 (1976)

United States v. Carpenter was the landmark privacy ruling that was shaped by twenty-first century technology. In this decision, the court acknowledged that technology and the type of data that was collected by third-parties had changed immensely since the days of *United States v. Miller* and *Smith v. Maryland* stating that "when *Smith* was decided in 1979, few could have imagined a society in which a phone goes wherever its owner goes, conveying to the wireless carrier not just dialed digits, but a detailed and comprehensive record of the person's movements" and thus, it was reasonable for the court to take a different opinion here than they did in *Smith*.[56] The Chief Justice stated in the opinion that "the fact that the information is held by a third-party does not by itself overcome the user's claim to Fourth Amendment protection."[57] Instead of no legitimate expectation of privacy like in *Smith,* "an individual maintains a legitimate expectation of privacy in the record of his physical movements as captured [through cell phone records]."[58]

Thus, we can see two separate but directly competing opinions on privacy that now stand as precedent. Why did the Court change direction from the firm stance created by the Third-Party Doctrine? According to the Court, the cell phone data under question in the case, the data that is collected on anyone who carries around a smartphone on a daily basis, "provides an intimate window into a person's life, revealing … his 'familial, political, political, professional, religious and sexual associations'."[59] In this way, the mere breadth of information that is revealed through cell phone data is what caused the Court to reverse its position on privacy. The question, then, is whether the information that is contained in our genetic data and stored in a private genealogical

[56] Carpenter v. United States, 585 U.S. ___ (2018)
[57] Carpenter v. United States, 585 U.S. ___ (2018)
[58] Carpenter v. United States, 585 U.S. ___ (2018)
[59] Carpenter v. United States, 585 U.S. ___ (2018)

database closer to the information under question in the first set of privacy cases or closer to phone data?

Natalie Ram, one of the most prominent writers on the subject argues the latter. She states, in absolute terms, that "like the cell site location information at issue in *Carpenter*, genetic information is "deeply revealing," and so is presumptively private in nature."[60] The Court also considered the issue of testing a DNA sample separately from the issue of collecting a DNA sample. Ram suggests that "the separate consideration of genetic analysis indicates that genetic data carries with it an enduring privacy interest of constitutional magnitude."[61] In other words, by separating the testing from the physical sample, the court separated the physical DNA from the information that is contained in it, potentially leading to different privacy standards. Furthermore, the Court ruled in an additional genetic privacy case, *Maryland v. King* that genetic information that revealed things beyond just information about an individual's identity, "would present additional privacy concerns."[62] Thus, we can see that the information that a DNA profile stored in a private geological database which we have already described as far more revealing than that which is stored in CODIS and functions to provide far more information than an individual's identity can be considered to be beyond the scope of current genetic privacy standards.

It is within this tangled web of privacy laws and rights that the answer to constitutional privacy rights concerning genetic information in private databases lays. If we agree that genetic information in a private DNA database qualifies under the Third-Party Doctrine, even those companies who complied with law enforcement without notifying their users that their DNA

[60] Ram, "Genetic Privacy after Carpenter," 1381. Internal quotation marks omitted.
[61] Ram, 1381.
[62] Ram, 1382.

would be used for purposes beyond their intent would be acting within the scope of an individual's reasonable expectation of (a lack of) privacy. Furthermore, if the Third-Party Doctrine holds in all cases where an individual has voluntarily provided genetic information to a private company, the question of opting in or opting out of law enforcement access is null. Even if you opt out of access, law enforcement can still access.

However, if we view this case as more closely resembling the problems involved with *Carpenter,* the deeply revealing nature of DNA should lend itself a greater expectation of privacy, even when the information is being provided seemingly voluntarily to a third-party. I would have to agree with Ram and say that such information should not fall under the Third-Party doctrine. In other words, those who have explicitly said they do not wish to be included in a search conducted by law enforcement have a reasonable expectation that this decision will be respected and that their genetic privacy will be protected. This question of an informant's privacy does not exist in the same way if they have consented to law enforcement access. If an individual provides legitimate informed consent, and allows law enforcement-access, they are effectively relinquishing their claim to privacy in this regard.

Another issue may make this issue stand completely separate from prevailing privacy laws and prevent us from applying *Carpenter* or the Third-Party Doctrine to our case. This is because the information that is really being sought when law enforcement compares a sample to profiles in a database is typically not information on the partial match who becomes the informant, but rather the targets that they are able to lead law enforcement to.[63] All of these privacy questions have concerned the personal privacy rights that an individual sacrifices when

[63] While it may be that in rare instances a search with a Direct-to-Consumer database such as GEDMatch will reveal a direct match, in almost all cases partial matches indicating a familial relationship will be the only results. See: Sarah Zhang, "A DNA Company Wants You to Help Catch Criminals," The Atlantic, March 29, 2019, https://www.theatlantic.com/science/archive/2019/03/a-dna-company-wants-your-dna-to-catch-criminals/586120/.

they provide information to a third-party. However, the information that law enforcement gains through the technique we are examining relates to the privacy rights of individuals who have often never entered their genetic information into a private database. So, even if we were to accept the Third-Party doctrine, can we say that information gleaned from these searches about targets has truly been voluntarily sacrificed? When an individual provides their DNA to a company like GEDMatch or FamilyTreeDNA, they are providing information not just about themselves but information about their genetic relatives who have never voluntarily consented to such a sacrifice of privacy. It is for that reason that we must examine the ways in which the privacy rights of targets may be violated.

Is a Target's Right to Privacy and Autonomy Violated?

In the case of an individual who submitted their DNA under normal circumstances to a private company and provided legitimate informed consent to law enforcement accessing that DNA, that individual has no legitimate claim to privacy in the event that law enforcement compares a crime scene sample to a private database and comes up with an exact match. However, the same cannot be said of the individual who is identified and located because of a family member's willingness to sign away privacy rights for the sake of learning more about their heritage. It seems here that the family member located in this manner has a legitimate objection to raise about their privacy rights and the manner in which they were identified. The nature of genetic information and genetic similarity means we inevitably reveal at least some information about others when we reveal information about ourselves. An individual cannot control the fact that their DNA is similar to their blood relatives, and to a certain extent they cannot dictate how their family members decide to use their DNA or who they choose to allow to access their DNA. However, can we reasonably say that the identification of a guilty target,

despite the fact that they never submitted their own DNA to a database, is a violation of the target's privacy?

The mere fact that two individuals are related does not seem to qualify as information that we expect to be kept private. Public records can be used in the same way that genetics can be to establish the presence of biological relationships. In fact, genetic detectives rely on public records amongst other things to build the family trees that identify targets. Consider a case that does not involve the use of genetics. Investigators are looking to identify a suspect in a violent crime that has occurred in their jurisdiction. They receive a very credible tip from an individual who says they are sure that the person they are looking for is one of their cousins. They are not sure which one, and they have many that law enforcement will need to look into, but they provide law enforcement with this information willingly in the hopes of helping solve the crime.

From there, law enforcement use public records such as birth certificates and social media posts that are obtained without misuse to track down and identify every single one of the tipster's cousins. They then narrow this list down, eliminating all the cousins that have alibis or do not fit the criminal profile or match the other evidence they have in the case, and are finally able to identify their likely suspect. When they arrest and interrogate the suspect, the suspect objects that he did not consent to his cousin providing the information or law enforcement accessing the information that led to his arrest. The suspect's objection cannot be seen as legitimate, nor do the practices that law enforcement members used to identify the suspect seem to violate any privacy rights.

When the example changes and the tipster becomes a genetic informant, nothing of value changes so that the process suddenly becomes a violation of the target's privacy. Instead of a caller on a hotline, the information that is the first step in identifying the target becomes is two

people who have enough genetic similarity to the target to indicate they are second cousins. Just like in the case of the tipster, all investigators know is that the person they are looking for is related, to a specified degree, to someone they have been able to identify. This kind of information does not reasonably qualify as the kind of information we can expect to be kept private.

There are other kinds of information that our DNA holds that we can say contains a reasonable expectation of privacy, such as medical information. Such information is personal and revealing and would otherwise not be obtainable by law enforcement, and thus, should not be revealed. If a company such as 23andMe is able to learn from an individual's DNA that they have a predisposition to a disease or other genetically linked mental illness, we should expect that this is not the kind of information would be provided with. Even if it would help narrow down a list of suspects or otherwise aid an investigation, this kind of information holds a different, higher status than information that establishes a genetic relationship.

Applying Prosser's Four Conceptions of Privacy

I will finish my examination of the privacy implications of forensic genealogy by looking at Prosser's four conceptions of privacy, and the specific ways that we can envision either a target or informant's privacy could be violated. I stipulate here that, while medical information *can* be stored in genetic information stored in commercial databases, it is unlikely that law enforcement have the ability to identify this kind of information given the information they are provided, nor a meaningful interest in trying to uncover medical information while they try to identify new suspects. Thus, as I have stated, while medical information can certainly be considered private information, I do not include it in my considerations here. If we are to find out that law enforcement has significantly changed its tactics so that they can uncover medical

information, new discussions regarding new violations to privacy will have to occur. Instead, I will focus solely on information concerning who you are related to someone (perpetrator or otherwise) and how you are related to them (the amount of genetic similarity that indicates the degree of biological separation). As this is the kind of information that is explicitly sought, it is at the heart of our consideration over whether or not it can be considered within the scope of our privacy rights.

Public disclosure of embarrassing private facts about an individual

A violation of this kind of privacy is imaginable but not inevitable during the course of a familial DNA search. There are a number of embarrassing things about our familial relationships that can be brought to light during the course of an investigation of this nature. The negative impacts of these kinds of concerns will be addressed at greater length during the following section on the communitarian perspective, but here we can conceive of this privacy concern in a brief and limited sense. For the guilty target, the fact that they are a serial killer or other violent criminal to be an "embarrassing private fact" that they would rather not be revealed to the public if they are identified. We generally would not accept this as a legitimate violation of privacy, however. The rights of the criminal and specifically the protection of their identity is not recognized, nor will I make the case here that it should be. It would be strange to think that a man like Joseph DeAngelo who committed numerous rapes and murders deserves to have his identity protected after police are sure that they have identified the correct person. Furthermore, this kind of information is revealed after an investigation that does not utilize forensic genealogy and is not widely disputed.

For the informant or the innocent target however, the familial connection to a violent criminal can be considered an embarrassing fact that they would prefer to keep private. Any kind

of stigma surrounding the idea of crime "running in a family" may cause a family to distance themselves from a violent criminal and keep secret any kind of biological relationship.[64] This kind of stigma can be thought to violate our rights because in instances like these we are being treated not as an individual but as a member of a group. When the group (your family) is thought to have a negative reputation (being predisposed to violence or crime) then you can say your rights have been violated because you are being judged and treated not based on your own merits or what people know about you but based on the assumptions of the group.

Thus, the kind of information that is deliberately sought out through this process and could be revealed to the public during the course or after an investigation. While this relationship is certainly highlighted in an identification that results from a familial DNA search, this kind of embarrassing fact is not limited only to those crimes solved through this method. Many people are forced to deal with the general public knowing that they are related to a violent criminal. Stigma or negative treatment occurred because of this public knowledge, while unfortunate, is not unique to cases involving forensic genealogy and cannot be seen as a significant enough deterrent to persuade us against its use.

Publicity placing one in a false light in the public eye

There is only one case I can imagine this is a legitimate violation of privacy and that is in the case of misidentification but publicity that fails to acknowledge this misidentification. For example, if a law enforcement agent publicized the identity of an innocent target but purported them to be the perpetrator, this would certainly constitute placing an individual in a false light in the public eye. Or it could instead be the mistake of a newspaper or other publication that misunderstands the process or information provided to them and instead of reporting the guilty

[64] The risk of increasing this kind of stigma through this process will be explored in greater depth later in this chapter during my communitarianism discussion.

target as the perpetrator, publishes instead the identity of the informant. In either of these cases, misidentification or misreporting leads to extremely damaging lies being spread to the public.

Further risks occur because of the misguided way we view DNA evidence as being infallible. To many, DNA the presence of a DNA match means that we have caught a perpetrator with absolute certainty. There are instances when we can imagine that DNA belonging to someone who had not interacted with the victim would be present at the crime scene. For example, consider the hypothetical murder of a woman. During the course of her autopsy, the coroner finds traces of semen on her body, and investigators hypothesize that she was raped prior to her death, or at the very least that the person who left the semen was very likely the person who had committed the murder. However, in reality, the man who left the semen had engaged in consensual sex with the woman prior to her murder and knew nothing about her death or the person responsible. Police identify the person who left the semen using forensic genealogy, become convinced that he is their perpetrator, and perform surveillance on the man until they can collect a piece of trash that has his DNA on it. Of course, when they run a subsequent test to confirm the match, the results yield an exact match. In this case the science has not failed, but police have misattributed the DNA as belonging to the perpetrator rather than an innocent man.

This is certainly an injustice, and a potentially terrifying one at that. However, once again, we can see how this kind of problem is neither unique to this kind of investigation. The same thing could happen with fingerprints left behind innocuously at a crime scene. A repair man who was at the house the same day of a murder who leaves his fingerprints behind during the course of the maintenance he performs could just the same be falsely accused and even falsely convicted. This kind of publicity certainly places one in a false light in the public eye and can have disastrous consequences beyond just problems of privacy. False identification,

mistaken arrests, and wrongs that stretch all the way to the execution of innocent individuals plague all kinds of investigations.

I take all of these concerns as reasons why law enforcement should be incredibly cautious when evaluating DNA that they are attributing to a perpetrator. Some DNA will more reliably point to a perpetrator rather than an innocent person who came into contact with the victim. Only DNA that meets a high standard of confidence of belonging to the true perpetrator should be included in searches, just as evidence such as fingerprints should only be included in a trial or investigation if there is a high level of confidence that it is attributable to the perpetrator. Absolute thoroughness must exist on the part of the investigating team to prevent such injustices from occurring while utilizing forensic genealogy. I will emphasize this once again in the final chapter of this thesis when I call for regulations and legislation to be passed in this domain.

Appropriation of one's likeness.

This aspect of privacy is one that I believe is least applicable in our situation. This conception of privacy is most frequently applied to instances in which publicity or marketing is involved and as such is closely related to the idea of "the right of publicity".[65] In this sense, a company may violate an individual's right to privacy by misappropriation if they were to use a genetic informant's picture or story in a marketing campaign designed to attract more customers to use their services or opt into law enforcement access.

Intrusion into private affairs

Relationships, familial or otherwise, can be argued to be part of our "private affairs". In the case of the woman identified during the course of the *New York Times* investigation

[65] Eric P. Robinson, "Appropriation," in *The First Amendment Encyclopedia* (Free Speech Center at Middle Tennessee State University), accessed March 2, 2021, https://www.mtsu.edu/first-amendment/article/891/appropriation.

involving data mining, information about a private intimate relationship was revealed through call records and the individual's movements. This kind of identification is intuitively off-putting and seems to be a violation of privacy when revealed in this manner. Two consenting adults, it would appear, have the right to engage in a relationship privately. There may be a fear of judgment or lack of approval from friends or family members that lead two people to engage in a relationship in secret. However, other kinds of information that are shared between two individuals seem to lay beyond the scope of absolute privacy. After all, genetic information relating to familial relationships is necessarily shared beyond just the individual. It would be impossible to expect or guarantee a right to privacy over information that rightfully belongs to both individuals. While sharing of the information will impact both people, it is within each of the rights of the individual to dispense with that information how they please.

Consider the example of information relating to paternity that is discovered both through analyzing DNA and without the help of DNA. In one instance, two sisters discover while reading an old journal of their mother's, that the man they thought was their father their whole life, and who also assumed paternity was in fact not their biological father. One sister wishes to tell the man who raised them the truth, the other sister does not want to reveal the information. Both have an equal "right" to the information as he is neither's father but raised to believe differently. If one sister revealed the information without the consent of the other sister, it cannot be said that she violated her privacy as the information dealt with both of them. Consider now the case of the sisters finding this information out not while reading a diary but after having their DNA analyzed by a direct-to-consumer genealogy company. Once again, the information belongs equally to each of them and should one sister decide to disclose the information against the wishes of the other sister, it cannot be that the sister violated her privacy or autonomy.

Thus, we can see how our genetic information relating to familial relatedness is not the kind of information that belongs only to us or remains completely within the scope of our control of privacy. Furthermore, we can see that the individualism that is central to a number of liberal rights arguments is not equipped to fully deal with these kinds of issues. Privacy issues of this kind necessarily involve more than one person and while liberal rights conceptions of privacy may be equipped to deal with informational privacy issues in which information belongs to just one person, we cannot fully make sense of them without considering the implications for others involved or their relationships. To answer this problem fully, incorporating views from communitarianism and so called "relational autonomy" viewpoints are helpful.

Relational Autonomy & Relational Privacy

Relational accounts of autonomy and privacy help bridge the gap between communitarianism and liberalism. Many claim that relational perspectives are better equipped to deal with more complicated privacy issues and are even able to provide a more holistic view of autonomy. Nedelsky argues that "Relational views . . . underscore the social embeddedness of selves while not forsaking the basic value commitments of . . . liberal[] justice. [They] underscore the social components of our self-concepts as well as emphasize the role that background social dynamics and power structures play in the enjoyment and development of autonomy."[66] In this way, the liberal and the communitarian may find a middle ground in this conception of autonomy: those who favor relational autonomy are able to continue to advance

[66] Stuart Hargreaves, "'Relational Privacy' & Tort," *William & Mary Journal of Women and the Law* 23, no. 3 (2017), 433. Citing John Christman, "Relational Autonomy, Liberal Individualism, and the Social Constitution of Selves," *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* 117, no. 1/2 (2004): 143–64.

ideas of liberalism while acknowledging that the individual is not as inseparable from the communities that they are a part of as purely liberal theories suggest.

Relational autonomy, as well as relational privacy is an overarching view containing a number of different individual perspectives. Some philosophers believe that relational privacy is valuable in that it helps develop intimate relationships with others and that sharing private information with someone else, with the expectation that they will preserve that privacy, is crucial in the development of full relationships.[67] Others believe that what relational privacy is able to provide that individualistic views of privacy are not able to provide is an acknowledgement that individuals can share private information and that the violation of privacy of this information can affect more than just the self. A violation of informational privacy which involves multiple people will inevitably have an impact on both (or more than two) individuals and the relationship they share. Hargreaves aptly states that "a proper relational account attempts to gauge the severity of any claimed privacy violation by analyzing the harm it does to the web of relationships any individual finds herself in."[68]

In this way, when we are evaluating the potential harms of a violation of relational autonomy, we must take into account the many different people a violation like this might impact, and the number of relationships that may be affected by a violation of this kind. When it comes to forensic genealogy, this number is certainly high. In the event of a partial match, law enforcement will be given reason to investigate potentially hundreds of relatives. During the course of whittling down all of these distant relatives, many biological relationships will be put under a metaphorical microscope and potentially called into question. In most of these cases, nothing will be revealed to the public or nothing that is not already known will be uncovered. As

[67] Hargreaves, 462.
[68] Hargreaves, 462.

many of these biological relationships will already be established in public record -- through birth records and other documentation -- it cannot be said that simply accessing and establishing these relationships constitutes a meaningful violation of privacy, relational or otherwise.

However, there will be instances where the information that these searches uncover may contradict what is publicly known or shared and perhaps reveal information that a family prefers to keep secret. In these cases, we can say that searches begin to violate relational privacy. In most cases law enforcement will be unable or unwilling to distinguish between what will constitute a violation of relational privacy and what will not. In many cases, it is clear only when information has been revealed and people object to its uncovering that we discover that it was not a matter of public record like we would expect. For that reason, we must evaluate critically whether or not law enforcement investigations of biological relationship related information are undue violations of privacy.

In Cohen's account, she defines relational privacy as "the right not to have one's constitutive identity needs violated or interfered with by the state or by third parties *without very compelling reasons indeed*."[69] Within this statement, and throughout other examinations on the right to and value of privacy, we can see that this right is not absolute. While it may be that the state or a third party must have, as Cohen says, very compelling reasons to violate privacy, these reasons may exist and may justify an interference. If we view security as a public good that all enjoy and all must contribute to, it may be the case that even when individuals argue a right to privacy over this kind of biological information, the duty to provide to a public good overrides this kind of right. If we accept the security that is obtained when a violent criminal is caught and

[69] Hargreaves, 461. Citing Jean L. Cohen, Rethinking Privacy: The Abortion Controversy, in Public and Private Thought and Practice: Perspectives on a Grand Dichotomy, 133, 153 (Jeff Weintraub & Krishan Kumar eds., 1997). Emphasis added from Hargreaves text.

taken out of a position to continue harm as a kind of public good, it is also the case that many liberals would accept that there is a duty for the individual to contribute to this public good by aiding in the identification of such a violent criminal. Certainly, there will be instances in which information that is uncovered by law enforcement through an investigation of this kind will constitute a violation of relational privacy and will place a burden on the web of individuals and relationships involved, but generally these kinds of burdens cannot be considered undue to degree that would prohibit law enforcement from utilizing this tool to increase security.

While this relational account of autonomy and privacy does more to account for social relationships beyond the individual, communitarianism goes even further to emphasize the inherent value of communities and the importance of protecting social bonds. Given that social relationships will certainly be impacted in a number of ways by this process, I turn now to an account of the communitarian view and the insight it can lend to the topic at hand.

The Communitarian Argument

While the liberal rights and autonomy arguments are highly individualistic in nature, as they focus on personal rights, the communitarian argument we turn to now considers the harmful effects on the family unit or community. On the most broad level "communitarians are interested in communities (and moral dialogues within them), historically transmitted values and mores, and the societal units that transmit and enforce group values such as families, schools, and voluntary associations (social clubs, churches, and so forth), which are all parts of communities."[70] Given that communities and families do the important work of supporting an

[70] Amitai Etzioni, "A Communitarian Approach: A Viewpoint on the Study of the Legal, Ethical and Policy Considerations Raised by DNA Tests and Databases," *The Journal of Law, Medicine & Ethics* 34, no. 2 (June 1, 2006), 214, https://doi.org/10.1111/j.1748-720X.2006.00028.x.

individual and transmitting that which is important to cultures and individuals, communitarians stress the importance of protecting the integrity of these units. Furthermore, communitarians reject the idea of individualism or the liberal conception of separation from the communities one is associated with. While it may not be that liberalism suggests a complete extrication from the broader social context, communitarians argue that their view "neglects the extent to which individuals are embodied agents in the world."[71]

Thus, the communitarian is able to more fully deal with the problems we have now in which the individual necessarily cannot be separated from their relationships with their family members. The communitarian also recognizes that an individual is part of not just one, but many kinds of communities. Furthermore, the communitarian's interest in preserving these different kinds of associations or families is likely to differ depending on the context. Or "which form of community to emphasize and which form to deemphasize depends upon the needs and problems of particular societies."[72] In our particular context, we will see tension between the types of action we take that will preserve or benefit the family unit versus the courses of actions that will aid one's wider community or state. Furthermore, the idea of special obligations originating from relationships will help us understand the threats that familial DNA mapping poses as well as legitimate reasons that an individual may choose to opt out of law enforcement inclusion.

Special Obligations

Virtually all people acknowledge the moral weight of special obligations, and communitarians will hold them in especially high regard. Special obligations are duties that are

[71] Daniel Bell, "Communitarianism," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta (Metaphysics Research Lab, Stanford University, 2020), https://plato.stanford.edu/archives/fall2020/entries/communitarianism/.
[72] Bell, "Communitarianism."

greater than just those that are owed to all people, regardless of their relationship to you. These kinds of special obligations occur on top of the more baseline level obligations that you hold towards all people. Special obligations typically arise between family members or individuals who share some other kind of relationship. One of the most frequently cited and widely accepted examples of special obligations are parental special obligations. Take this common example: a mother is sitting on a beach when she sees two children in the water drowning. One child is her own and the other is a stranger. She only has time to save one child. It would seem obvious that she should save her own child and while she may feel terrible that she was not able to save both, certainly no one would view her decision to prioritize the needs of her own offspring over the needs of some other child. In fact, a decision to do the opposite would appear strange and immoral to many because of the particular obligations that arise from parenthood.

It may be that there are even stronger obligations that a parent has to their child that would confound this example. Many would say that the role of the parent is to protect and raise the child that creates an overwhelming obligation to choose one's own child over the strangers. However, if we are to change the scenario so that the adult on the beach is an aunt and the child in the water is a niece, the woman's decision to save the child with whom they share a familial bond still appears logical. It would appear that the responsibility of the aunt to protect the niece is significantly less strong than the responsibility of the parent to protect their child; however, it is still likely that in almost all cases the adult would choose the child they have a familial relationship with. All but the strict universalist would choose to save the niece, and liberal philosophers are willing to agree that "as long as we don't violate anyone's rights, we can fulfill the general duty to help others by helping those who are close at hand—such as family members

or fellow citizens."[73] This kind of statement may seem to not entirely hold in the example at hand: is the aunt or mother violating the right to life[74] of the stranger's child by choosing their own offspring over the stranger's child? Assuming that the parent truly only has time to save one child, and both children have that same equal right to life, it still seems as if the parent is not violating any duties by choosing their child over the stranger's child. The equal right to life in combination with a special obligation to one's own child justifies the decision.

Special Obligations and Informing on Criminal Acts

So, the question becomes, do these kinds of special obligations extend to informing on a family member for committing a crime? In other words, do we have a special obligation to protect family members from being arrested or convicted for a crime? The answer for most, I believe, would be no. However, this is not true for all. In his book *Justice, What's the Right Thing to Do?* Michael Sandel explores the question of whether or not one can abandon one's duty to prevent harm or deliver justice so as to protect one's family.

To do so, Sandel (a communitarian himself), looks at the different decisions two brothers made regarding balancing obligations to family and obligations to the rest of the community. In the story of William and James (Whitey) Bulger, William Bulger, president of the Massachusetts State Senate and University of Massachusetts refused to cooperate with investigations into his notorious mob leader brother. Charged with nineteen murders, Whitey fled arrest warrants and

[73] Michael J. Sandel, *Justice : What's the Right Thing to Do?* 1st ed. (New York: Farrar, Straus and Giroux, 2009), 234.

[74] It should also be mentioned that the failure to save is contested as a violation of a right to life. If the example was that there was a child drowning that the adult had every opportunity and ability to save, but chose not to, this seems to be a clearer violation of a right to light and an immoral failure to save than in the example of two children. Even still, some argue, and I would agree that in many cases the right to life does not equal an obligation to save.

his brother refused to assist in locating him, despite continued contact. When questioned about this, William said "I don't have an obligation to help everyone catch him."[75]

In the second story, during the course of a seventeen-year search for the Unabomber, a domestic terrorist responsible for the killing of three and injury of twenty-three others, the language of a published manifesto led David Kaczynski to suspect and later turn in his brother, Ted. While he was deeply conflicted, David ended up reporting his suspicions to the FBI and provided information regarding his location, eventually leading to his arrest and conviction. In both stories we see that both brothers felt, to some degree, a special obligation to their family, even if their final decisions differed. While David ended up turning his brother in, he was tormented by the decision and the prosecution's decision to seek the death penalty after he had helped in the capture of his brother. Some Bostonian's expressed approval for William's decision to not assist police officers, expressing admiration for his loyalty.

The communitarian would, I think, approve of such actions as well and our justice system even acknowledges those special bonds that exist within families. Spousal privilege rules grant spouses the ability to not testify against their partners in criminal and civil cases, allowing a spouse to not assist in the prosecution of their partner. In all of these cases, one can see that by nature of the familial bonds one shares and the obligations that one incurs through these bonds, a certain dilemma arises in whether or not to turn in a family member for a crime or to assist in the prosecution of a family member for a crime.

This conflict applies to the world of familial DNA mapping as well in an individual's decision whether or not to consent to their genetic information being used by the police in generating suspects. When consenting, one is ultimately opening up the possibility of their DNA

[75] Scot Lehigh, "Bulger Chose the Code of the Street," *Boston Globe*, Dec 4, 2002, p.A19.

being used in the capture of a family member for a crime. While they may not turn in a family member in the same active way that David Kaczynski did, there is still a chance that by opting in, they could eventually lead to a family member's arrest. Should their DNA be a partial match to that found on a crime scene, they may be contacted to assist in an investigation, or their family tree may be used to narrow down potential suspects. This is an objection, or at least a major consideration, one might have to law enforcement access of their DNA.

Sandel leaves a question unanswered that I think is critical in evaluating the ethics of these brother's decisions and furthermore the ethics of familial DNA mapping. Sandel asks: "Under most circumstances, the right thing to do is to help bring a murder suspect to justice. Can family loyalty override this duty?"[76] To answer this question, it is useful to consider special obligations that we have to our communities outside of obligations we have to our family members as well as what kinds of rights are being violated by claiming this kind of special obligation.

Non-familial Special Obligations

As an umbrella theory, communitarians are concerned with preserving social ties to the community more generally. However, almost all people belong to a number of different communities. Each of our relationships to these communities incur different kinds of obligations or responsibilities. While we have obligations to our family, we may simultaneously have special obligations to our community. For example, if a tornado were to devastate the community center in my town and the community center in a town many miles away from me, and I only had the time or money to assist with rebuilding one, the special obligations that arise that exist from

[76] Sandel, *Justice : What's the Right Thing to Do?* 237.

participating in my local community would likely push me to aiding the one just down the street rather than across state lines. Similarly, if a child were to go missing in my town or neighborhood, I may feel a special obligation to help with the search. This obligation does not arise from any personal connection to the child or family (though that may also exist in tightly knit communities) but rather that the child and its family belongs to the same group that I belong to. Conversely, if I saw a report of a missing child in a state 50 miles away, while I may feel a great sense of sympathy for the child and its family, I would likely not feel the same pull or obligation to assist in that community's search party like I do in my own community. While Peter Singer would argue that this feeling is illegitimate, the communitarian view gives normative legitimacy to this feeling.

It can be said that one element of living in a community is the expectation of safety. I trust the members of my community, the people who live around me, to not commit crimes. Community watch groups often are formed to this end: to keep a neighborhood or community safe. Thus, individuals in a community or neighborhood often feel a heightened obligation to report crime or look out for their neighbors. This is applicable not only to the local community but on a wider scale as well.

Thus, we can say that while we may feel an obligation to protect a family member from being arrested for a crime, at the same time we have an obligation to our community to protect it from further harm. For most of this argument I have focused on the small scale: those local communities that I live and work in which we frequently feel the strongest connection to. However, in many cases, the DNA that is used to locate the perpetrator of a crime will belong to a distant relative who does not belong to or live in the same local community that we have previously described. It still may be that we have special kinds of obligations to individuals who

live in the same country or region as us. While the obligations we may feel to those who simply share a title of citizenship with us will certainly not be as strong as those that live down the street from us, belonging to a nation with a shared identity and culture may evoke stronger obligations to protect or help than the obligation to help those in countries across the world.

It may be, however, that we do not need special obligations or duties at all to tell us that we cannot, morally, shield a family member from arrest. Instead of a competing special obligation to a larger group, it may be that the competing duty is simply a duty that is owed to all persons. In cases of such duties, the existence of our obligations does not arise from any special connection we may have with the individual to whom we owe something, but merely from the fact that we owe all people at least some very basic things. In this conception, proximity may facilitate the fulfillment of a duty, but it is not a part of the fundamental explanation of why the duty exists in the first place. Among the natural duties that philosopher John Rawls articulates are "duties of mutual aid, mutual respect, not to harm or injure another, and not to cause unnecessary suffering."[77] Thus, it may be that choosing to not inform on a family member who has committed a violent crime, constitutes a violation of a natural duty that one has to all persons generally, those of mutual aid and potentially allowing another person to be harmed or injured without you yourself preventing the suffering.

It is clear that the moral dilemma of saving one's family member instead of a stranger in the hypothetical question addressed earlier is inherently different than that of protecting a family member suspected of a violent crime. Underlying this idea is the right to life and safety which has already been violated when a violent crime is committed and may be violated again in the future by the same criminal. This right is greater than any obligations one might feel towards a

[77] Faviola Rivera-Castro, "Natural Duties," in *The Cambridge Rawls Lexicon*, ed. David A. Reidy and Jon Mandle (Cambridge: Cambridge University Press, 2014), 548, https://doi.org/10.1017/CBO9781139026741.142.

family member. Thus, the liberal's concession that we are justified in prioritizing our family over a stranger is null because the part of the statement "as long as we don't violate anyone else's rights" is no longer intact. While we may feel strong ties to our family, and even a desire to protect them from the harm that would be inflicted if arrested and charged with a crime, this obligation does not outweigh those obligations we hold to preserve the rights of victims, their families, and potential future victims.

So, my answer to Sandel's unanswered question is no: family loyalty cannot override the duty one has to their community and the rest of society to bring a murder suspect to justice. In the context of familial DNA mapping and inclusion of one's genetic information in such databases, opting out is equivalent to (potentially) preventing a murder suspect being brought to justice. While the probability is small that your DNA would at some point be the missing puzzle piece in solving a cold case or leading law enforcement to a violent criminal, by removing oneself from such databases one essentially makes the same decision William Bulger did.

Protecting a Family Member by Failing to Opt In

One may argue that by failing to opt into police access of DNA, one is not knowingly shielding a family member from being caught. In other words, there may be an important moral difference between knowing a family member has committed a crime and knowingly hiding their identity or preventing them from being caught, and simply preventing oneself from being put in the position that they might expose a family member to police identification. It does seem that the first instance, knowing that a family member has committed a violent crime and intentionally interfering with their identification or arrest, is worse than simply preventing oneself from ever becoming involved in the first place.

A comparison can be made to hiding a fugitive from the police. Say your cousin is wanted for a string of murders and they are on the run. In the middle of the night, they show up on your doorstep and ask for you to let them hide in your basement until they are able to return to a life on the run. Fully knowing that they are responsible for a number of violent crimes, the pull of your familial attachment is still strong enough that you agree, and they set up camp in your basement. The next day, the police show up on that same doorstep and ask if you have seen your cousin or know where they may be located. You lie and say no, and without strong enough reason to suspect you are lying, they do not obtain a warrant to search your house and they move on to the next place they think your cousin may be located. In this circumstance you can be charged with harboring a fugitive and impeding an investigation. Certainly, it seems as if lying to law enforcement and preventing your cousin from being arrested is immoral. Even if law enforcement were not to show up on your doorstep asking for information, concealing your cousin's location by harboring them and failing to provide police with the necessary information to capture a violent criminal is still a crime and still seems to me to be deeply immoral.

Consider a similar example. One night your cousin shows up on your doorstep and asks to stay the night. They say they have just gotten in a terrible fight with their partner, and they cannot bear to be at the house in their presence any longer. Appearing quite distraught, you of course allow them to stay in your basement for a few days while they claim they are waiting for the fight to cool off. What you do not know is that they are actually on the run from police who have identified your cousin as the perpetrator as a number of murders. When the police arrive at your doorstep asking for information, they do not share why they are looking for your cousin and you still remain ignorant to the seriousness of their crimes. So, you still conceal their whereabouts. In this case you do not know that you are harboring a violent criminal, but still are

impeding an investigation. Even if you can claim that you were not aware that your cousin was a violent criminal at the time you allowed them into your house, there still seems to be something troubling with impeding an investigation in this way.

It seems to me that if you justify opting out of law enforcement access to your DNA on the grounds that you want to protect family members who are violent criminals from being identified, it shares the same characteristics as hiding the fugitive. Whether or not you know that your cousin is a violent criminal, by saying you do not want law enforcement to be able to search your DNA so that you can prevent your murderer-cousin from being identified and arrested, you are saying that you wish to stand in the way of an investigation and prevent a violent criminal from being brought to justice. In other words, it seems as if this is a less egregious version of Whitey Bulger refusing to give information on his brother. You are not committing an obstruction of justice like the individual who knowingly harbors a fugitive and lies to the police, but there does seem to be a sense of impeding justice from being served.

To clarify, what I am trying to say here is that if one were to ask a GEDMatch user who had chosen to opt out of law enforcement access to their DNA why they chose to do so, and they replied by saying that they wished to protect any of their biological relatives from being identified by police, this would not be a fair justification and an immoral reason. Reasons grounded in familial loyalty or the special obligations for family members that one may feel that compel them to protect them from police identification are not necessarily strong enough, on their own, to override competing duties to help keep our communities safe.

Deterioration of the Family Unit

Another line of argument that the communitarian may invoke is the idea that this kind of informing on a family member will deteriorate the family structure more generally and lead to

significant rifts within families or undermine the integrity of a family structure. For instance, one can certainly imagine a scenario where a family member serves as a genetic informant on a cousin or second cousin. While the degree of separation from the family member who the informant turned in might be far enough that the informant themselves does not feel as guilty for their involvement, those closer related to the target could harbor resentment or feelings of betrayal towards the informant or those closely related to the informant. These kinds of feelings of betrayal, if strong enough, could cause fissures in the family or undermine the family structure as a whole. Knowing that a family member has submitted their DNA to a website that allows law enforcement access may create feelings of unease within a family. Some family members will view an action like this as a family member exposing the rest of the family to undue surveillance or threat by law enforcement. In a scenario like this, we can imagine ostracization of that family member. All of this does the opposite of protecting and promoting ties to the family.

Another threat to the family that is commonly raised is the possibility of the revealing of family secrets that could result from involvement in these searches. There are a number of family secrets that are potentially encoded in our DNA and revealed through genetic searches. Mistaken paternity, previously unknown or hidden offspring, or any other kind of complex and potentially embarrassing secrets about how a family is actually biologically related can be revealed by these searches. If one were to learn during the course of an investigation that their father or husband had a number of other children that had been hidden from them for many years, or that the person who had raised them was not in fact their biological father, the revealing of these secrets could certainly destabilize a family. This kind of destabilization can occur not just within the

direct relationship involved, but also with "the other relationships (social and genetic) that are based on, and implicated with, that particular relationship."[78]

Destabilization of this kind might be the best-case scenario. Discomfort at family reunions or rearranging typical holiday celebrations because of rifts or splits in a family pale in comparison to some of the potentially dangerous consequences of revealing information. In extreme scenarios, it can be imagined that "those deceived by the family secrets might do harm, physically or emotionally, to those deceived them, or perhaps even to those with whom the presumed genetic relationships no longer exist."[79] In these extreme scenarios, it is not just that the family may be torn apart but even that individuals may be put in physical or emotional danger by the revealing of such information.

A third and final threat to the family exists in the stigma that may follow a family if it is implicated in a crime that is solved in this manner. By involving DNA in the solving of a crime, and by solving a crime by identifying a perpetrator through a genetic relationship, law enforcement links the idea of criminality with genetics. Even if it is not the case that the family as a whole has a history of criminal involvement, the public may still be misled to believe that there is something in their genes that makes them more prone to violence or unlawful acts. Even if law enforcement or the state goes to great lengths to prevent this assumption from spreading through the public, "a family may feel the 'taint of criminality' resulting from their relation to the offender in the database"[80] particularly "when there are public statements about the value of

[78] Mary McCarthy, "Am I My Brother's Keeper? Familial DNA Searches in the Twenty-First Century," *The Notre Dame Law Review* 86, no. 1 (2011), 381.
[79] Sonia M Suter, "All in the Family: Privacy and DNA Familial Searching," *Harvard Journal of Law & Technology* 23, no. 2 (2010), 309.
[80] McCarthy, "Am I My Brother's Keeper? Familial DNA Searches in the Twenty-First Century," 399.

familial searching lying partly in the assumption that criminality runs in families."[81] This taint of criminality can be felt in investigations that are not solved using DNA or forensic genealogy.

Family members of serial killers have reported that after their family members were caught and their crimes publicized, they were sucked into a "vortex of shame, anger and guilt" and that they suffered from the "blame and ostracism they had received for crimes they had no part in."[82] Family members of notorious violent criminals have felt the weight of their family members actions in their personal and professional lives. In a number of interviews conducted by *The New York Times* with family members of mass murderers and violent criminals, these family members have been asked to step down from long term volunteering positions, lost clients in private practices, and faced stigma and threats from others.[83]

Perhaps involvement in catching a violent criminal who is also a family member would reduce this kind of stigma or backlash from a community: those who directly aid in an investigation could be admired for their bravery or thanked for the part they played in identifying a violent criminal and taking them out of community where they could continue to inflict violence. However, in a best-case scenario in which the target is thanked rather than harassed, the rest of the family may not be privy to this kind of treatment. The second cousin may be thanked by law enforcement while the brother, the daughter, and the wife are all left to grapple with the emotional turmoil of their close relationship to a violent criminal.

Furthermore, it also may be that by catching a violent criminal who is a family member by a genealogical relationship only further cements the relationship in the eyes of the public and

---

[81] Erica Haimes, "Social and Ethical Issues in the Use of Familial Searching in Forensic Investigations: Insights from Family and Kinship Studies Symposium Article - Part I," *Journal of Law, Medicine and Ethics*, no. 2 (2006), 270.
[82] Serge F. Kovaleski, "Killers' Families Left to Confront Fear and Shame," *The New York Times*, February 5, 2012, sec. U.S., https://www.nytimes.com/2012/02/05/us/killers-families-left-to-confront-fear-and-shame.html.
[83] Kovaleski.

puts the person at further risk of ostracization. Nadar Hasan, cousin of Nidal Malik Hasan, the man who was convicted for killing thirteen in the Fort Hood mass shooting in 2009, faced immense pressure to distance himself from his cousin in the fallout of the mass murder. Even when Nadar Hasan wanted to do make something good from the situation by setting up a website to encourage moderate Muslim-Americans to denounce acts of extremism, "there was a tremendous amount of family pressure on him to do nothing public, to not remind the world we are related to the Fort Hood shooter."[84] In order to avoid public scrutiny or worse, a family may want to do everything to shield their relationship to the perpetrator from the public. Having the crime explicitly linked in news reports to biology or genetic relationships may prevent a family from ever escaping that kind of public stigma.

The relationship to a violent criminal does more than create intense and complicated feelings of shame and guilt for those close to the perpetrator. The family as a whole can face the consequences for actions they had no involvement in, being shunned from their larger communities entirely. One can imagine a worst-case scenario in which a family member is involved in the catching of a violent criminal through a familial DNA search. Their family shuns them because they feel as if the informant has betrayed not just the guilty target but the family as a whole. The family may feel that the informant should have protected the family member who was identified or may feel betrayed because their information is now also accessible by law enforcement, or both. Once the genetic target is arrested and convicted and once this information is made public, the genetic informant's identity may be made public or be involved in reporting on the story.[85] From there, their association to the case and the criminal may be cemented in the

[84] Kovaleski.

[85] Brandy Jennings' name was mentioned in a search warrant that was a part of solving the 1979 murder of Michelle Martinko. While she was unaware of the part, she played in catching the perpetrator, a second cousin twice removed, after the search warrant was made public, people in a Facebook group dedicated to solving the cold case

public eye for forever and they may be ostracized from their larger community. In the blink of an eye, by allowing law enforcement access to their DNA, a genetic informant can find themselves completely disconnected from the communities that they previously relied upon. Feelings of isolation coupled with feelings of guilt and shame may put these genetic informants in a precarious position mentally.

So, we can see, forensic genealogy and familial DNA searches can be seen to pose a significant threat to the family unit. And, in general, "communitarians tend to favor policies designed to protect and promote ties to the family and family-like groups."[86] So generally it would seem as if the communitarian would oppose these kinds of familial searches. Even for those communitarians who do not focus on the family unit and instead focus on the importance of larger community bonds, we can see how these bonds are put at risk. At the very least, an individual's position in these larger communities can be put at risk if they become involved in investigations.

Instances of family ostracization or family rifts are not universal. After all, every family is different, and a family structure may be impacted by a number of factors. Some families may value loyalty tremendously, and others may not view this kind of "informing" as a kind of betrayal. As Suter says, "How great a risk familial searches present to the integrity of families is an empirical question that depends on a number of factors: the percentage of such secrets among families; why and from whom the information was hidden; the surrounding circumstances that

reached out to her to notify her and discuss it. She was then interviewed by a number of news stations for her role in the investigation. See Benner, "Vancouver Woman Surprised to Learn Her DNA Helped Identify Suspect in 1979 Iowa Murder." and Mehaffey, "Distant Relative Learns Her DNA Led to Arrest in Michelle Martinko Slaying."

[86] Bell, "Communitarianism."

led to secrecy; the probability that police investigations will uncover such secrets; and whether and how law enforcement would reveal such information to the family."[87]

Other factors may influence how a familial search will impact a family: if the family geographically dispersed, if they spend a great deal of time together, if family members beyond the nuclear family feel close, how the family views crime and the rights of victims. One family who all live in the same town or cluster of towns, who gets together frequently as a nuclear family and regularly on a larger scale, who value loyalty among family members greatly and expect family members to protect one another from a number of kinds of harm (including police identification and arrest) will likely have a strong and negative reaction to participation in a familial DNA search. Another family who is dispersed across the country or world, who seem to have stronger relationships with friends than family, who get together infrequently or have limited communication, who generally are physically and emotionally distant, is likely to view involvement in this kind of search less critically.

It is possible to imagine the existence of both of these kinds of families in the United States today, as well as a number of families who fall somewhere in the middle of this spectrum. The only ones who truly know the strength of the family relationship are those in the family who are privy to this kind of information. Thus, we may ask if the government or law enforcement has any kind of right to make rules or regulations that will impact all of these families in the same way when all families are not the same. It is likely that those in the family are best equipped to make a decision on whether or not involvement in an investigation in this way, or the revealing of family secrets during the course of an investigation will negatively impact a family.

[87] Suter, "All in the Family: Privacy and DNA Familial Searching," 365.

Perhaps an unofficial solution to this kind of problem is simply an internal family dialogue. If a family truly feels this close and this strongly about protecting one another, they may decide as a group that no member of the family will submit their DNA to a website that voluntarily participates in law enforcement searches. While a group that seems to have this degree of commitment to family bonds and history may benefit from the other kinds of information that can be obtained from these websites (i.e., information about where the family originated from or identifying long-lost relatives) they may decide that this kind of information is not worth potentially undermining the family as a whole by being thrown into an investigation. If a family really feels as if one family member's involvement in the identification of another family member would serve as a serious threat to the integrity of the whole family unit and remaining neutral and uninvolved from law enforcement investigations truly matters that much to a family, the best course of action may simply be to decide as a whole to not become involved.

This does not necessarily mean that a family that decides to do so is immune from identification using familial search techniques. All it takes is one black sheep of the family to break away from the agreement and submit their DNA to GEDMatch or FamilyTreeDNA for the whole family to be put in a position of identification. Or it may be that a family member who is beyond the close-knit circle is the one responsible for the identification of a violent criminal within the circle. An individual as far removed as a third cousin or second cousin twice removed will likely not feel the same kind of emotional attachment or loyalty to the rest of the family that has created the agreement. A family member this far removed will likely not even be involved in the agreement or notified of this kind of family policy and thus will have no way of knowing there are members of their family that feel so strongly about having their genetic information inaccessible to law enforcement. This family member, if they become a genetic informant,

cannot be blamed by the rest of the family for going against the wishes of a family they perhaps have never met. Furthermore, they will likely not suffer any kind of emotional distress or bear the brunt of any kind of familial ostracization -- after all they are not close enough to the family involved to feel the negative effects of ostracization. You cannot be shunned from a group you are not a part of.

I do not necessarily view this as entirely problematic to the family who forms an agreement. Such a family has created an agreement to avoid tension within the tight-knit group. But if it is someone from outside of this group that is implicating an individual within the group, the family cannot truly blame anyone within the circle for the events that follow. It is certainly possible that the family will be thrown into turmoil after someone from within the circle is identified and arrested for a violent crime. The family will be destabilized by the absence of someone who they all once considered themselves to be close to, the family may have to reexamine their relationships with one another and just how much they believe they should have to protect one another. Rifts or splits may occur as some family members take the side of the perpetrator while others wish to distance themselves from the individual because of the acts they have committed. But at the end of the day this will be because of the person who committed a violent crime, not the person who led to their identification and arrest. A family may go to great lengths to make sure that if a family member does commit a crime, they are not involved in their identification, but that does not mean that the person will or should never be caught in order to preserve the integrity of the family unit.

On a related note, we can see that while these kinds of familial concerns can be heightened by familial DNA searches, they are not unique to these kinds of cases. Individuals may be put in a position where they are asked or forced to provide information about a family

member or their involvement in a crime in contexts that do not involve DNA. A family member may be compelled to give information about a family member's whereabouts, relationships with victims, or behavior and attitude throughout the course of an ordinary investigation. They may even be forced to testify on this kind of information during the course of a trial, eventually contributing to the conviction of a family member. Suter goes as far as to claim that familial searches may not even pose the greatest risk to the disruption of a family unit through the exposure of intimate information. This kind of information can be equally, if not more easily, be revealed "through surveillance of suspects or searches of personal documents or property that uncover infidelities, adoptions, etc."[88]

Furthermore, this kind of embarrassing information or these kinds of family secrets may be revealed long before a police investigation when a family begins submitting their DNA to private companies. After all, genealogy companies that analyze DNA are supposed to reveal information that is in our DNA but not part of public record or common family knowledge. By attempting to identify a long-lost relative, one inevitably puts themselves in the position of potentially uncovering family secrets. A relative may be long-lost for a reason: they were given up for adoption in secret or were the product of an infidelity. Once a genetic relationship has been established through one of these websites and an individual begins investigating how they are related to this unknown person, it is likely that they will uncover these kinds of secrets without any kind of law enforcement investigation.

And while exposing these kinds of secrets can certainly pose a risk to family stability, we also must wonder about the legitimacy of claims that this kind of information deserves to be kept

[88] Suter, 368.

secret.[89] While some may see keeping this secret as a way to protect the family as a whole or individual member of the family, it could also be that those affected by the secret may want or deserve to know the information. The difficulty here is predicting the harm that revealing these kinds of secrets will do and weighing it against the benefits of knowing. Furthermore, once again, we can see that not every individual or person is the same: some may wish to know this kind of information for a number of reasons while others may prefer to never know. Some families may be highly destabilized by the revealing of this kind of information while others may remain relatively unchanged.

Suter poses, and I and many others echo, another kind of question: how strong is the integrity of a family that "built on deceptions and lies"?[90] Is a family that claims to be extremely close-knit and loyal and bases a decision to remain uninvolved in law-enforcement searches of their DNA on this tight relationship really this way if they have a number of secrets related to infidelity or unknown relatives? In other words, can a family that relies on the keeping of secrets from one another truly be considered to have the kind of trust and loyalty that they claim to have? And is any decision to opt out of law enforcement access to their DNA that is based on this claim valid? At the very least, it may be that if revealing a family secret to others in the family will cause a great degree of destabilization, the family should reassess how they characterize the closeness of the family.

---

[89] There is a myriad of circumstances that one can imagine: some more deserving than others of protection. If a child was the product of rape or incest, this may be a circumstance when we would want to take great lengths to protect the secret for the benefit of a number of involved parties. If a woman was involved in an abusive relationship and had a child with someone other than the abuser, we might also want to protect this kind of information from being discovered in order to protect the woman. While all secrets relating to biological relatedness are sensitive, these kinds of secrets or others like them seem particularly sensitive and difficult to determine what the right course of action is. It is not my intent here to generalize to the extent that all secrets should be revealed or that all parties in every circumstance might have a right or even benefit from learning the truth. What I am trying to say is that while one party in some circumstances may wish to keep biological information a secret, it is not always the case that they have a far reaching right to keep this information a secret.

[90] Suter, "All in the Family: Privacy and DNA Familial Searching," 366.

I do not mean to be unsympathetic to those individuals or families who keep secrets from others. I believe it is likely that nearly all, if not all, families have some kind of secret that they do not wish all members of the family to know, or certainly do not want people outside of the family to know. In many of these instances, it is likely that the family or members of the family have very good reasons for keeping this information private. I am, however, not convinced that the risk of revealing this kind of information is unique to forensic familial DNA searches or that it is strong enough to prevent law enforcement from using this technique to help solve violent crimes.

With all of that being said, I do believe that communitarian goals to preserve the family unit or that recognize that these methods may ostracize individuals from their larger community are more compelling than communitarian arguments rooted in a desire to protect family members who are violent criminals. Given that crime can be very difficult on families in a number of senses and for a number of reasons, and to expect family members to willingly insert themselves into an investigation of their family member and lead to their arrest is not reasonable, and even might not be fair. We may be able to expect families to turn over information during the course of an investigation if they are directly asked by law enforcement. In other words, we can expect that an individual will not harbor the cousin, but we cannot expect an individual to go to the police station and give information on their cousin if they have no reason to believe they have committed a crime. Thus, those that choose to opt out of law-enforcement searches and justify this choice by saying that they do not want to risk their relationship with family members who may resent or shun them for "betraying" a family member in this way seems to have a legitimate claim to doing so. At the very least, these claims seem more legitimate than justifications grounded in the protection of violent criminals who are also family members.

Many of the cases that have been solved with familial DNA mapping thus far have used information not from a family member of close connection to the perpetrator but rather individuals who are second or third cousins. This is not to say that no cases will be solved with DNA that is a much closer match, but rather that while individuals may fear turning in a sibling or cousin by granting access to their DNA, they may in reality be protecting distant relatives that they have never met or have no real relationship with. Furthermore, just because an individual chooses not to allow access to their DNA so that they may protect family members or so that they are not involved in an investigation does not mean that a family member who has committed a crime will never be caught because all of their immediate family or first-degree relatives do not submit their DNA. It would be incredibly difficult, if not impossible, for an individual to ensure that none of any genetic relatedness to them has granted law enforcement access to their DNA. If an individual is okay with a family member who is a violent criminal being caught, so long as they are not implicated in the investigation or do not aid in the catching of said family member, it may be that some of these fears could be alleviated by strict protocols that should already be in place.

The regulations and protocols that I believe are necessary if law enforcement wishes to continue to use this method will be outlined in greater detail in the final chapter of this thesis, the solution chapter. However, a brief mention of privacy protocols that should be in place seems useful as a response to both communitarian and liberal rights concerns. While it is the case that in the past that the names of genetic informants have been leaked to the press or general public in the past,[91] it should be the greatest priority of investigators to keep the names of genetic informants private to the investigation. I would go so far as to say that the genetic informant

[91] See footnote 85 detailing the experience of Brandy Jennings.

themselves does not always need or want to know that they played a role in the identification of a suspect in a familial search.[92] Maintaining privacy over an individual's role in a familial DNA search may eliminate some of risks of familial ostracization. By keeping press releases vague and protecting a genetic informant's identity during and after the investigation and trial, these kinds of risks in the familial context will be mitigated.

The shame and other consequences that accompany the stigma associated with a relationship to a violent criminal likely cannot be avoided by regulations. Close family members will likely inevitably feel this kind of emotional weight no matter the role they play in an investigation and it is impossible for their intimate relationship with a violent criminal to be kept a secret: these kinds of relationships are a matter of public record or knowledge. As tragic as these kinds of situations are, once again they are not unique to crimes solved using familial DNA mapping. Protecting the privacy of the genetic informant may help in lessening the association the public may generate between criminality and biological relatedness, but this problem is larger than privacy or familial DNA mapping. While of serious concern, I do not believe that by allowing familial DNA mapping will we be seriously contributing to the problem further. Similarly, refusing to engage in familial DNA mapping will not solve these kinds of problems. This problem has much more to do with how we as a society attribute blame and less to do with how we solve crimes.

[92] Here there may be more room for individual choice or decision making on a company level. For example, if an individual decides to have their DNA accessed by law enforcement, at the same time they make that decision the company may also ask them whether or not they would like to be notified if their DNA is used in an investigation. Some may value this information and wish to have even basic information when police are able to safely release the information while others may prefer to not know. Both of these decisions are valid and should be respected. In order to respect both the individual who decides to know and the individual who decides not to know, a company should obtain this information at the time of obtaining consent for DNA use.

Conclusion

These possible fears and consequences seem to suggest to me that there is not a duty to submit your DNA or even allow police access to DNA that has already been submitted. It is clear that there are some privacy concerns and threats to the family unit that, in combination, may make an individual hesitant to allow police access to their DNA. However, given that DNA searches are being conducted to solve violent crime and increase security in a community, there does not seem to be a duty not to submit in order to preserve one's family unit. This is perhaps a disappointing conclusion: if, throughout our discussion of liberal rights and communitarian arguments we were to find that there was a strict duty on either or both of these grounds to not submit, then the path forward would be very simple indeed. Our answer would then be that one should not allow access to their DNA and that law enforcement should maybe not even be given access to any DNA to prevent this duty from ever being violated.

However, this is not my conclusion after examining both of these arguments. While there are serious concerns, there is not legitimate grounding in either a duty to submit or not submit. For that reason, we must examine the reasons *for* law enforcement access and weigh these positives against the negatives presented in this chapter. From there, we will be able to make a decision on the right path for individuals, governments, and companies going forward and hopefully draw some concrete recommendations for all parties.

Chapter 2: The Argument For

Introduction

Central to the argument in favor of utilizing revolutionary forensic techniques such as familial DNA mapping is the great potential for good that can be done. First, familial DNA mapping harnesses information that commercial databases contain, and, as a result, gives law enforcement greater ability to solve crimes. Second, given this increased ability to solve crime, specifically the expanded suspect pool police have access to, these techniques give law enforcement the ability to better correct injustices that currently exist in our criminal justice system.

Both of these arguments are essentially consequentialist in nature: we ought to use these techniques because of the strong likelihood that a great amount of good that can result from their utilization. The first argument is utilitarian in nature. One former district attorney who now spends his time advocating for forensic genealogy estimated that if more law enforcement agencies used familial testing "we might solve twice as many cases as we do now."[93] Twice as many solved cases means twice as many violent criminals who are unable to continue committing crimes and twice as many victims (or families of victims) who receive the satisfaction of justice served and peace of mind. The second argument appeals to more particular concerns about social and racial justice which address current inequities in our criminal justice system.

In this chapter, I will explore how a utilitarian might look at these issues and advocate for the increased use of familial DNA mapping methods. According to this argument they are

[93] Rainey, James. "Familial DNA Testing Puts Elusive Killers behind Bars. But Only 12 States Use It." *NBC News*, April 28, 2018. https://www.nbcnews.com/news/us-news/familial-dna-puts-elusive-killers-behind-bars-only-12-states-n869711.

justified by their potential efficacy in increased crime solving, perpetrator apprehension, and security. I will also claim that commercial databases have the power to correct some of the wrongs that currently exist in our criminal justice system, namely, the racial disparities that are evident. For example, while African Americans and Latinos make up 29% of the U.S. population, they make up 57% of the U.S. prison population. Further disparities exist in pre-trial and arrest rates.[94] In what makes up the second part of this chapter, I examine further the disproportionate identification, arrest and conviction rates of minority members of the American population. Current literature commonly objects to familial DNA mapping on the basis that the technique, when combined with solely using information from government databases will increase these disparities we already see. In response to this objection, I counter argue that by expanding access to the information housed in private databases we will be able to equalize the genetic information playing field as these databases mostly contain profiles from white members of the population.

Of course, it is common for new technologies to be met with apprehension, especially when they are put in the hands of those with power such as police and other law enforcement. Without a complete understanding of the possible consequences of new technologies and techniques, there is potential for misuse and injustice. Societal and academic debate surrounding these issues forces us to take a close look at the dangers and positive possibilities that may coexist. This debate encourages critical examination of these techniques and highlights the necessity for comprehensive regulation and transparency.

On one hand, law enforcement officials give clear arguments in favor of familial DNA mapping techniques in general and commercial databases in particular as they advocate for

[94] The Sentencing Project. "Report to the United Nations on Racial Disparities in the U.S. Criminal Justice System," March 2018. https://www.sentencingproject.org/publications/un-report-on-racial-disparities/, 6.

continued or increased access to techniques that will help them do their job. The more concrete benefits that can be articulated by law enforcement in favor of these techniques (as opposed to the more difficult to pinpoint liberal rights arguments against that were addressed in the previous chapter) frequently aid their efforts in maintaining their access to new and controversial forensic methods.[95] While those in favor of the technique can point to statistics and notorious cases that were finally solved with this technique to support their position, those against the practice have the more difficult task of articulating just exactly how privacy or other values are endangered.

Law enforcement personnel have been able to harness a great number of scientific and technological advancements which have increased their ability to solve crimes. With a better understanding of the unique nature of fingerprints came fingerprinting techniques that are now widely considered to be standard police procedure and trustworthy ways to confirm the placement of a suspect at a crime scene. Similarly, when scientists became able to analyze DNA, law enforcement began using discarded pieces of DNA evidence such as hair, blood, and other biological remnants to identify and convict perpetrators of crimes. All current and future advancements in science and technology give investigators the power to identify more suspects and convict at a higher level of certainty. An increased ability to solve crime (combined with higher levels of certainty) is a good thing as it increases security, decreases crime, and achieves a greater degree of justice in our communities, our country, and the world at large.

It is clear that there are strong arguments for allowing police access to already established commercial DNA databases composed of voluntary submissions based on consequentialist ideals: by employing these techniques, the potential results could be widely beneficial to solving

[95] Mark A. Rothstein and Meghan K. Talbott, "The Expanding Use of DNA in Law Enforcement: What Role for Privacy?" *The Journal of Law, Medicine & Ethics* 34, no. 2 (June 1, 2006): 153–64, https://doi.org/10.1111/j.1748-720X.2006.00024.x.

crime and increasing security in our communities. In what follows next, I will examine two arguments with philosophical roots: the utilitarian argument and social justice argument that would seem to allow, and even advocate for increased access to these databases. Furthermore, there may be a strong utilitarian argument that would argue that there is a strong moral reasoning, or even an obligation, for individuals to individually allow police access to their genetic information in the case that commercials provide a choice or opportunity to opt out of participation in programs that partner with law enforcement.

The Utilitarian Argument

At the most basic level, utilitarians believe in the maximization of good utility. To evaluate whether a process or action is morally good the utilitarian examines the amount of utility it generates and how much harm it inflicts. By nature, utilitarianism is consequentialist: the only consideration that one should take into account when determining the goodness of an action is the utility that results from it. In other words, utilitarians "reject moral codes or systems that consist of commands or taboos that are based on customs, traditions, or orders given by leaders or supernatural beings," choosing instead to focus solely on the pleasure or utility that is generated by any given action.[96] In other words, this theory contrasts with deontological theories such as Kant's and religious traditions that rely on strict commands that guide behavior. By maximizing happiness and finding the ideal balance of pleasure over pain, utilitarians argue we create the morally right and ideal society.

Applied to commercial familial DNA mapping, a utilitarian approach would look at the good (and perhaps even types of good) that the process generates as well as the negative

[96] Stephen Nathanson, "Act and Rule Utilitarianism," accessed October 13, 2020, https://iep.utm.edu/util-a-r/.

consequences of the technique. In general, it is likely that the utilitarian would look at the process as contributing positively to the overall happiness of a society: there are clear positive benefits to reducing and solving crime that come in the form of preserved life and increasing the overall levels of security -- including the feeling of security -- within a given society. So, there are good initial reasons to think that the utilitarian would think that law enforcement using these techniques is morally good. But very quickly we can see that there are complications. Cost benefit analysis is a central theme in utilitarianism and is used to calculate the actual net good that results from an action. In this analysis, one must weigh both the good and the bad that may result from an action to understand if it maximizes utility and is thus morally permissible. This calculation, however, can become difficult when comparing the plight of one to the pleasure of many or when balancing the utility of a life saved to the cost needed to save it.

For example, consider the cost benefit analysis in the context of committing a crime. A strict utilitarian would evaluate the utility gained by the criminal who commits the crime (presumably a net positive utility for the individual if gone uncaught) equally against the individual(s) who is/are the victim(s) of the crime and presumably incur a net negative utility. Thus, the calculation is complex: one must balance the utility of the victim, the criminal, and society as a whole whose affected utility may come in multiple forms (fear of crime lessens happiness, but resources are needed to investigate crime and pay law enforcement officials--these costs are incurred by all citizens in the form of increased taxes). Similarly, it may not be that in every single case commercial familial DNA mapping is the utility maximizing technique: it may not be the most efficient or the most effective way to track down suspects or generate leads in a case where there are witnesses or fingerprints that would lead to the perpetrator quickly.

One way to get around the complexities of engaging in cost-benefit analysis in every particular case is to draw on a conception of utilitarianism called rule utilitarianism.[97] Rule utilitarians follow the idea that there are general rules that maximize utility and that one should observe those rules instead of focusing on each specific action that may fall under that rule.[98] In other words, rule utilitarians believe that "the rightness or wrongness of a particular action is a function of the correctness of the rule of which it is an instance". Thus, it may be that the particular application of a rule may not result in the maximization of happiness, but to the rule utilitarian, that is to be expected and is morally permissible. The fact that the use of forensic genealogy is not the utility maximizing technique in every instance does not deter the rule utilitarian and would not serve as a strong argument against the use of the technique. For the rule utilitarian, because it still holds that as a widely applied rule allowing the use of the technique will generate a substantial amount of good, it is morally permissible.

When applied to DNA databases and familial DNA searching, then, the calculus is this: is the cost of using and maintaining private DNA databases greater than or less than the utility derived from solving crimes using these resources? The actual dollar amount of using these resources is unclear and may change from company to company or over time. Private companies typically charge law enforcement a fee for using their services-- as law enforcement agencies do not have the resources or training to themselves perform complex DNA analysis and comparison. Moreover, because they are using information that companies themselves have control over, this service is outsourced to a company like GEDMatch or an associated laboratory like Parabon NanoLabs. As the business grows and more labs pop up, the free market will regulate what this

[97] Hooker, Brad. "Rule Consequentialism." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta, Winter 2016. Metaphysics Research Lab, Stanford University, 2016. https://plato.stanford.edu/archives/win2016/entries/consequentialism-rule/.
[98] Nathanson, "Act and Rule Utilitarianism."

dollar amount is, but ultimately taxpayer dollars will go towards these services if they are utilized in the same way that taxpayer dollars go towards paying the salaries of police officers or to buying new equipment for a precinct.

There are further cost considerations to be made when thinking about an individual who is contributing their genetic information to private DNA databases. After all, in order for these databases to be useful to law enforcement, there must be a significant number of genetic profiles in a system to compare a sample to in order for it to be useful for an investigation. In the past, sites such as GEDMatch or Family Tree DNA have sold services similar to 23andMe or Ancestry DNA: by paying a fee to have one's DNA collected and analyzed, one receives information about heritage, familial connections to others, or perhaps health and wellness information. In the specific cases of GEDMatch and Family Tree DNA -- the most prominent cooperators with law enforcement -- individuals can submit a DNA profile that has already been analyzed by a different third party (such as AncestryDNA) in order to expand their likelihood of finding a long lost relative or receiving new information about one's health.

When you choose to buy these services, you incur no additional financial cost by opting in to having your genetic information accessed by law enforcement (i.e., you are not charged more for opting into these services). Furthermore, there are rarely other additional costs such as inconvenience. In the unlikely case that your DNA is a partial match to DNA found at a crime scene, you would almost never be contacted and instead, your genetic information is used only to construct a family tree which would be used to identify the individual who the original sample belongs to. In other words, if you are found to be a partial match, you may just be an additional clue that helps construct a family tree.

For example, if you are found to be a partial match to a sample that was found at a crime scene, scientists would begin by estimating your degree of separation on a family tree based on the number of similarities in the two samples.[99] Depending on the degree of genetic similarity, the geneticist would estimate your proximity in relationship. Then, for example using any other matches that may have been identified (ideally one from a separate, but intersecting family tree, investigators would look at a point of overlap and narrow down possible suspects from there. The vast majority of the time you would never be the wiser that your information actually helped identify a suspect.

If your DNA is indeed a partial match, you should not be considered a suspect and thus would not incur the cost of facing investigation as investigators are looking to identify an exact, not parietal match. At this point in time, there have been no cases where law enforcement has identified an exact match through a commercial database search. Regulations discussed in the solution chapter of this thesis should ensure that samples identified at the scene of the crime and later used to identify suspects have a high probability of belonging to the perpetrator himself and not an innocent individual who may have come in contact with the victim or the scene. Assuming all these regulations are followed, and law enforcement is ethically using the technique, false identifications that impose undue burdens on innocent individuals should be avoided.

Asking for assistance in constructing a family tree to generate suspects from those identified in a search would not be an attractive option, unless as a last resort option, for most

[99] While this writing does not delve into the scientific specifics of familial searches or partial match searches, in general it can be understood that a higher number of matching alleles (or variations of genes) indicates a closer familial relationship. While this is subject to a certain degree of variability and randomness (i.e., not all siblings or third cousins share the same number of alleles), scientists are able to accurately estimate how closely the two samples are related with a great degree of accuracy. For a more in depth explanation of the science behind the process, see Bieber, Frederick R., Charles H. Brenner, and David Lazer. "Finding Criminals through DNA of Their Relatives." *Science*312, no. 5778 (2006): 1315–16.

investigators. By asking for assistance, investigators risk tipping off a suspect by alerting a family member that they are on the trail of the criminal. In this unlikely event however, the greatest cost you incur is the time and perhaps stress that is involved with undergoing questioning or assisting law enforcement. This is a cost that many witnesses or leads must accept during the course of an investigation. As detectives follow the path of an investigation, they are oftentimes required to interview many people who end up not being involved whatsoever in a crime, but who are able to provide valuable information that ends up leading eventually to the perpetrator. Thus, while we can see this circumstance as a potential cost incurred if you opt into law enforcement accessing your DNA during the course of using another service, it is not an excessive cost that can be considered a significant deterrent and reason to opt out. It is hard to imagine that anyone would consider this kind of cost too great to impose upon any individual: if we did, it is unlikely that any investigations could go very far or that very few would be solvable, resulting in increased crime.

In this way, we can see that the costs of opting into these services are not high enough to justify an individual choosing to opt out. Thus, on these grounds, an individual ought to opt into law enforcement access to their genetic information. To take things one step further, we could argue that an individual ought to choose services such as GEDMatch or Family Tree DNA who cooperate with law enforcement rather than other services that advertise an unwillingness to cooperate. All else being equal in terms of cost and quality of service, there is no significant difference in cost associated with choosing a company who does work with law enforcement compared to choosing one that does not comply with working with law enforcement. Assuming you can receive the service at the same cost and quality, you incur no additional costs that should prevent you from choosing these services by choosing a cooperating company over a non-

cooperating company. Of course, there may be instances in which cooperating companies do not provide the services a customer is looking for which pushes the customer to a different, non-cooperating company. These are instances when choosing a non-cooperating company is morally permissible but again, all else equal, one ought to choose cooperation over non-cooperation to maximize utility.

We must consider the price we assign to catching criminals, preventing further crime, and delivering justice. These are all intangible, and to some degree, invaluable, ideals. While companies and the U.S. government have tried to assign a monetary value to life when running cost-benefit analysis (typically arriving at $200,000 dollars per life), many individuals balk at the idea of prescribing a price tag to a human life.[100] To the potential future victim and their families, to assign a cost in order to prevent a crime from happening to them is an infeasible idea, and perhaps even an unethical one. In order to assign a value to a life saved or crime prevented, one must ask an individual "how much would you pay in order to prevent being the victim of a violent crime?" When thought of in this way, there seems to be something fundamentally wrong, something fundamentally inhumane about asking someone to assign a value to their life or well-being. There might even be something even worse in assigning that value for them in order to make the accurate calculation the utilitarian needs.

However, the entire framework of utilitarianism and the calculus needed to evaluate an action from a utilitarian point of view falls apart if we assign infinite value to every life saved or crime avoided. For this reason, it may be that we have to settle on the idea that there is a calculable value to human life, and substantial benefit to preserving said life and preventing violent crimes such as rape and murder. Furthermore, there benefits not only to the individual

[100] Sandel, *Justice : What's the Right Thing to Do?*

whose life is protected but also benefits to society as a whole. There is certainly greater overall happiness in a society in which individuals can feel confident that crimes will be solved and criminals will be apprehended. Thus, the benefits incurred unto society from justice exists on both the individual and societal level.

On the individual level, those whose genetic information is used to identify a suspect and convict a criminal actually report feeling good about being able to help bring a criminal to justice. Brandy Jennings, whose genetic information had been uploaded to GEDMatch for genealogical purposes and then later used to solve a murder from 1979, said she felt positive about making a contribution, albeit unknowingly, to solving the murder.[101] When asked about how she felt about her role in solving the crime and her genetic information leading to her second cousin behind bars she said: "I feel OK about it … I want someone to have to do time if [he/she] did something like that."[102] In another interview Jennings expressed even stronger positive feelings, saying "I'm really glad I did it … I can't imagine being the family and not knowing for 39 years what happened."[103] One of GEDMatch's co-founders, Curtis Rogers, reported that he frequently received emails from individuals looking to post their profile to GEDMatch "so they can assist in catching criminals, including those who might be family members, so that any unsolved cases can be solved, and families involved can get closure."[104] Because they are contributing to a victim or family finding peace and bringing a perpetrator to

[101] Murphy, Heather. "Sooner or Later Your Cousin's DNA Is Going to Solve a Murder." *The New York Times*, April 25, 2019, sec. U.S. https://www.nytimes.com/2019/04/25/us/golden-state-killer-dna.html.
[102] Mehaffey, Trish. "Distant Relative Learns Her DNA Led to Arrest in Michelle Martinko Slaying." *The Gazette*, March 22, 2019. https://www.thegazette.com/subject/news/public-safety/distant-relative-brandie-jennings-learns-her-dna-led-to-arrest-in-michelle-martinko-slaying-jerry-lynn-burns-20190322.
[103] Mike Benner, "Vancouver Woman Surprised to Learn Her DNA Helped Identify Suspect in 1979 Iowa Murder," *Kgw.Com*, March 27, 2019, https://www.kgw.com/article/news/crime/vancouver-woman-surprised-to-learn-her-dna-helped-identify-suspect-in-1979-iowa-murder/283-cbe7a16e-6dd4-4429-b7bb-c12bb68d0d6f.
[104] Lageson, Sarah Esther. "Privacy Concerns Don't Stop People from Putting Their DNA on the Internet to Help Solve Crimes." *The Conversation*, June 7, 2019. http://theconversation.com/privacy-concerns-dont-stop-people-from-putting-their-dna-on-the-internet-to-help-solve-crimes-118091.

justice, it is understandable that individuals feel positively about being able to assist in an investigation. Thus, the individual utility incurred by allowing access to your genetic information can potentially lead to a substantial amount of personal happiness or satisfaction if you are the one to lead investigators to apprehending a violent criminal.

Most importantly, catching a criminal will ultimately add to the utility of society as a whole, especially in the case of repeat offenders and violent criminals. When resources are dedicated to catching a criminal, you prevent that criminal from continuing a life in society where they are able to commit that crime again and lessen the happiness of others. Allowed to exist without facing justice, criminals may continue to pose a threat to society and risk lessening utility by inflicting harm upon others. This concept is especially prevalent in the area of violent crimes which are the focus of commercial forensic genealogy today. The United States remains locked in a cycle of recidivism, the pattern of re-offense after committing one or more crimes.[105] Catching a criminal early makes reoffending harder "for disruption of a criminal career earlier in its cycle … can prevent future victimization and associated costs to both the individual and society".[106]

Joseph DeAngelo, the Golden State Killer, showed chronic recidivism and criminal escalation. While his first reported crimes were initially burglary and peeping, he escalated to eventually stalking, raping, and killing his victims, a phenomenon common among serial killers

[105] It should be noted that institutional factors are likely the largest factors for high recidivism rates and that our current criminal justice system does very little to encourage rehabilitation, which subsequently can encourage recidivism. It is not my opinion that this technique will solve the recidivism problem that plagues the United States, but rather that this tool is being used frequently to solve heinous crimes from otherwise repeat offenders. Interrupting this cycle and protecting would-be victims increases the security of a community.
[106] Ray A. Wickenheiser, "Forensic Genealogy, Bioethics and the Golden State Killer Case," *Forensic Science International: Synergy* 1 (January 1, 2019), 115, https://doi.org/10.1016/j.fsisyn.2019.07.003.

and rapists.[107] Before all of his crimes were linked, Joseph DeAngelo committed so many crimes in different locales that he had two other names: the East Area Rapist and the Night Stalker.[108] These two facts combined paint a clear picture of frequently observed patterns of crime in violent criminals generally and serial killers specifically. While the United States' high rates of recidivism point to a more general problem of effective rehabilitation in jail and limited prospects for released criminals after they've served time that is also in need of addressing, this pattern also points to potential opportunities for early apprehension and prevention of future crime if correctly addressed. Thus, the benefits incurred by stopping a repeat offender are substantial: by halting a cycle of recidivism, one is able to prevent future harm and increase security in their community.

Ideally, a criminal would be stopped before they commit any crimes at all, or at least advance from petty crimes to violent ones in order to maximize overall utility. However, when this is not possible it is clear that stopping a criminal from committing further crimes or escalating further than they already have is in the best interest of society. In the case of the Golden State Killer and other serial killers and rapists, a lack of credible leads during the time of their crime sprees meant that police were unable to apprehend and prevent them from committing further crimes and inflicting more pain on future victims. The tools that led to their eventual identification, capture, and arrest could have been instrumental to stopping their crimes. Furthermore, it may be that the use of familial DNA mapping techniques which are at this point in time only used in investigation of violent crimes, are only justified in solving violent crimes.

---

[107] Jill Sederstrom, "The Predator Lurking Outside: The Dangerous Training Ground Where Many Prolific Serial Killers Get Their Start," Oxygen Official Site, August 20, 2019, https://www.oxygen.com/martinis-murder/why-peeping-toms-escalate-serial-killers-like-ted-bundy-btk.
[108] Jeva Lange, "Michelle McNamara's Tantalizing Roadmap for Finding a Long Lost Serial Killer," *The Week*, March 19, 2018, https://theweek.com/articles/761206/michelle-mcnamaras-tantalizing-roadmap-finding-long-lost-serial-killer.

Familial DNA mapping takes considerable time, effort, and outside investigation and is not necessarily a straightforward technique that should be used to identify every petty criminal. Because of the associated higher cost to investigators in using these techniques it may be that a utilitarian cost benefit analysis does justify the use of this technique only in pursuit of violent criminals.

When utilitarians address the idea of crime control, they would argue that "resources should be devoted to crime prevention only up to the point at which the marginal cost of prevention equals the marginal cost of the crime prevented."[109] In other words, utilitarians argue that there is a point in which solving or preventing crime no longer adds as much utility to society as it costs to solve or prevent it. Where exactly this "breakeven" point would be is unclear and likely depends on the wealth of the nation, the prevalence of crime, and the impact of crime on one's ability to lead a happy life.

A personal assessment on the benefit of catching a crime is likely to differ among individuals. When one is the victim of a crime, this "breakeven" point (the point in which solving or preventing crime no longer adds as much utility to society as it costs to solve or prevent it) may be very high. If I, or someone I love, is the victim of a violent crime, I would want law enforcement to do everything they could, devote any resource available, to solve the crime and catch the perpetrator. In crime shows you often hear investigators tell families "we're going to do everything we can to catch this guy", knowing that that is what families of victims or victims themselves expect in order to receive justice.

A utilitarian would balk at such a proposition: in a calculation of utility, it would likely be morally impermissible to devote every resource or do "everything we can" to catch a criminal.

[109] Louis Michael Seidman, "Soldiers, Martyrs, and Criminals: Utilitarian Theory and the Problem of Crime Control," *The Yale Law Journal* 94, no. 2 (1984), 316, https://doi.org/10.2307/796227.

However, these statements should not be taken literally as it is unlikely that a law enforcement team would ever have the willingness or ability to devote every single resource, for an extended period of time to catch a criminal. We see this in the mere existence of cold cases: if law enforcement was willing and/or able to devote an unlimited amount of time and resources to solving any given crime, no case would ever be cold and every case would be continually investigated even in the face of a lack of leads or a small probability of catching the perpetrator. Thus, it is clear that there is no real-life situation in which unlimited resources will be committed to solving a crime or catching a criminal. It may be that there is, from a utilitarian perspective, waste or inefficiency in our criminal justice system. Some cases may be investigated past the point of maximizing utility for a society and others under investigated. Media attention and public pressure may push law enforcement to devote more resources than a utilitarian would recommend to high profile cases while neglecting others. To the extent that this occurs, genetic genealogy should hopefully serve as a tool to better aid investigators in dedicating even more resources to a case by providing effective leads.

After a crime is solved, utilitarian reasoning can also be applied to punishments. The utilitarian would use the following standard to determine punishments whether punishment, and in what degree, is justifiable:

> If punishing an offender would most likely produce the greatest balance of happiness over unhappiness compared with the other available options (not taking any action, publicly denouncing the offender, etc.), then the punishment is justified. If another available option would produce a greater balance of happiness over unhappiness, then that option should be chosen, and punishment is unjustified.[110]

[110] Kevin Murtagh, "Punishment," in *Internet Encyclopedia of Philosophy*, accessed October 6, 2020, https://iep.utm.edu/punishme/.

Because it is clear that crime creates unhappiness, the prevention and reduction of crime is an obvious concern of the utilitarian. Punishment, from the utilitarian point of view is thought to reduce crime by deterring crime in the future, by incapacitating criminals from continuing to commit crime (i.e., by putting them in prisons where they are unable to inflict further pain on the rest of society), and by rehabilitating criminals so that when they reenter society, they are no longer likely to commit crime.[111]

It may be that seeing a violent criminal punished brings happiness or at the very least satisfaction to a community. Large groups of people gathered outside of the jail where notorious serial killer and rapist Ted Bundy lived his last days, barbecuing and celebrating his upcoming execution. This is an extreme, and perhaps a little barbaric, example of "happiness" that can be felt from seeing a criminal face punishment. In some, difficult to label form, society enjoys, or gains utility, from seeing criminals convicted of heinous crimes finally be punished for their wrongs.

There is an additional consideration about the crimes that are being solved (or attempted to be solved) are cold cases. With respect to investigations that forensic genealogy has been famously been used for, this technique has been a sort of "last resort" method of generating and investigating leads. It has become a method for solving cold cases, cases that have had no leads or progress for many years. In the case of the Golden State Killer, DeAngelo was not caught until 30 years after his reign of terror ceased. By that time, DeAngelo, 72 at the time of his arrest likely no longer posed a threat to society. Thus, would a utilitarian believe that the capture and conviction of a criminal who was no longer committing crimes really provided a net positive utility to society? I believe they would. The capture of this prolific serial killer provided a sense

[111] Murtagh.

of closure to DeAngelo's many victims and to the communities that had lived in fear of DeAngelo's potential return. Furthermore, by finding and charging DeAngelo, investigators may have succeeded in deterring other serial criminals.

Deterrence of crime through punishment is a complicated issue in itself, but research shows that it is the certainty of apprehension and punishment, and not the degree of punishment itself that deters crime.[112] Thus, we can see that giving law enforcement more techniques for criminal apprehension is likely to deter other criminals. By spotlighting these techniques, the cold crimes that have been solved, and the criminals who were apprehended because of these techniques, law enforcement may be able to deter future serial criminals. A criminal may look at the high number of cold cases and think "if all those criminals could get away with it, so can I". Solving these crimes through forensic genealogy dispels this myth and deters crime.

Proposing a Universal Database

Some scholars have advocated for the use of a universal, government run database instead of separate criminal and commercial databases. While the merits and reasoning of this idea will be explored more fully in the following section of this chapter on social justice, a brief utilitarian examination is worthwhile here. This database would include the information of every citizen, making familial DNA mapping a non-issue as direct matches to any citizen would be possible. However, the costs of achieving this universal database would be incredibly high, both in actual dollar amount and in a more intangible sense. In its favor, a universal database would maximize equality as no group of people would be disproportionately represented like in the federal databases we see now. However, the costs of achieving this universal database would be

[112] "Five Things About Deterrence." United States Department of Justice National Institute of Justice, May 2016, 1.

incredibly high, both in actual dollar amount and in a more intangible sense. The cost of collecting DNA from all of the 328 million people living in the United States today as well as every individual going forward would be astronomical. Furthermore, the creation of the infrastructure needed to analyze and sustain this system would be great as well.

Beyond the tangible costs, the costs to the government to legitimize and dissuade fear in the American people would be substantial. Already some people see governmental access to criminal's DNA as a potentially dangerous infringement on privacy and civil liberties. Ingrained in the American psyche is a fear of government overreach and encroachment into one's private lives. Articles like those titled "Beware! Uncle Sam has your DNA" begin by conveying a fundamental fear of the government becoming Big Brother-esque.[113] Thus, the costs to overcome this fear, legitimize a universal database, and actually implement it would likely be insurmountably high. No matter how great the benefits of catching criminals, it is unlikely that the utilitarian would view the costs incurred to outweigh the benefits acquired.

Applying Peter Singer's Perspective

I have argued that the use of private databases in law enforcement is justified on utilitarian grounds. I also believe that there are utilitarian reasons to set aside fears about government access. Although the costs of overcoming these fears on a large scale are too high, they are not too high on the individual level. So, what should we, as individuals, do? Here, my argument appeals to Peter Singer, a utilitarian who specializes in applied ethics. He promotes the idea that "if it is in our power to prevent something bad from happening, without thereby

[113] Marcia J Weiss, "Beware! Uncle Sam Has Your DNA: Legal Fallout from Its Use and Misuse in the U.S," *Ethics and Information Technology* 6, no. 1 (2004): 55–63, https://doi.org/10.1023/B:ETIN.0000036159.90081.cc.

sacrificing anything morally significant, we ought, morally, to do it."[114] In other words, if we can prevent something very bad from happening, at what is essentially no cost to ourselves, we are morally obligated to do so. Singer uses the example of passing a drowning child in a puddle during a walk: as you are already close by and because saving the drowning child will not require you to sacrifice, comparably, very much, you ought to save the child.

As we have explored earlier, the potential good that can be done by allowing police enforcement access to one's genetic information is great. If you are able to assist in catching, for example, a violent, serial criminal, you have done a large amount of good by taking this criminal out of society and preventing them from inflicting further harm to others. Conversely, we have established that the costs to opting into these programs is almost negligible. It costs you nothing monetarily to participate when you are already employing these services. It also costs you very little in time or stress if your genetic information is used to construct a family tree that leads to the apprehension of a criminal. Thus, because we can see that the costs to opting in are low and the potential good that can be done is great, an individual ought to grant access to genetic information. To do so would be to pass up a uniquely low-cost way to provide a tremendous amount of good not only to the victim of a violent crime, but to society as a whole.

Based on these considerations, we can see how from a utilitarian point of view, familial DNA mapping by private companies is the best option to maximize utility. By using private companies, costs will be substantially lower than the costs needed to build and operate a universal national DNA database. Furthermore, benefits to society in the form of increased safety and lower crime will be delivered by using these private databases that would otherwise be withheld if private companies were prevented from offering these services in tandem with

[114] Peter Singer, "Famine, Affluence, and Morality," *Philosophy & Public Affairs* 1, no. 3 (1972), 235.

genealogical services that they are typically used for. Because we ought to do things that incur only a small cost but also lead to a large amount of good, we can see that individually we ought to allow access to our genetic information, and on a societal level we should allow law enforcement to continue to use these databases to identify criminals in order to maximize utility.

Thus, there is a utilitarian argument at the level of the individual and the societal and company level. There is a strong moral argument for individual opting into these services. There is an additional strong utilitarian argument for continued law enforcement access to these databases. By opting in you are able to maximize your opportunity to contribute positively to society by helping solve a crime. By allowing law enforcement access to these databases, they are able to widen their pool of potential leads and solve more crimes, increasing security and happiness in their communities.

After addressing the utilitarian argument and arguing for the use of this technique on utilitarian grounds, I move now to examine a social justice perspective on the issue.

The Social Justice Argument

Unequal Representation, Unequal Identification

As I caveated in the introduction to my piece, a great deal of the literature on genetic genealogy was written when the process was limited to the information stored in government DNA databases. In these pieces, a common objection to the technique draws on a social justice argument. Current racial disparities that exist in government DNA databases impacts the pool of potential suspects when investigators search for matches.[115] In the United States, members of minority groups are disproportionately arrested and convicted of crimes, both petty and

[115] Frederick R. Bieber, Charles H. Brenner, and David Lazer, "Finding Criminals through DNA of Their Relatives," *Science* 312, no. 5778 (2006), 1316.

serious.[116] These long-standing racial disparities in our justice system are then replicated in who is represented in the national government DNA database (CODIS) and state-level databases. Thus, if we allow familial DNA matching practices but limit the practice to searching only government databases, this trend of disproportionate incarceration will continue.

While the criteria of admission to DNA databases varies from state to state, felony conviction is the most common reason for collection: all but three states (Idaho, Nebraska, and New Hampshire) require DNA collection in all felony conviction cases.[117] As Greely et al. note in their examination of the practice of partial matching and familial DNA mapping, African Americans make up around thirteen percent of the population of the United States; however, they comprise over forty percent of people convicted of felonies.[118] Thus, we can see that African Americans are convicted at a higher rate than whites for a crime that all but guarantees admission to a government DNA database. This will certainly lead to their disproportionate representation in databases like CODIS. This statistic has been replicated in the composition of DNA databases: while only 13% of the American population is black, 34.47% of the samples in government DNA databases are from black individuals.[119] More generally, Greely et. al. note that "the set of individuals in the Offender Index is not racially neutral with regard to the American population."[120] When the pool of suspects that investigators can pull from is not racially neutral, those future criminals that they are able to identify and arrest will also not be racially neutral. A

[116] Ashley Nellis, "The Color of Justice: Racial and Ethnic Disparity in State Prisons" (Washington, D.C.: The Sentencing Project), accessed November 9, 2020, https://www.sentencingproject.org/publications/color-of-justice-racial-and-ethnic-disparity-in-state-prisons/.
[117] Sarah B. Berson, "Debating DNA Collection," *NIJ Journal*, November 2009, 10, https://doi.org/10.1037/e513962010-003.
[118] Henry T. Greely et al., "Family Ties: The Use of DNA Offender Databases to Catch Offenders' Kin Symposium Article - Part I," *Journal of Law, Medicine and Ethics*, no. 2 (2006): 248–62.
[119] Erin Murphy and Jun Tong, "The Racial Composition of Forensic DNA Databases," *California Law Review* 108 (August 8, 2019), 63, https://doi.org/10.2139/ssrn.3477974.
[120] Greely et al., "Family Ties: The Use of DNA Offender Databases to Catch Offenders' Kin Symposium Article - Part I," 258.

source pool that is already an inaccurate representation of the entirety of the American gene pool is likely to continue the overrepresentation of African Americans and other minorities in the prison system. Inequity as a result of a criminal justice system that has been shown to have deep racial bias is increased by new techniques like familial DNA databases that are based on existing systems.

By using government databases whose sample makeup is an inaccurate representation of the racial makeup of the United States, individuals fear that familial DNA mapping and genetic genealogy will create "a self-reinforcing picture of who's involved in crime in our country."[121] In this way, a cycle of incarceration within minority communities that is already visible *without* the use of familial DNA mapping techniques will be exacerbated by implementing this tool with government run DNA databases. This concern is troubling for all minorities who are across the board disproportionately represented in our criminal justice system and DNA databases but this disproportionate burden is especially concentrated on the black population.[122] In a comprehensive study on the racial makeup of forensic DNA databases, Murphy and Tong estimate that "2.26% of the black population has their DNA collected per year, whereas only 1.21% of all non-white persons have their DNA collected within that same year."[123] All of this is to say that the biases that have been well documented in our criminal justice system spill over into government run DNA databases.

A less apparent but similarly troubling concern for minorities exists in the Hispanic community in particular. Daniel Grimm notes that that "Under familial testing, Hispanics will be more likely than other demographic groups to be added to the databank system, more likely to

[121] Michael B Field et al., "Study of Familial DNA Searching Policies and Practices: Case Study Brief Series," no. 2013 (n.d.), 41.
[122] Murphy and Tong, "The Racial Composition of Forensic DNA Databases," 5.
[123] Murphy and Tong, 5.

partially match a sample once it is added to the database, and, therefore, will be more likely to be targeted by law enforcement for DNA sample collection."[124] He explains that this is a result of two factors: disproportionately high arrest and conviction rates and subsequent overrepresentation in DNA databases and higher birth rates in the Hispanic community that create larger family trees to be matched to and explored. According to calculations done by Grimm, Hispanics would be exposed to a risk of genetic surveillance approximately 3% higher than whites and 2% higher than African Americans after two generations and 5% more than African Americans and 8% more than whites after three generations.[125] A larger family tree, like the one Grimm suggests exists within Hispanic communities as a result of higher birth rates, means that there are more possible connection points to a criminal that police are looking to identify. This coupled with higher rates of incarceration in comparison to White citizens means that more individuals can be identified from just one sample obtained by law enforcement at a crime scene.

It is clear that the concerns raised by Grimm and others are valid ones: while the history of inequity in our criminal justice system is long and complex, the current disparities that exist at a number of levels are a major area of reform for many social justice advocates. It is clear that a familial DNA process that relies on information stored in federal, state and local databases will do little to help the current disparities and instead make them worse. However, these same concerns do not apply to the case of commercial DNA databases. In fact, this argument that is typically made in opposition to the expansion of forensic genealogy serves better as an argument

[124] Daniel J. Grimm, "The Demographics of Genetic Surveillance: Familial DNA Testing and the Hispanic Community Note," *Columbia Law Review* 107, no. 5 (2007), 1166.
[125] Grimm, 1182.

for familial DNA mapping using commercial databases. This is due to the starkly different racial makeup of private DNA databases.

The use of private databases through companies such as GEDMatch and Family Tree DNA serve as one potential way to equalize the type of genetic information that is being accessed. This could lead to less pronounced disparities in our criminal justice system like we see now. While government databases overrepresent minorities, private companies who offer other genealogy services are typically dominated by white users. For example, 75% of users on GED Match and other similar genealogy websites are from Northern European heritage.[126] European Americans are the largest consumers of direct-to-consumer DNA tests and research has suggested that over half of white Americans can already be located with the profiles accessible today.[127,128] This means that increasing the access to and use of these pools of DNA will expand and hopefully equalize those individuals represented. Bioethicist Malia Fullerton of the University of Washington have observed that expanding access to these data pools certainly begins to equalize the playing field: "This is giving law enforcement access to this category of individuals that, prior to this, was immune to surveillance."[129]

Another way this practice will contribute to social and criminal justice is through the process of exonerations. In 2019, Christopher Tapp became the first person to be exonerated for

---

[126] Heather Murphy, "Most White Americans' DNA Can Be Identified Through Genealogy Databases," *The New York Times*, October 11, 2018, sec. Science, https://www.nytimes.com/2018/10/11/science/science-genetic-genealogy-study.html.
[127] Nsikan Akpan, "DNA Ancestry Searches Can Now Identify Most White Americans. Here's Why That's Legally Questionable," *PBS NewsHour*, October 12, 2018, sec. Science, https://www.pbs.org/newshour/science/dna-ancestry-searches-can-now-identify-most-white-americans-heres-why-thats-legally-questionable.
[128] Erlich, Yaniv, Tal Shor, Itsik Pe'er, and Shai Carmi. "Identity Inference of Genomic Data Using Long-Range Familial Searches." *Science* 362, no. 6415 (November 9, 2018), 690. https://doi.org/10.1126/science.aau4832.
[129] Laura Hautala, "How Sharing Your DNA Solves Horrible Crimes... and Stirs a Privacy Debate," *CNET*, July 2, 2019, https://www.cnet.com/news/how-sharing-your-dna-solves-horrible-crimes-and-stirs-a-privacy-debate/.

a crime as a result of genealogical DNA evidence.[130] After more than 22 years of prosecution and imprisonment for the 1996 rape and murder of an 18-year-old girl that rested heavily on a coerced confession, genealogical DNA evidence not only proved that Tapp was not the perpetrator, but identified the actual perpetrator, Brian Dripps. From this example and second exoneration in 2019 that used familial DNA mapping, we can see that allowing access to private DNA databases also increases the possibility of overturning wrongful convictions. Not only have there been cases of apprehension and conviction of perpetrators of violent crime by using services such as GEDMatch and Family Tree DNA, but also cases of exoneration. Historically, advancements in DNA technology and its uses in forensics have led to overturning and increased number of wrongful convictions, with over 350 wrongful convictions overturned between 1990 and 2016 thanks to DNA evidence.[131] While not all of these wrongful convictions fell along racial lines or were the product of a racist investigation, it is clear that a number of wrongful convictions and wrongful investigations *did* occur because of a criminal justice system still fraught with racism. As minorities are more likely to fall victim to false convictions because of racism in the American criminal justice system, they will hopefully benefit the most from exonerations that genetic genealogy can provide. Although our eventual goal, of course, should be to get rid of racism in our criminal justice system entirely instead of relying on the overturning of wrongful convictions, it cannot be argued that DNA exonerations do not advance justice in our society. These typical exonerations by using DNA evidence can be augmented with the tools that familial DNA mapping can provide. This is good not only for justice as a whole,

[130] Innocence Staff, "DNA Testing Identifies Actual Perpetrator in 1996 Idaho Falls Rape and Murder, Confirming Christopher Tapp's Innocence," *Innocence Project*, July 17, 2019, https://www.innocenceproject.org/christopher-tapp-exoneration/.
[131] "DNA's Revolutionary Role in Freeing the Innocent in the U.S.," Innocence Project, April 18, 2018, https://www.innocenceproject.org/dna-revolutionary-role-freedom/.

but also provides additional methods for overturning convictions that may have been impacted by racial bias.

This is not a comprehensive fix to the problems we see in our criminal justice system by any means: the crimes that familial DNA mapping is able to help solve is a small percentage of all prosecuted crimes in any given year. It is clear that larger scale structural changes are needed to correct long-standing injustices, but what is clear is that commercial forensic genealogy will not continue the problems in the way that familial DNA mapping with government databases does. While it is unlikely that catching criminals through forensic genealogy will lead to an evening of information in CODIS, this does not matter if law enforcement continues to have access to information in commercial databases. By preventing access to commercial databases however, policy makers would be protecting a large portion of the population from investigation while continuing the cycle of disproportionate incarceration.

Moral Luck (and Unluck)

Legal scholar Natalie Ram seems to speak at the issue of unfairness or unluck that one individual can be located just because one of their family members' DNA is in a database: criminal or otherwise. In interviews Ram has expressed concern that "Individuals who are not directly a part of a database are findable as a byproduct of biology, and not through any voluntary conduct of their own."[132] This argument seems to suggest that only individuals who voluntarily cooperate with investigations or who's voluntary actions lead to identification and arrest should be caught. By this same logic, investigation techniques that rely on a criminal accidentally leaving a clue behind or who's family members provide any incriminating evidence

[132] Akpan, "DNA Ancestry Searches Can Now Identify Most White Americans. Here's Why That's Legally Questionable."

should not be allowed either. At first glance, and I think after further examination, this argument seems odd.

Thomas Nagel, a prominent philosopher to speak on the issue of Moral Luck expresses the idea that "nothing or almost nothing about what a person does seems to be under his control," in other words, that outside occurrences will always impact our actions and how people perceive them.[133] It is impossible to exist in a world completely isolated from the influence of other independent agents and independent occurrences, thus, to some degree, our actions are always to some degree impacted by others. Nagel also goes on to point out, however, that "it seems irrational to take or dispense credit or blame for matters over which a person has no control, or for their influence on results over which he has partial control."[134] Thus, while Nagel believes that there is no such thing as an action that is completely within one's control as the concept of absolute control does not exist, he simultaneously believes that no one can be held blameworthy for an action that is not within one's complete control.

There are a number of things that are outside of our control, or ways that individuals are "disturbingly subject to luck" as Nagel puts it. (1) Constitutive luck which concerns the kind of person you are outside of the scope of what you deliberately do, (2) luck of circumstance, (3) luck in how an action plays out as a result of prior circumstances, and (4) luck in the way one's actions turn out.[135]

While I am hesitant to label race as a category "luck" or "unluck" for the potentially negative implications that such a label may incur, it is clear that race is an element that is

[133] Thomas Nagel, *Mortal Questions*, Canto Classics (Cambridge: Cambridge University Press, 2012), 27, https://doi.org/10.1017/CBO9781107341050.
[134] Nagel, 28.
[135] Nagel, 28.

outside of one's control. Furthermore, in the specific context of our criminal justice system that has shown clear biases against individuals of color, especially African Americans and Hispanic individuals, it could be said that once an individual has entered the criminal justice system, their race is circumstance outside of their control that will render them more or less lucky. Sentencing disparities indicate that compared to white offenders, African Americans serve more time after entering prison for the same violent crimes and drug crimes.[136] Disparities exist at other levels of the criminal justice process, as we've explored previously, but this is merely a more precise example: at the time of sentencing, one's race is a factor outside of one's control that will impact the length of the sentence imposed. Because of an unjust, racist, criminal justice system, race can unfortunately be seen as a kind of circumstantial luck that impacts the criminal justice system at every stage. I move now to examine the idea of moral luck more generally before examining the specific way that Ram's argument becomes intertwined with race as an element of luck in the case of familial DNA mapping.

Generally, the idea of moral luck says that "that we are morally assessable only to the extent that what we are assessed for depends on factors under our control."[137] In other words, our degree of morality should only be impacted by the things that we can control and that things outside of our control cannot and should not play a part. The corollary to this principle states that

[136] "Same Crime, More Time," *Georgia State University Research Magazine*, April 29, 2020, https://news.gsu.edu/research-magazine/spring2020/incarceration.
[137] Dana K. Nelkin, "Moral Luck," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Summer 2019 (Metaphysics Research Lab, Stanford University, 2019), https://plato.stanford.edu/archives/sum2019/entries/moral-luck/.

"two people ought not to be morally assessed differently if the only other differences between them are due to factors beyond their control."[138]

Take the example of two drivers: both are driving distracted, for example by texting or talking on the phone. Both drivers swerve slightly because of their distracted driving. Only, for one driver there happens to be a person on the side of the road who they strike and injure (or even kill). The other driver merely swerves, corrects his driving, and hopefully puts his phone down for the duration of his trip. Both drivers have committed what is a crime in 48 states but only one has seriously injured or killed another person, and only one will be caught and charged for the crime. This is something outside of their control, they cannot control who is standing where even if they can control their own actions. But the control principle states that these two should not be judged differently because of factors outside of their control. This seems to go against what our legal system, and own moral standards prescribe.

A less extreme but more easily applicable may be this. Two drivers are texting and driving. In one case, a police car is hidden on the side of the road to serve as a speed trap. In the second instance, no police car is present. In the first instance the police officer sees the driver texting at the wheel, pulls the driver over, and issues a citation. In the second instance the driver continues and goes uncaught. The presence of the police officer was certainly unlucky for the first driver and something out of his control. However, if we extend the control principle to this example, we cannot and should not hold the first driver any more accountable than the second driver who gets away with the crime. If the first driver were to

[138] Nelkin.

say to the officer after being pulled over “well there are many other drivers on the road who text and aren’t charged just because your patrol cars aren’t on the streets they are” this would not persuade the officer to not give the driver a ticket.

This is what seems to be the closest analogy to our case here. Natalie Ram, when she complains that some individuals (in fact, criminals) are “findable as a byproduct of biology, and not through any voluntary conduct of their own” seems to be alluding to the argument that is as follows. Two criminals might have committed the same exact crime (say, murder) and police may have located DNA evidence at both crime scenes and progressed through all of the steps of an investigation up until the point of resorting to familial DNA mapping. In one case, the perpetrator’s family member had uploaded their DNA to GEDMatch, and investigators were able to construct a family tree, conduct an outside investigation, and locate the perpetrator. This criminal is arrested, charged, and convicted. In the second case though, no family member of the second criminal uploaded their DNA to a website, or only family members that were too far away in relation to the criminal to be of use uploaded their information. In this case, familial DNA mapping, the investigator’s last hope at generating a suspect, fails and the criminal goes uncaught.

In this situation, whether or not a family member uploaded their DNA to a website like GEDMatch is something that is certainly out of the control of the criminal. The murderer who is caught because of their family member’s decision to upload their DNA and consent to law enforcement accessing it is certainly unlucky in comparison to the murderer whose family does not do the same. By extending the control principle to this situation, it would seem as if because one criminal went uncaught, the other one should not be held responsible for their crime either. I think that when viewed from that lens, the entire premise, and certainly Ram’s argument does

not hold. In the committing of any crime there will be things that happen outside of one's control. The imperfect criminal deserves to be caught just as much as the perfect one, regardless of what circumstances outside of their control may happen during or after the crime. When Ram says that their identification and apprehension occurs because of something their family members did and not because of something they did, this cannot be taken as a serious argument against the process. There may be instances when the interviewing of a family member reveals information that leads to a criminal's arrest. Certainly, it is the case that family member gave the vital clue in this case just as much as when their DNA leads to the criminal, but we do not look at the former case as being unlucky in the way that would mean that we should not hold them morally admissible for their actions like the control principle would suggest.

This argument perhaps becomes more difficult when we consider luck in the racial sense. In the case of government DNA databases whose contained information is racially skewed, the aspect of luck is now more complicated. Luck is no longer contingent on a family member's decision to upload their genetic information to a private DNA database, but rather on a number of factors that leads to criminal apprehension, conviction, and admission to a government database. A dominant factor through all of this will be race. Thus, if we conceive of luck to be circumstances outside of one's control that will lead to different moral evaluation, minorities will become significantly unluckier as they face a higher likelihood of being caught because of a family member's presence in a DNA database.[139] It is clear that this kind of luck is, as Nagel would describe it, disturbing.

[139] This is not to say that any race or family is any more prone to criminal activity than another -- a dangerous and untrue claim to make. What this is to say is that race, family, and genetics are all inherently connected in a way that has damaging consequences when one race is overrepresented in a DNA database.

If we are to go back to our texting and driving analogy then, the description may be this. Two individuals are texting and driving on two different roads. One, who is himself a person of color, drives on a street in a neighborhood whose inhabitants are mostly minority families. The second individual, who is white, is driving on a street that runs through a neighborhood mostly dominated by white-owned households. Now the problem shifts: because of a long history of racism in the criminal justice system as a whole, there are, say, triple the number of cops that patrol the street that runs through the neighborhood in the first town. This means that anyone breaking the law is three times more likely to be pulled over and cited. So, it comes as no surprise that the first driver is pulled over and punished while the second driver, driving through the white community, goes uncaught and continues on his drive without trouble.

This is no longer the same clear-cut case as before: while it may be that the first driver should still be pulled over and given a citation for breaking the law and putting other lives in danger, there is a new element of luck that seems fundamentally more unjust. Before we could chalk up the disparity to random occurrence and while the randomness may be seen as unfair to the driver who is punished while knowing another driver got away with the same thing, our new situation is no longer random. Now we have an outside force that is actively attempting to catch and punish drivers on one road more than they are trying to catch and punish drivers on another road. That is no longer random, it is intentional. The question then is, how to fix this problem of unfairness.

It may be that laws and regulations mean that law enforcement is not able to reduce the number of patrol cars on the road. On the street that goes through the minority community the increased presence of patrol cars increases their effectiveness of catching individuals violating driving laws. If laws do allow for decreasing the number of patrol cars, reducing the number of

patrol cars means a greater level of equality between that street and the street in the white neighborhood. However, it will also mean that a greater number of texters will go uncaught, allowing these drivers to continue to break the law and put people's lives in danger. Either way, it seems as if reducing the number of patrol cars is not the feasible or right solution. Then it seems the logical solution to achieve fairness (barring creative solutions that will not translate out of the hypothetical example into our real-world application) is to increase the number of patrol cars in the white neighborhood and prevent fewer drivers from escaping punishment for the same crime.

To move out of the hypothetical and back into the actual topic of discussion then, the problem and solution is this. Yes, it is true that it is more unfair that minority individuals are "unluckier" in our criminal justice system because of the color of their skin. Yes, it is true that if genetic genealogy techniques are restricted to information in government databases that minorities will become even more unlucky because of their disproportionate representation. However, I do not believe that the solution to this problem of "unluck" as we are conceiving of it here is to completely halt familial DNA mapping entirely. Firstly, I do not believe that we can expect law enforcement to give up a technique that is helping them solve high profile cases and I would not expect Congress or any other legislative body to prevent them from accessing information in CODIS and other government DNA databases for this purpose. Secondly, it is clear that the technique is helping catch violent criminals and solve heinous crimes, something that, regardless of race, is good for society. I then think that our solution should not be to prevent access to information in CODIS, but rather to allow access to DNA databases so that all violent criminals, and not just minority ones, can be found using this technique.

We would not argue that because one goes uncaught by dint of luck that the other should also escape accountability (moral or otherwise). Ram's solution seems to be that we should not use these techniques because of luck or unluck. Rather, I think the solution is to expand access to databases and DNA information to the point whereas few criminals as possible evade detection because of luck, all while balancing other privacy and ethical concerns. Ram's claim that speaks to luck does not hold after critical analysis and should not be a factor of consideration when deciding whether or not law enforcement should have access to different sources of DNA information or if we should continue the practice of familial DNA mapping.

A Universal Database: Maximum Equality?

It is possible that the solution that would be the most equal is a universal government run DNA database. This solution would mean that all citizens, regardless of class, race, or criminal history would be represented in one common database. This solution would certainly treat everyone exactly the same and eliminate any sort of over or underrepresentation of any racial or ethnic group. A universal database would also essentially eliminate the need for familial DNA mapping and some of the ethical considerations that accompany it. If all members of society submit a genetic sample to be kept on file, presumably for the duration of their life or even after their death, investigators would be able to simply search for exact matches instead of constructing elaborate family trees and conducting long investigations. Furthermore, other inefficiencies exist with the process of searching multiple private databases. While investigators may begin by searching databases who actively cooperate with investigators such as GED Match or Family Tree DNA, if these databases yield no credible leads, investigators may attempt to access private DNA databases such as those operated by 23andMe or Ancestry DNA, through authorized or unauthorized means. Searching all of these databases separately is time consuming

and inefficient. CODIS was the solution to this problem of inefficiency in the realm of databases containing criminal and arrestee DNA as the database was formed to centralize disparate databases and assist in investigations that crossed state borders.[140] Establishing a universal database would take another step towards maximum efficiency by creating one central location for all DNA profiles to be found instead of separating them by private and public, criminal and (likely) non-criminal.[141]

It is likely that with the sole purpose of establishing equality across all individuals and achieving universal representation of all citizens, a universal database is the ideal solution. However, the process is not without its faults. We have already explored the large price tag attached to such a database and the societal ramifications of the perception of government overreach. This combined with privacy concerns that will be addressed further in the next chapter means that a universal database would likely be infeasible and/or inadvisable to implement. Therefore, commercially run DNA databases serve as a logical middle ground that ends the current practice of shielding a large portion of the population, white individuals, from discovery during the course of an investigation. It is for that reason that we should look to privately run, commercial DNA services to equalize representation along race and class lines of genetic information to be used in apprehending suspects.

[140] Niedzwiecki, Debus-Sherrill, and Field, "Understanding Familial DNA Searching: Coming to a Consensus on Terminology," 1.
[141] J. W. Hazel et al., "Is It Time for a Universal Genetic Forensic Database?" *Science* 362, no. 6417 (November 23, 2018), 898, https://doi.org/10.1126/science.aav5475.

Conclusion

Throughout the course of this chapter, I have tried to take an in-depth look into the strongest arguments in favor of commercial forensic genealogy. The clear added security benefits are highlighted most readily each time an infamous serial killer like the Golden State Killer is caught and sensationalized in the media. Beyond those individual stories that grip the public's attention, there are indications that genetic genealogy is the next major innovation for forensic teams aiding investigations. This major innovation has the possibility to solve a large number of cases previously considered unsolved, increasing security and overall utility as a result. This utilitarian argument is convincing enough that commercial providers themselves are using advertisements appealing to individuals' capability of being a key piece of the puzzle of solving an investigation.[142] There seem to be overall positive views of the practice so far in the public. A Pew Research study found that 51% of adults who have used private DNA services say that law enforcement use of information in these databases is acceptable.[143] Another study showed even higher numbers: this survey found that 79% of those surveyed supported police searches of genetic websites that identify genetic relatives.[144] These two starkly different numbers make it clear that public opinion on the subject needs to be more fully investigated, however these two relatively high numbers do indicate that individuals place a high value on

[142] Anthony Regalado, "Help Us Catch Killers Is Now the New Advertising Angle for DNA Companies," MIT Technology Review, March 27, 2019, https://www.technologyreview.com/2019/03/27/1194/help-us-catch-killers-is-now-the-new-advertising-angle-for-dna-companies/.
[143] Andrew Perrin, "About Half of Americans Are OK with DNA Testing Companies Sharing User Data with Law Enforcement," *Pew Research Center* (blog), February 4, 2020, https://www.pewresearch.org/fact-tank/2020/02/04/about-half-of-americans-are-ok-with-dna-testing-companies-sharing-user-data-with-law-enforcement/.
[144] Christi J Guerrini et al., "Should Police Have Access to Genetic Genealogy Databases? Capturing the Golden State Killer and Other Criminals Using a Controversial New Forensic Technique," *PLoS Biology* 16, no. 10 (October 2018), 3, https://doi.org/10.1371/journal.pbio.2006906.

increasing security in their community and society, even at the perceived expense of their privacy.

Furthermore, we can see that commercial forensic genealogy evades objections that apply to familial DNA mapping using government databases. Those objections that concern minority overrepresentation in the criminal justice system and the continuance of this pattern by subjecting the families of convicted criminals or other individuals' whose DNA sits in CODIS and other government databases are legitimate ones against familial DNA mapping using CODIS as a source database. However commercial databases have the opposite effect: they eliminate the current shield that has historically protected an entire racial group in the United States. Not only will commercial forensic genealogy even the playing ground between whites and minority groups, but the tool also has the power to exonerate wrongly convicted individuals and right major injustices.

In the next chapter, I will summarize my view of the ethical use of forensic genealogy. In this solution and recommendations chapter, I will make recommendations on the level of political and commercial leaders and at the level of the individual.

Chapter 3: Solutions and Recommendations

Introduction

For the entirety of my thesis thus far I have considered different philosophical perspectives on the problem of forensic genealogy. Liberal rights, communitarianism, social justice, and utilitarianism can all lend insight into whether or not we should continue the use of forensic genealogy. However, it is clear that we are past the point of stopping commercial forensic genealogy in its tracks entirely. It is unlikely that law enforcement will be willing to give up a tool that has already helped solve hundreds of violent crimes. It is also unlikely, given how courts have ruled thus far and how legal scholars have hypothesized they will rule on cases of forensic genealogy in the future, that the Supreme Court will rule evidence garnered through commercial forensic genealogy searches unconstitutional. I do not think this process is going anywhere, nor do I necessarily think it should. It is clear, however; that serious safeguards should be put in place to keep law enforcement and companies in check and to preserve the autonomy and privacy rights of individuals. In this final chapter, I lay out specific recommendations about how all of these parties (commercial leaders, governments that run law enforcement agencies, and individuals themselves) should act.

For the political leaders, it is clear to me that regulations are severely lacking and are creating vulnerabilities. Federal legislation that affects all state and federal law enforcement agencies should be put in place that establishes boundaries on what kind of crimes can be solved with these tools, legal burdens of proof, and harsh penalties for investigators that violate these rules in any number of ways. Further requirements should be put in place to ensure the security of these commercial DNA databases. In an age with increased domestic and international

hacking threats, protecting genetic information should be of the utmost importance and security measures should reflect this importance.

For commercial leaders, I argue that they must implement and uphold comprehensive privacy policies and obtain adequate informed consent. This is no easy task, but I believe that nudges can be ethically implemented to push users in the direction of choosing to allow access while avoiding problems of manipulation. By ethically implementing nudges, we may be able to make privacy statements easier to understand while at the same time achieving a higher level of users who opt in, all while we preserve informed consent. Once again, this will not be easy as individuals tread a thin line when crafting ethical nudges, but I also believe this is achievable and could be very effective in attracting a larger pool of genetic profiles for law enforcement to use.

For individuals, I argue that unless presented with serious reason not to, individuals should choose to allow law enforcement access to your DNA. While the government or commercial entities should not be able to force you to do this, there is significant reason to believe that by creating a large pool of accessible DNA, we will be able to solve a greater number of violent crimes. By doing so, we will be able to increase security and provide justice and closure to victims and their families who may be looking for answers for years or decades.

Finally, I will close with a brief note on other steps that should be taken in the criminal justice system in addition to formalizing access to commercial DNA databases. I have spoken so far under the assumption that arresting a violent criminal increases security and achieves some degree of justice for victims. However, to achieve long term security in the United States, it is clear that our criminal justice system does not do this entirely effectively. An overhaul of our prison system is outside the bounds of this thesis, but I do not want to finish without expressing that justice does not end when a perpetrator has been caught. An increased focus on

rehabilitation, instead of punishment, will do a great deal more to increase security and interrupt cycles of recidivism than simply catching and locking up violent criminals.

For Political and Commercial Leaders

Informed Consent

In their evaluation of forensic genealogy and bioethics in the specific realm of private companies, Ray Wickenheiser agrees that "Individuals have the right to make an autonomous choice to place their DNA in a databank with informed consent to permit a search to develop investigative leads."[145] This is important in the realm of commercial companies because forensic uses are often auxiliary or outside of the initial intended use of a service. Companies like GEDMatch were founded to augment other direct-to-consumer websites and when an individual uploads their information to a site like this, it is typically to utilize these services, not to make their DNA accessible to investigators. As such, these companies face an additional responsibility to inform their users of any and all third parties that may be granted access to their genetic information.

This practice is already typically followed by companies like GEDMatch, however; there is cause for concern. Notification of additional uses is buried in lengthy terms and conditions, which users are already overburdened by and desensitized to.[146] Furthermore, Wickenheiser notes that users can be "their own worst enemy regarding dissemination of their own information, often permitting very wide access beyond what they imagine the true range of use may be."[147] In this way, not only do individuals skip over long terms and conditions that may

[145] Wickenheiser, "Forensic Genealogy, Bioethics and the Golden State Killer Case," 120.
[146] Wickenheiser, 120.
[147] Wickenheiser, 120.

contain vital information, but also individuals, when agreeing to disclose information, may not be well enough informed about who exactly they are agreeing to release their information to. For the most part, privacy regulations in the United States rely on a self-management model which emphasizes individual choice and does not significantly limit what companies are required to do in order for you to adequately self-manage.

While burying important information like who may gain access to your genetic material after you have submitted it to an online database in a long and dense terms and conditions document may be legal, it is another question entirely if doing so is ethical. I think it is clear that by failing to obtain informed consent from a user, especially on a matter so important and outside of the intended scope of the service, a company would be acting unethically. By failing to treat the user as an autonomous individual and even potentially intentionally withholding vital information, the company impairs a user's decision-making ability and fails to treat them as an autonomous individual.

In Portugal, individuals are able voluntarily to submit DNA samples into the national forensic database that is typically populated by samples taken from suspects and criminals. Typically done in order to help locate missing relatives whose samples may also be in the system, individuals who volunteer to submit their DNA are required to read and sign a document that authorizes informed consent. In their exploration of the issue, Machado and Silva posit that the mandatory written request that constitutes informed consent goes beyond merely informing users and "may symbolically stand for the maximization of choice and a sense of individual responsibility in the maintenance of social order."[148] In this way, the information provided before obtaining consent serves both a practical and symbolic purpose and offers force in both domains.

[148] Machado and Silva, "Informed Consent in Forensic DNA Databases: Volunteering, Constructions of Risk and Identity Categorization," 341.

Thus, by acknowledging that what you are doing is voluntary, you are affirming your own autonomy as well as your belief that your action will contribute to public good. By requiring informed consent, the government both acknowledges that the donor as a free and rational agent, capable of making their own decisions and the individual affirms their desire, even when provided information of possible uses and consequences, that they agree to the terms laid out before them.

However, Machado and Silva present concerns they have with the practice of informed consent in the Portuguese case. They argue that "the evaluation of citizens' understandings and interpretations of information is crucial to ensure that the information sheet is satisfactory for most donors and sufficient to legitimize the construction of the Portuguese forensic DNA database in order to guarantee that informed consent is not merely a formal discursive practice, but something that ought to humanize and democratize social relationships."[149] In other words, without a true evaluation of what exactly a volunteer understands from the information sheet provided prior to the individual providing consent, the process of informing merely becomes a formality. While it may be *legal* for the government to continue without a true understanding of the knowledge actually garnered from their information sheet, it is unlikely that it is ethical for them to continue. Furthermore, Machado and Silva argue that "the Portuguese forensic DNA database information sheet does not give equal weight to all ethical, social and political issues."[150] In the eyes of the authors, the information sheet does not do enough to inform volunteers, or at minimum, accurately lay out the relative risks and rewards that one may incur by volunteering.

[149] Machado and Silva, 343.
[150] Machado and Silva, 343.

Generally, the authors draw a conclusion that can be applied to our examination of private DNA databases which is that, hypothetically, the consent form:

> "symbolically maintains social ties between the donor and their biological material and, at the same time, it can be seen as an instrument that reinforces: (1) the importance of individual choice and autonomy; (2) the donor's responsibility as a citizen in the fight against crime and in the promotion of future human well-being; and (3) the transformation of the biological material into objects of knowledge and intervention".[151]

While the authors have doubts that the consent form used in the Portuguese case adequately obtains ample consent, they do emphasize the failings of the Portuguese information sheet which may help guide those who are looking to obtain informed consent going forward. The authors state that while the information sheet clearly identifies the legal and forensic risks of participating in the voluntary database, other risks are minimized or not mentioned at all. Furthermore, by emphasizing the good that can be provided to the community, the authors fear that the state "fosters an increase in mandatory volunteerism as good citizenship."[152] In this way, we can see the complexities that are involved in creating an adequate information sheet.

What Not to Do: Prior Failures of Cooperating Companies

What we can say at this point is that the process of informed consent is an integral part of the preservation of personal autonomy and is absolutely necessary if it is decided that law enforcements can have access to DNA databases. Furthermore, we can see that obtaining consent is not as straightforward as one might think. And what is even more clear is that up to this point,

[151] Machado and Silva, 345.
[152] Machado and Silva, 346.

companies like GEDMatch and FamilyTreeDNA have failed to properly obtain informed consent, or even any kind of consent, from their users for law enforcement access. GEDMatch's actions in particular display the failure on behalf of a company to properly obtain consent and the harmful ramifications that a failure to obtain consent can have. A look at the evolution of GEDMatch's privacy policies can give insight into what new or existing companies should *not* do when considering allowing police access to their DNA databases.

Like all other genealogical databases, GEDMatch began with the goal of connecting individuals to unknown relatives and providing greater insight into an individual's heritage. Co-founder Curtis Rogers started GEDMatch as a way for individuals who had tested their DNA with any number of websites to upload the analyzed DNA profile to his website and connect with family members who may have had their DNA submitted to a different website. In other words, Rogers wanted to ensure that an individual who had their DNA analyzed through Ancestry DNA could still find relatives who had their DNA tested by FamilyTreeDNA. He offered this service for free, and the website began to take off. Nowhere in the initial terms of service or privacy policy was there information about DNA being shared with or accessed by law enforcement because at the time of its creation, this kind of use didn't seem to be on anyone's radar, let alone a man who had taken a hobby and with the help of a computer specialist, turned it into a publicly accessible website. It wasn't until *after* the arrest of the Golden State Killer, Joseph DeAngelo, that Rogers learned his website had been the key to finding DeAngelo and solving the case.[153]

When asked prior to the arrest about whether his website could be used to identify violent criminals, Rogers stated that "he couldn't explicitly sanction it because people were there primarily for genealogical research. No one was expecting to be cooperating with law

[153] "A New Way to Solve a Murder, Part 1."

enforcement."[154] The initial privacy statement appeared vague, stating that "users participating in this site should expect that their information will be shared with other users."[155] As it was being used as a tool to connect different individuals, this statement seems relatively straightforward, however, it clearly did not indicate any possibility of law enforcement access.

After the identification and arrest of DeAngelo, Rogers began receiving a number of emails thanking him and congratulating him on the role he and his company played in solving such a prolific case. It was then that Rogers and his partner officially decided to open up GEDMatch to law enforcement access. Upon this decision, in May of 2018, they rewrote the user agreement so that the default setting was law-enforcement access to solve sexual assault and murder cases. This user agreement that the entirety of the website had acknowledged and likely not thought much of when they initially submitted their DNA, possibly years ago. While it seems as if GEDMatch notified its users that there had been a change in the initial user agreement, there was no requirement for users to acknowledge that they had read and understood the significant changes that had been made.

It wasn't until Rogers and GEDMatch received significant backlash from the genealogy community and their users in May of 2019 that Rogers made the most recent and substantive change to the privacy policy. After breaking his own terms of service and allowing investigators to use his website to solve a crime that was neither a rape nor murder (at the time, the only two crimes that qualified for use of the website), Rogers received heavy criticism. In response to this criticism, Rogers decided to opt all users out of law enforcement access and require them to log

[154] "A New Way to Solve a Murder, Part 1."
[155] Cyrus Farivar, "GEDmatch, a Tiny DNA Analysis Firm, Was Key for Golden State Killer Case," Ars Technica, April 27, 2018, https://arstechnica.com/tech-policy/2018/04/gedmatch-a-tiny-dna-analysis-firm-was-key-for-golden-state-killer-case/.

in and actively opt back in if they wished to do so.[156] In a matter of minutes, law enforcement went from having access to over a million DNA profiles on the website to zero. As of May 2020, that number had grown to about 260,000 -- still a figure nowhere near the original pool accessible to genetic investigators.[157]

In looking at the way GEDMatch handled the issue of law enforcement access over the years, I see a number of problems with the course of action that should guide our expectations of how companies behave going forward. First, when Rogers agreed to aid law enforcement in 2018, the website automatically opted all of their users-in. Users who potentially had not utilized GEDMatch's services in years but let their profile lay dormant, perhaps even forgetting about its existence entirely, were then subjected to a privacy intrusion that they had likely not considered when they initially signed up for the service. While individuals could choose to remove their profiles if they did not agree with this kind of use, there was no way for users to opt out of law enforcement access and maintain access to the website's other services. This problem continued as new users joined: no users were able to opt out, rather, they were simply informed that law enforcement would have access.[158] Second, Rogers violated his own terms of service to make an exception to solve the violent assault of a 71-year-old woman. While this is certainly a heinous crime that deserves to be solved just as much as any rape or murder, it was clearly outside of the bounds of what the terms of agreement explicitly stated qualified for the use of GEDMatch.

I do not mean to pass too harsh of a judgment on Rogers and the rest of the GEDMatch team. It is not easy to create policies that align with public opinion and ethical standards as a

---

[156] "A New Way to Solve a Murder, Part 2."
[157] Alex Wood, "DNA, Genealogy Led to Arrest in Series of Rapes," *Journal Inquirer*, June 10, 2020, https://www.journalinquirer.com/crime_and_courts/dna-genealogy-led-to-arrest-in-series-of-rapes/article_27b25296-ab2d-11ea-8b3e-472861ca42e0.html.
[158] I use informed here in its most general sense: the information was likely mixed in with a multitude of other information, deep inside a privacy statement, and it is likely that those agreeing with the terms of service had no idea that that was one thing they were agreeing to.

technology is evolving, and missteps like the ones Rogers made were highly likely, or perhaps even inevitable. It is clear though that the way GEDMatch handled the situation was far from ideal. After the Golden State Killer was identified and arrested and GEDMatch began receiving a great deal of press on the matter, the average number of DNA kits being uploaded to GEDMatch a day jumped from 1,200 to 5,000.[159] It is likely that if presented with an opt-in option at the time of their sign-up, many of these people who had been attracted by the Golden State Killer press would have opted-in.[160] By waiting so long to change the practice, it will likely take years to return to the original, or even a comparable, number of accessible profiles. In this way, we can see how imperative it is that new services that may arise or companies who currently do not cooperate with law enforcement that wish to change their policy, create comprehensive policies that they stick to. By doing so, companies will be able to preserve their user's autonomy and privacy while also maximizing the number of profiles police can access, making these searches even more effective.

I also must take a moment to appreciate the fact that Rogers decided to switch all of GEDMatch's users into an opt-in system at all. As we can see from the way FamilyTreeDNA, another major player in the commercial forensic genealogy industry has handled the same problem, this course of action seems not to be required by current US privacy regulations and thus not what all companies have decided to do. FamilyTreeDNA has two separate policies for

[159] Andrea Marks, "DNA Search Method That Caught Golden State Killer No Longer Available," *Rolling Stone* (blog), May 23, 2019, https://www.rollingstone.com/culture/culture-news/dna-search-method-that-caught-the-golden-state-killer-no-longer-available-839315/.

[160] This statement is made with the assumption that the increase was directly linked to the increased press attention on GEDMatch and that those who heard about GEDMatch's participation in the case were signing up to hopefully help in some other case going forward. I think it to be unlikely that someone would hear about law enforcement access to a private DNA database and would then choose to sign up directly afterwards but not wish law enforcement to access their DNA, or at least not know that this was a possibility. This assumption would of course be undermined by evidence that the jump in people who signed up was attributable to a marketing scheme or genealogy-related news.

their US and EU users that underscore the perceived importance of an opt-out model and the tension between this practice and more stringent privacy regulations. FamilyTreeDNA, much like GEDMatch, transitioned to an opt-out policy in March of 2019. However, while GEDMatch decided to opt all users out of law enforcement access in May of 2019, FamilyTreeDNA chose to opt all of their US users in and allow users to individually opt themselves out of access in their privacy settings. In comparison, all EU users were automatically opted-out of law enforcement access but have the ability to opt themselves in within their privacy settings.[161] The difference in policies was so that FamilyTreeDNA could remain in accordance with the EU's General Data Protection Regulation (GDPR), privacy regulation that is far more extensive than data privacy regulation in the United States.

To create two different policies for EU users and US users was certainly more complicated than creating one all-encompassing policy like GEDMatch implemented. The company had to differentiate between US and EU accounts and generate different code that would instruct the database to treat new accounts differently based on the user's location. Greater complication equals greater cost, but it is clear that this cost was something that FamilyTreeDNA was willing to bear in order to retain access to their US users profiles rather than lose all of them like GEDMatch was forced to.[162] Furthermore, it is clear that FamilyTreeDNA recognized the importance of the default and preferred an opt-in default to an opt-out default: the only reason it seems that the opt-out feature was used was so that the company did not face consequences for violating the GDPR. A deeper discussion of nudges, opt-in and opt-out models, and defaults will

[161] "GAP Announcement: Updates to Our Terms of Service and Privacy Policy," March 12, 2019, https://mailchi.mp/familytreedna/updates-to-our-terms-of-service-and-privacy-policy-march19?e=dfef197239.
[162] Natalie Ram and Jessica L. Roberts, "Forensic Genealogy and the Power of Defaults," *Nature Biotechnology* 37, no. 7 (July 2019), 707.

be continued as I examine the increasing discussion of and debate over nudges and their applicability in our context.

Nudges

Sunstein and Thaler's seminal book, "Nudges: Improving Decisions About Health, Wealth, and Happiness" outlined a revolutionary way for those in power to capitalize on the failings of rational decision making. The authors argue that because people have flawed decision making processes, "choice architects" should design how choices are presented to nudge individuals towards making decisions that are in their best interest. The two say that no matter how choices are presented, an individual will be pushed in one direction or another and because this is the case, those who design the choices should choose the way that favors the "right" decision. Thus, the authors define a nudge as "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives."[163] Nudges work by identifying and taking advantage of heuristics -- ways in which our mind unconsciously processes information that contributes to decision making. Different heuristics can be exploited to alter how we make decisions.

In the process of developing a theory of nudges, Thaler and Sunstein advocate for libertarian paternalism. This view says that private and public entities can and implement nudges to affect our choices and behavior while still respecting autonomy and freedom of choice. Libertarian paternalism is libertarian because no choices are being completely eliminated: even if choice architects are influencing which option an individual is likely to pick, the individual is still free to choose the alternative options. Libertarian paternalism is paternalistic because these

[163] Richard H. Thaler and Cass R. Sunstein, *Nudge : Improving Decisions about Health, Wealth, and Happiness* (New Haven: Yale University Press, 2008), 6.

private and public entities are selectively pointing an individual towards the option that will make the individual better off.

Nudges can also be non-paternalistic in nature when their goal is not to help the individual but rather to contribute to general good. Nudges that would be used in our context would fall under this category. After all, it does not seem as if the person submitting their DNA is likely to be the direct beneficiary of providing law enforcement with their DNA. Instead, individuals who choose to allow access are contributing to a wider database that will increase security across a larger community. This kind of nudge was used in the case of organ donation policies. As described in Sunstein and Thaler's book, the authors found that far more people approved of organ donation or wished to become donors themselves than had taken the steps to ensure that, if the circumstances arose, their organs would actually be harvested for donation. Nudges designed to increase the number of people who register to become organ donors are not paternalistic because if successful, they contribute to a society-wide good rather than an individual benefit.

Thaler and Sunstein come up with a number of nudges from where healthy food is placed to encourage healthier eating habits to programs that encourage individuals to save more for retirement. The types of nudges that will be most likely employed here are a choice between opt-in, opt-out, or active choosing policies. I have been speaking casually about opt-in vs. opt-out policies throughout the writing, but it is here that I wish to emphasize the important difference between the three practices. The three different policies are likely to yield significantly different numbers of people who are opting-in There may be companies who may choose to not create a choice for their users on whether or not their DNA can be accessible by law enforcement. One can imagine a website popping up in the next few years whose main purpose and mission is to

help law enforcement solve more crimes with forensic genealogy. These websites would essentially reverse the importance of purposes that GEDMatch initially had, prioritizing helping solve cold cases over auxiliary genealogy services. For a hypothetical website like this, it seems acceptable to not provide an option to opt out of law enforcement access. As there are a number of other services an individual could use for only genealogical purposes, there seems to be little case to argue that the company should also have to provide an opt-out option or that this option be a prominent part of the sign-up process.

However, most of the services that exist now do not have these priorities. Most companies focus on genealogical services and provide law enforcement access as an auxiliary service. For these companies, there should be a portion of the sign-up steps that is dedicated to obtaining consent and allowing the user to choose whether or not they would like to participate in law-enforcement access. While companies may have latitude to choose which of the three policies they choose, there should be a dedicated portion of the sign-up process focused on explaining how law enforcement will have access, why they would want access, and how the individual providing DNA could be affected. When I reference a difference between opting in and opting out, I do not intend to say that users could or should be automatically opted in or out and would have to dig around in their security preferences after the fact if they wished to change the default setting. Rather, I envision a portion of the sign-up system in which forensic genealogy is explained thoroughly and users are presented with a choice.

A company could choose at this point, however, whether the user is presented with neither box checked (forcing the user to make a decision one way or another), the opt-in box is checked but the opt-out box is directly next to that option, providing a readily available option to choose to opt out, or the reverse. Any of these three options seem permissible to me. I do not

think that this kind of nudge could reasonably qualify as manipulation of an individual's choice after they are presented with comprehensive information about the process. Research has shown that setting the default option has a tremendous impact on actual choices.[164] Having one box checked indicates a default, like in the case of downloading software with either a regular configuration or a custom configuration. When the software provider indicates that a regular configuration is the default by presenting this option with the default option already checked, customers are more likely to choose this than if the provider checked the custom configuration box.[165] Thaler and Sunstein also note that this default configuration is also in the best interest of the consumer as they likely do not have the expertise needed to follow the custom route.

Research suggests that this will push individuals towards opting-in if the default, checked-box, method indicated that allowing law enforcement access was the norm. However, it could be that the specifics of this case, as well as how the information was presented during the informed consent portion of the sign-up process will have a greater impact on what consumers choose to do with their information than implementing nudges. Other research has indicated that while Thaler and Sunstein advocate for transparency in nudges and argue that informing individuals that they are being nudged has little to no impact on their behavior, this situation may not be the same. Individuals may balk at the idea that the government or a private company is trying to influence their decision-making, especially in a direction that can be perceived to intrude on their personal privacy. Further research on the empirical success of nudging in this context would be needed to understand just how much of an effect limited nudges have, and if articulating nudges would actually reverse the intended effects.

[164] Thaler and Sunstein, 87.
[165] Thaler and Sunstein, 87.

Framing

Framing effects are closely related to nudges but have their own unique impact on decision-making that I will now briefly discuss their use and affect here. Much like nudges, framing effects also appear to have a significant impact on decision making. There are two types of framing effects that I consider relevant to our discussion here: equivalency frames and emphasis frames. Equivalency framing effects examine "how the use of different, but logically equivalent words or phrases … [cause] individuals to alter their preferences".[166] In these cases, the interpretation of information that is equally accurate elicits different choices. Equivalency framing effects are frequently described in the medical context. For example, a patient is more likely to consent to a medical procedure if the prognosis is described in terms of survival rates instead of mortality rates. Describing a treatment as having a 90% chance of survival results in a significantly higher rate of consent than the same procedure which is described to have a 10% mortality rate. These two descriptions are objectively the same, but yet the human mind interprets the two sets of information differently, and this interpretation affects the decision one makes on whether or not to go through with the procedure.

In comparison, emphasis framing effects "shows that by emphasizing a subset of potentially relevant considerations, a speaker can lead individuals to focus on these considerations when constructing their opinions."[167] Emphasis framing effects differ from equivalency framing effects in that they "are not logically identical ways of making the same statement" instead, "the frames focus on different potentially relevant considerations."[168] This kind of frame frequently occurs in the news media or political setting and impacts the public's

[166] James N. Druckman, "The Implications of Framing Effects for Citizen Competence," *Political Behavior* 23, no. 3 (2001), 228.
[167] Druckman, 230.
[168] Druckman, 230.

perception of a particular issue that may involve a number of morally relevant considerations. In the context of forensic genealogy, emphasizing the number of cases solved using the practice or the way the practice will increase security or achieve justice is likely to result in a greater approval for the process than framing police access to databases as "genetic surveillance" or a privacy concern.

Framing effects and nudges can both theoretically be used to increase the number of individuals who decide to opt in to law enforcement access of their genetic information. Framing effects and nudges can sway how individuals think about an issue and lead their eventual choice in the direction the choice architect prefers. However, this kind of guiding can be ethically dubious and, if taken too far or implemented incorrectly, can qualify as manipulation. I move now to examine the idea of manipulation, how it undermines autonomy and informed consent, and how companies and governments can ethically use nudges in a way that maintains user autonomy while hopefully increasing turnout.

The Problem of Manipulation

It is clear that nudging and framing effects can have a significant impact on how individuals make decisions. Given that these two influences can shape our decision-making, we should be critical of them to ensure that they do not fall into the category of manipulation. The topic of manipulation itself is widely disputed, and while "the view that manipulation undermines the validity of consent is widely held among medical ethicists" "there is far less agreement about how to determine whether a given form of influence is manipulative".[169] Susser and coauthors define manipulation as "imposing a hidden or covert influence on another person's

[169] Robert Noggle, "The Ethics of Manipulation," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Summer 2020 (Metaphysics Research Lab, Stanford University, 2020), https://plato.stanford.edu/archives/sum2020/entries/ethics-manipulation/.

decision making" by "influencing someone's beliefs, desires, emotions, habits or behaviors without their conscious awareness, or in ways that would thwart their capacity to *become* consciously aware of it by undermining usually reliable assumption".[170] This definition emphasizes a conception of manipulation that bypasses an individual's ability to make a rational choice or be fully realized as a rational decision-maker.

Since autonomy can be considered to be both a capacity and a self-conception, to know that one's decisions were manipulated by a third party can cause individuals to feel outraged. To be the subject of manipulation means that the manipulator did not think the individual to be capable of rational decision making or if they were capable, they did not respect the final decision that they believed the decision-maker would arrive at. Furthermore, to know that an individual was the subject of manipulation violates the conception of the individual's decisions as resulting from or belonging to themselves. If this decision was the product of manipulation, what other decisions throughout one's life have also involved manipulation? To feel as if one's choices do not belong to them or reflect their true desires is unsettling and upsetting for those that have been manipulated.

Manipulation then, as it works against autonomy, is fundamentally at odds with liberal policy-making in a democratic society. As Hansen and Jespersen note, "state manipulation with the choices of citizens appears to be at odds with the democratic ideal of free exercise of choice, deliberation, and public dialogue."[171] After all, if states were respecting their citizens as rational choosers, and trusting them to make decisions themselves, they would simply present the options

[170] Daniel Susser, Beate Roessler, and Helen Nissenbaum, "Online Manipulation: Hidden Influences in a Digital World," *SSRN Electronic Journal*, January 1, 2018, 26, https://doi.org/10.2139/ssrn.3306006.
[171] Pelle Guldborg Hansen and Andreas Maaløe Jespersen, "Nudge and the Manipulation of Choice: A Framework for the Responsible Use of the Nudge Approach to Behaviour Change in Public Policy," *European Journal of Risk Regulation* 4, no. 1 (2013), 5, https://doi.org/10.1017/S1867299X00002762.

and allow their citizens to come to a conclusion themselves. Thus, if we find that nudges or framing qualify as manipulation, it seems as if they should not be used in any setting, let alone be employed by the government or involved in a process that aids the government.

Are Nudges Manipulative?

There is conflicting consensus which nudges, if any, qualify as manipulation. Some, if not all, nudges rely specifically on the way the brain fails to fully engage in rational decision making. Nudges that "operate by psychological mechanisms whose relationship to *rational* deliberation is questionable as best" and that "exploit heuristics, reasoning, and decision-making biases, and other psychological processes that operate outside of conscious awareness" seem to toe the line between acceptable influence and manipulation. Susser, Roessler, and Nissenbaum similarly acknowledge that while not all nudges are manipulative, "nudges are manipulative if they are hidden and exploit vulnerabilities."[172]

Thaler and Sunstein, as well as a number of other defenders of nudges, argue that the vast majority of nudges are ethical and nonmanipulative. Sunstein himself argues that ethical objections to nudges lack moral force for two reasons. Firstly, "nudges and choice architecture are inevitable" it is "pointless to wish them away and secondly, "many nudges, and many forms of choice architecture, are defensible and even required on ethical grounds, whether we care about welfare, autonomy, dignity or some other value."[173] Thus, Sunstein and others believe that because there is simply no way around influencing our decisions, and if that influence has to happen, it is morally defensible or even required to push our decision making towards decisions that are beneficial. However, Sunstein continues on to say:

[172] Hansen and Jespersen, 25.
[173] Cass R Sunstein, "The Ethics of Nudging," *Yale Journal on Regulation* 32, no. 2 (2015), 413.

> There is also a pervasive question about manipulation. A nudge might preserve freedom of choice, but it might manipulate people and be objectionable for that reason. As we shall see, transparency and accountability are indispensable safeguards, and both nudges and choice architecture should be transparent. Even if so, there is a risk of manipulation, and that risk should be avoided. Many of the most interesting and complex ethical questions involve the disputed concept of manipulation.[174]

So, Sunstein seems to believe that while nudges are defensible and, in some cases, necessary, he also seems to believe that there are instances in which nudges qualify as manipulation.

Thus, in order to avoid the sticky issue of manipulation and violation of autonomy, if companies or governments wish to employ nudges in the context of forensic genealogy, these nudges must be transparent. Thaler and Sunstein rely on Rawls' publicity principle that suggests that governments should not implement policies they would not be comfortable advertising to their citizens. Thaler and Sunstein endorse this standard on two grounds: the first being that on a practical level, a government should not implement policies in secret that they would not be willing to defend to citizens because should the policy be made public, they will face significant embarrassment and perhaps outrage from those governed. The second reason, a more moral one, is that a government should have and show respect for those under its governing, and by implementing policies in secret, leaders and government officials are failing to show respect for those they govern, treating citizens as means rather than ends.[175]

With the end of transparency and welfare in mind, it seems to me that it is certainly possible in our context to craft a nudge that is both effective and non-manipulative. The system I have in mind may not be the only morally defensible system but is one that I believe avoids accusations of manipulation while encouraging users to contribute to this kind of public good. First, during the time of their account setup, users should be provided with clear and

[174] Sunstein, 416.
[175] Thaler and Sunstein, *Nudge : Improving Decisions about Health, Wealth, and Happiness,* 248.

comprehensive information about the process of familial DNA searches for forensic purposes.[176] After users have been adequately informed new users will be provided with the option to opt in or opt out of law enforcement searches. At this time, it seems reasonable for companies to have the opt-in box pre-checked, indicating that it is the default. This will likely indicate to users that this is what they should do, while adequately providing them with an easy opportunity to opt out if they so choose. Along-side this choice, it may be wise, in order to avoid the issue of manipulation completely, for companies to include a disclaimer that states that the opt-in box is checked to encourage more people to participate and thus increase the effectiveness of these searches. From that point on, users should be able to change their preferences at any point they choose to do so.

Are Framing Effects manipulative?

Framing effects are thought to be ethically relevant to the issue of autonomy and consent for similar reasons as nudges. Framing effects can change how we interpret information and what decision we make. Furthermore, framing effects may be unavoidable. In the case of the doctor that must present prognosis information to a patient, they can only choose between describing the outcome in terms of survival rates or mortality rates. The doctor can give both numbers, but even this does not eliminate the problem of framing effects as what becomes important is what number is listed first. Philosophers interpret the problem of framing effects and consent differently. Jason Hanna concludes that because framing effects are unavoidable and

[176] The precise information that is provided is beyond the bounds of my knowledge or expertise. The crafting of these informed consent materials should involve bioethicists, legal scholars, and leaders within the companies and governments involved. These materials should be clear enough for the layperson to understand but not overly simplistic as to leave out critical information that may alter their decision. All of this must be done while avoiding the use of long, cumbersome privacy policies. It may be that a short video explanation that users must finish in order to continue with the sign-up process is useful in communicating the necessary information in a clear and engaging way that ensures that users will watch all of.

clearly impact consent, consent is less morally significant than has been historically thought.[177] In contrast, Eric Chwang suggests that "framing effects pose no more of a problem for the moral force of consent than ignorance does."[178]

It seems a troubling claim to say that because framing effects can be unavoidable, that we should discount the moral importance of obtaining informed consent. Instead, it seems to me that companies should be extraordinarily careful of how they frame information during the informed consent process. Companies may be inclined to emphasize the growing number of cases that have been solved using genetic genealogy or their websites specifically since their databases have become accessible to persuade users to opt in. By focusing on the benefits of opting-in rather than the potential costs, companies are likely to obtain a greater number of individuals who choose to opt in but will also sacrifice truly informed consent.

To the greatest extent possible, information during the informed consent process should be presented neutrally and without the presence of significantly biased frames. If a company wishes to make a strong case for submission that draws upon the number of cases solved with the method or using strongly persuasive language, they should equally have to present information on the risks of submission. Risks that they will be identifiable by police should their DNA be found on the site of a violent crime or that their family unit may be compromised should their DNA be used to identify a family member are equally as relevant to the decision-making process as information regarding the number of cases that can and have been solved.

[177] Jason Hanna, "Consent and the Problem of Framing Effects," *Ethical Theory and Moral Practice* 14, no. 5 (2011), 517, https://doi.org/10.1007/s10677-011-9266-y.
[178] Eric Chwang, "Consent's Been Framed: When Framing Effects Invalidate Consent and How to Validate It Again," *Journal of Applied Philosophy* 33, no. 3 (2016), 270, https://doi.org/10.1111/japp.12112.

Leadership and Nudges

The purpose of leadership is itself full of varying opinions and nuance. I am afraid that to fully address this topic is outside of the bounds of this thesis. One, relatively non-controversial view of leadership is that leaders exist to help their groups achieve certain goals. A manager institutes policies and may inspire their employees to finish a project or accomplish a business objective. Political leaders work to create a better environment (however they may define it) for their constituents. Leaders may use a variety of methods to help their groups achieve a certain end, from inspiring speech to carrots and sticks. Amongst such methods are nudges. Nudges have been used by the government to increase participation in organ donation and leaders within companies have used nudges to increase employee enrollment in retirement plans. Leaders are some of the most apparent choice architects: they craft policies and influence their followers with every decision they make.

In another sense, leaders may also serve a purpose in that they exist to push their followers towards a moral good. While their followers may not have a moral duty or strict obligation to do something, leaders can assist them towards achieving a morally good end. By setting up incentive structures or even using nudges to push their followers in some direction, leaders can guide their groups towards ethical improvements or achievements. So, an argument in favor of leaders, either within businesses or governments, using nudges to increase participation in genealogical databases accessible by law enforcement may unfold as follows. First, I have described that while ethically complicated, these databases and an increased participation in them can help solve more violent crimes and increase security. Increased security in our communities, as well as the social justice benefits that are also incurred, can be seen as a type of good leaders would like to achieve. In order to push individuals towards doing a morally

good thing (themselves contributing to the database of accessible DNA information) and contributing to a public good, leaders can and ought to use different methods to do so. Because nudges can be used without qualifying as manipulation, this is one such tool that leaders can ethically use to achieve the end we are looking for.

Unifying Regulation

As of the time of writing this thesis, Maryland is the only state that has even brought forward legislation that would regulate the use of forensic genealogy. Like many other forensic measures, science is progressing faster than lawmakers are able to understand how it can and will be used as well as the potential implications. The consequences for this lack of regulation are far reaching as Thomas F. Callaghan, a chief biometric scientist at the Federal Bureau of Investigation notes. Callaghan expressed fears that "Absent best practices, use of FGG [forensic genetic genealogy] could lead to compromised cases, diminished use, or the loss of this new investigative tool. Public support for FGG could be jeopardized and confidence in forensic DNA analysis could be undermined."[179] As we saw from GEDMatch clumsily attempting to forge their way through privacy concerns as the use of forensic genealogy grew, companies are bound to make mistakes and compromise the rights of users and the effectiveness of the tool without support from lawmakers.

In 2019 the United States Department of Justice published an interim policy regarding forensic genetic genealogy with a final policy promised for 2020. Without significant regulation, the practice remains an "unregulated wild west of genetic searching."[180] As of March 2021, that

[179] Thomas F. Callaghan, "Responsible Genetic Genealogy," *Science* 366, no. 6462 (October 11, 2019), 155, https://doi.org/10.1126/science.aaz6578.
[180] N'dea Yancey-Bragg, "DNA Is Cracking Mysteries and Cold Cases. But Is Genome Sleuthing the 'Unregulated Wild West?'" *USA TODAY*, accessed October 12, 2020, https://www.usatoday.com/story/news/nation/2019/05/14/heres-how-dna-cracking-cold-cases-and-exonerating-innocent/1159571001/.

policy has yet to be released. In the press release for the interim policy, the regulations were crafted to "balance the Department's relentless commitment to solving violent crimes and protecting public safety against equally important public interests – such as preserving the privacy and civil liberties of all citizens."[181] These regulations advise that forensic genealogy should generally be used only for violent crimes or to identify human remains. These specifications, however, can be overridden and broadened by a more lenient company policy if it exists, or by a prosecutor who believes their case presents "a substantial and ongoing threat to public safety or national security."[182] The policy also emphasized that forensic genealogy searches should be a last-resort measure. Furthermore, it barred police from falsely tagging themselves as regular users, rather than affiliated with a law-enforcement investigation: a process that has already popped up as investigators attempt to bypass restrictions and access all user profiles rather than drawing solely from genetic profiles of users that have consented to law enforcement access. Two final restrictions are notable and admirable: first that police cannot use a genetic profile to look for genes related to psychological traits or disease susceptibility. The second restriction prevents police from surreptitiously collecting DNA from a discarded piece of trash from an individual who is thought to be a suspect's relative in order to narrow down a suspect list. Informed consent was emphasized, absent the presence of a search warrant.[183]

These guidelines certainly cover a number of the regulations that I believe are necessary should police wish to continue to employ this tool. However, these regulations lack teeth: without serious consequences put in place to keep law enforcement in check, we are likely to see

[181] United States Department of Justice Office of Public Affairs. *Department of Justice Announces Interim Policy on Emerging Method to Generate Leads for Unsolved Violent Crimes*, September 24, 2019.
[182] U.S. Department of Justice, Interim Policy on Forensic Genetic Genealogical DNA Analysis and Searching (2019); www.justice.gov/olp/page/file/1204386/download.
[183] Jocelyn Kaiser, "New Federal Rules Limit Police Searches of Family Tree DNA Databases," *Science | AAAS*, September 25, 2019, https://www.sciencemag.org/news/2019/09/new-federal-rules-limit-police-searches-family-tree-dna-databases.

misuse. Each investigator believes that solving their case is of the utmost importance and in certain cases, especially after the case has gone unsolved for decades, might be desperate to do anything they can to solve the case. If an initial search of a database comprised only of individuals who have consented to law enforcement access comes up with nothing, an investigator might be tempted to violate rules set in place by the company and the guidelines set in place by the Department of Justice and submit the DNA evidence they have as a regular profile, rather than a criminal one. Other departments might be tempted to solve crimes that do not qualify as violent crimes but have genetic evidence using this method if they perceive the crimes to be of particular importance to solve. Without creating clear and strict consequences for violations of these nature, as well as other violations, it is likely that law enforcement will not respect these guidelines.

Consequences can and should include administrative violations for officers who are caught violating these regulations including removal from position, prevention from applying to other departments, or even criminal charges. Entire departments may also face penalties including restriction of access to these databases, removal of financial support or direct financial penalties, and more. Law enforcement should understand that access to these tools is a privilege, not a right, and that by violating the guidelines that are set in place to protect citizens from being compelled to submit their information against their will among other reasons, they will not be given access to this tool.

It may be the case that not all instances of misconduct will be caught, but the display of evidence throughout trial proceedings will serve as times of transparency and accountability. Some information that is used and uncovered throughout the process of familial DNA mapping should not be presented in court. Information that would reveal the specific identities of family

members who may have led to the identification and arrest of the accused should not be released to the press or remain part of the public record that results from a trial. However, trials do present an opportunity to ensure that all evidence that was collected was collected in accordance with laws and regulations, and thus serve, ideally, as a safeguard against law enforcement obfuscating misconduct.

Legislators and members of the Department of Justice should not hesitate to bring forward guidelines and strict penalties. As a number of departments at the federal, state, and local levels will have the ability to use these tools, regulation must adequately cover all of these departments. States may implement stricter regulations than those created on the federal level, but baseline protections must be put in place to keep law enforcement agents in check. It seems reasonable that if investigators are unable or unwilling to use forensic genetic genealogy tools ethically, within the bounds delineated by legislators and legal experts, they should not be allowed to use the tool at all, no matter how many cases it may assist in solving.

For the Individual

As I have written this thesis, my own DNA has sat at AncestryDNA, beyond the reach of law enforcement (without a warrant) but giving me information about my own family tree and heritage. At the time of submitting my DNA I was eighteen years old, and when I originally had my DNA tested, forensic genealogy had not been used, let alone become the center of my own internal ethical debate. I will admit that I hesitated to upload my DNA to GEDMatch, even as I wrote this thesis and came to the conclusion that there is a strong reason to do so. After reading countless scholarly articles, news reports, opinion pieces, and law reviews, it is not until March of 2021, almost a full year since I settled on this topic to write on, that I have uploaded my DNA to GEDMatch.

However, after all of my reading, writing, and thinking, I do believe that one ought to opt into law enforcement access, and if one has the ability to upload their DNA to a service like GEDMatch and grant access to law enforcement, they should. To make this claim without uploading my own information would feel hypocritical, so it now sits in the GEDMatch database, accessible to both long-lost cousins and law enforcement personnel looking for a break in their case. I believe that others who are in the same position that I am: with their DNA already analyzed and their results easily downloadable should do the same. I have no personal qualms with the idea that my DNA might lead to the apprehension of a violent criminal. If I am related to a person who committed a crime, and my genetic information helps lead to their identification and arrest, I do not believe I will have any regrets with my decision to upload.

I do not think that all people will have the same feelings I do. There are a number of legitimate reasons to prevent an individual from uploading their information or if they do upload, deny access to law enforcement. I have never had a negative experience with the police, nor have I or a close family member been the subject of an investigation. While I am close with my nuclear family as well as my aunts, uncles, cousins, and grandparents, as well as some second cousins or beyond, I do not think my family would hold me responsible for the crimes of a family member if they found out it was my DNA that led to a family member's arrest. And while most people do not think their close family members capable of a violent crime, even when incorrect, I have a certain degree of faith in those family members who I am close with that my DNA will never be needed to identify them. This is not the case for all people, and for those who feel particularly compelled by any of these thoughts or feelings, it is reasonable to accept that they will not allow law enforcement access to their DNA.

Furthermore, I had already paid for my DNA to be analyzed and the only cost to me to upload was the 30 minutes it took to download my DNA profile from Ancestry and upload it to GEDMatch. Had this not been the case, I am not sure I would have been willing to incur the expense of ordering (typically around 100 dollars for Ancestry and other similar services), the time of testing my DNA and having it analyzed, and the further step of uploading my DNA to GEDMatch. Certainly, it is the case that many people are unable to bear this expense, nor should they be expected to.

GEDMatch is still not at the number of profiles it was when their database was initially accessible to law enforcement. For that reason, it seems to me that any individual who does not have legitimate reason not to upload and allow access should do so. There are certainly enough true crime fanatics and "online detectives" that should feel compelled to upload their information in order to themselves contribute, potentially to catching a violent criminal and solving an otherwise potentially unsolvable case. Internet sleuths have been shown to be willing to dedicate hundreds of hours to solving cases that law enforcement agencies have stalled out on or are not pursuing. Such individuals who remain deeply committed to solving cases and delivering justice to victims and their families, as well as increasing security in their communities and beyond, should feel just as compelled to submit their genetic information to a site that allows law enforcement access.

With that being said, not every citizen needs to upload their DNA to a website in order for law enforcement to be able to theoretically identify any American. Given that DNA mappers need only a third cousin match from either side of a perpetrator's family tree in order to effectively identify the perpetrator and the number of profiles accessible to law enforcement continues to grow, those who have serious apprehension for any of the reasons I have outlined

above are not strictly obligated to upload their information, even if they are able to. Even without their information, it seems likely to me that we will, at some point, reach the point where almost all, if not all, individuals are identifiable through this method. All white Americans, who have historically evaded identification and arrest through previous familial matching techniques or have evaded suspicion because of long standing prejudices in our criminal justice system, will soon be identifiable through these methods, if the numbers have not already reached this point once again.

To summarize and clarify, I believe that individuals ought to upload their information and allow law enforcement access. Chapter two articulated the strong moral reasons one ought to do so, namely that one has the potential to do a great deal of good by sacrificing very little. However, individuals may either not be able financially to do so or may have legitimate reason not to do so. These individuals should not and cannot be compelled to allow access to their DNA, and if they upload their DNA but deny law enforcement access to it, their information should be protected from investigator access. Given that there is not a strong duty to submit DNA, nor a strong duty to opt into law enforcement access, only a strong moral argument to do these things, other personal factors may override this argument and justify an individual's decision to opt out. Their decision not to upload, however, in the long run, will likely not have much impact as it is not necessary for every individual to upload their DNA in order for every individual to be identifiable through these methods.

Conclusion

Throughout my discussion on this topic, I have attempted to summarize a number of relevant philosophical perspectives and apply these perspectives to my particular topic at hand. In chapter one, I articulated two arguments: the liberal rights argument and the communitarian arguments. While these two perspectives have vastly different opinions on the importance of the individual and the communities they inhabit, both lend support to the position that forensic genealogy presents significant, and perhaps even impermissible ethical dangers. However, I concluded that many of the privacy concerns and perceived threats to autonomy are either not a legitimate reason to prohibit the continued use of forensic genealogy, or that a liberal rights framework cannot fully account for the fact that an individual cannot be fully separated from the biological relationships that are integral to this topic. While the liberal rights argument can lend insight into the necessary protections that must be put in place in order to protect individuals' privacy and autonomy, it does not provide compelling enough reasons to abandon the practice completely.

My communitarian argument articulated the special obligations that serve as a possible indication of a duty to not opt into law enforcement access. Individuals may wish to keep their DNA out of law-enforcement accessible databases to protect their family members from potential identification by law enforcement for a violent crime. I dismissed this reason as a legitimate reason to opt out of access, drawing on comparisons to harboring fugitives and obligations to victims and their families. Other concerns appear more compelling: namely that individuals fear ostracization from their family or general community if they are discovered to be related to a violent criminal and partially responsible for their arrest. Furthermore, fears that family secrets related to paternity or unexpected ways family members may be related will be

revealed may lead certain individuals to keep their information out of these databases. I believe that these reasons have stronger grounding, but that only extreme cases can override the strong moral reasons to submit.

In chapter two I more clearly articulated the strong moral reasons to submit DNA and opt into law enforcement access. In the first part, I offered a utilitarian argument in favor of utilizing forensic genealogy. This argument cited the maximization of good that occurs through when security in a community is increased, and the way that this can be accomplished by identifying and apprehending violent criminals using this method. I also outlined Peter Singer's position that if we can do something that has the potential to do tremendous good without incurring significant personal harm, we ought to do this thing. I argue that opting into law enforcement is an example of an action that can do a tremendous amount of good without imposing significant cost, and therefore, is something that an individual ought to do.

In the second part of this chapter, I offered a social justice perspective which argues that the expansion of and continued access to private DNA databases has the ability to correct some of the current injustices we see in our criminal justice system today. Disproportionate arrest and conviction rates of black and brown individuals means that these communities are overrepresented in government DNA databases. By providing continued access to commercial DNA databases, which are primarily populated by white citizens, we may begin to even the playing field between these two populations. Furthermore, I delved into the application of a moral luck argument that is often appealed to, albeit indirectly, to this topic and is offered as an argument against the use of forensic genealogy. I explored that while the practice may feel unfair to those who are "unlucky" enough to have a family member(s) submit their DNA which leads to their identification and arrest, this unluck does not justify suspending the use of this practice.

Furthermore, if we begin an appeal to circumstances beyond an individual's control, there seems to be stronger reason to continue and expand access to commercial databases as race can be viewed as a circumstance outside of one's control which actually has an equally large, if not larger, impact on one's likelihood of being arrested for a crime.

Finally, my solution chapter covered my position on the future use of the practice and what individual actors should do to act morally and what commercial and government leaders must do to ensure that the tool is used ethically. The practice of forensic genetic genealogy is still in its infancy and only time will tell how important its use will be in solving cases going forward. Already the tool is proving to be effective in clearing the backlog of cold cases and as a last resort option in solving violent crimes. For this reason, it is my belief that law enforcement will be hard pressed to give up this tool. Furthermore, continuing access to this tool is beneficial to society as it increases security and helps apprehend violent criminals. However, it is also clear that there are also a number of ethical considerations that we must keep in mind as well allow law enforcement to continue to use this technology. Creating strict bounds on privacy is of the utmost importance going forward and state and federal lawmakers should not hesitate to craft and introduce such regulations. Furthermore, nudges and framing can be ethically used to encourage new users to allow law enforcement access to their DNA, but fully informed consent must be obtained in order to ensure that the rights of individuals are being respected.

To do all of this will not be easy, and a number of perspectives should be taken into consideration as these privacy policies and laws are being crafted. However, once we achieve these ends, law enforcement will be able to use these methods ethically and individuals can have faith that should they continue to use genealogical services, their wishes and privacy will be

respected. Until that time, there remains substantial opportunity for misuse and the deterioration of trust in law enforcement and genealogy companies.

Bibliography

Akpan, Nsikan. "DNA Ancestry Searches Can Now Identify Most White Americans. Here's Why That's Legally Questionable." *PBS NewsHour*, October 12, 2018, sec. Science. https://www.pbs.org/newshour/science/dna-ancestry-searches-can-now-identify-most-white-americans-heres-why-thats-legally-questionable.

"A New Way to Solve a Murder, Part 1: The Genetic Detectives." *The New York Times*, June 6, 2019, sec. Podcasts. https://www.nytimes.com/2019/06/06/podcasts/the-daily/dna-genealogy-crime.html.

"A New Way to Solve a Murder, Part 2: The Future of Genetic Privacy." *The New York Times*, June 7, 2019, sec. Podcasts. https://www.nytimes.com/2019/06/07/podcasts/the-daily/genealogy-dna-crime-privacy.html.

Bell, Daniel. "Communitarianism." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta. Metaphysics Research Lab, Stanford University, 2020. https://plato.stanford.edu/archives/fall2020/entries/communitarianism/.

Benner, Mike. "Vancouver Woman Surprised to Learn Her DNA Helped Identify Suspect in 1979 Iowa Murder." *Kgw.Com*. March 27, 2019. https://www.kgw.com/article/news/crime/vancouver-woman-surprised-to-learn-her-dna-helped-identify-suspect-in-1979-iowa-murder/283-cbe7a16e-6dd4-4429-b7bb-c12bb68d0d6f.

Berson, Sarah B. "Debating DNA Collection." *NIJ Journal*, November 2009. https://doi.org/10.1037/e513962010-003.

Bieber, Frederick R., Charles H. Brenner, and David Lazer. "Finding Criminals through DNA of Their Relatives." *Science* 312, no. 5778 (2006): 1315–16.

Bloustein, Edward J. "Privacy as an Aspect of Human Dignity: An Answer to Dean Prosser." *New York University Law Review* 39, no. 6 (1964): 962–1007.

Buss, Sarah, and Andrea Westlund. "Personal Autonomy." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta, Spring 2018. Metaphysics Research Lab, Stanford University, 2018. https://plato.stanford.edu/archives/spr2018/entries/personal-autonomy/.

Carpenter v. United States, 585 U.S. ___ (2018)

Callaghan, Thomas F. "Responsible Genetic Genealogy." *Science* 366, no. 6462 (October 11, 2019): 155. https://doi.org/10.1126/science.aaz6578.

Christman, John. "Relational Autonomy, Liberal Individualism, and the Social Constitution of Selves." *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* 117, no. 1/2 (2004): 143–64.

Chwang, Eric. "Consent's Been Framed: When Framing Effects Invalidate Consent and How to Validate It Again: Consent's Been Framed." *Journal of Applied Philosophy* 33, no. 3 (2016): 270–85. https://doi.org/10.1111/japp.12112.

Cohen, Jean L., "Rethinking Privacy: The Abortion Controversy", in *Public and Private Thought and Practice: Perspectives on a Grand Dichotomy*, 133-153 edited by Jeff Weintraub & Krishan Kumar (1997).

DeCew, Judith. "Privacy." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta, Spring 2018. Metaphysics Research Lab, Stanford University, 2018. https://plato.stanford.edu/archives/spr2018/entries/privacy/.

"Department of Justice Announces Interim Policy on Emerging Method to Generate Leads for Unsolved Violent Crimes," September 24, 2019. https://www.justice.gov/opa/pr/department-justice-announces-interim-policy-emerging-method-generate-leads-unsolved-violent.

Druckman, James N. "The Implications of Framing Effects for Citizen Competence." *Political Behavior* 23, no. 3 (2001): 225–56.

Erlich, Yaniv, Tal Shor, Itsik Pe'er, and Shai Carmi. "Identity Inference of Genomic Data Using Long-Range Familial Searches." *Science* 362, no. 6415 (November 9, 2018): 690. https://doi.org/10.1126/science.aau4832.

Etzioni, Amitai. "A Communitarian Approach: A Viewpoint on the Study of the Legal, Ethical and Policy Considerations Raised by DNA Tests and Databases." *The Journal of Law, Medicine & Ethics* 34, no. 2 (June 1, 2006): 214–21. https://doi.org/10.1111/j.1748-720X.2006.00028.x.

Eyal, Nir. "Informed Consent," September 20, 2011. https://plato.stanford.edu/archives/fall2020/entries/informed-consent/#WhyInfCon.

Farivar, Cyrus. "GEDmatch, a Tiny DNA Analysis Firm, Was Key for Golden State Killer Case." Ars Technica, April 27, 2018. https://arstechnica.com/tech-policy/2018/04/gedmatch-a-tiny-dna-analysis-firm-was-key-for-golden-state-killer-case/.

Federal Bureau of Investigation. "Combined DNA Index System (CODIS)." Folder. Accessed November 2, 2020. https://www.fbi.gov/services/laboratory/biometric-analysis/codis.

Field, Michael B, Saniya Seera, Christina Nguyen, and Sara Debus-Sherrill. "Study of Familial DNA Searching Policies and Practices: Case Study Brief Series," no. 2013 (n.d.): 41. "Five

Things About Deterrence." United States Department of Justice National Institute of Justice, May 2016.

Flanigan, Jessica. "Why Autonomy Remains the Most Important Value." Cato Unbound, July 24, 2017. https://www.cato-unbound.org/2017/07/24/jessica-flanigan/why-autonomy-remains-most-important-value.

"GAP Announcement: Updates to Our Terms of Service and Privacy Policy," March 12, 2019. https://mailchi.mp/familytreedna/updates-to-our-terms-of-service-and-privacy-policy-march19?e=dfef197239.

Greely, Henry T., Daniel P. Riordan, Nanibaa A. Garrison, and Joanna L. Mountain. "Family Ties: The Use of DNA Offender Databases to Catch Offenders' Kin Symposium Article - Part I." *Journal of Law, Medicine and Ethics*, no. 2 (2006): 248–62.

Grimm, Daniel J. "The Demographics of Genetic Surveillance: Familial DNA Testing and the Hispanic Community Note." *Columbia Law Review* 107, no. 5 (2007): 1164–94.

Guerrini, Christi J, Jill O Robinson, Devan Petersen, and Amy L McGuire. "Should Police Have Access to Genetic Genealogy Databases? Capturing the Golden State Killer and Other Criminals Using a Controversial New Forensic Technique." *PLoS Biology* 16, no. 10 (October 2018). https://doi.org/10.1371/journal.pbio.2006906.

Gutmann, Amy, and James W. Wagner. "Found Your DNA on the Web: Reconciling Privacy and Progress." *Hastings Center Report* 43, no. 3 (May 1, 2013): 15–18. https://doi.org/10.1002/hast.162.

Haimes, Erica. "Social and Ethical Issues in the Use of Familial Searching in Forensic Investigations: Insights from Family and Kinship Studies Symposium Article - Part I." *Journal of Law, Medicine and Ethics*, no. 2 (2006): 263–76.

Hanna, Jason. "Consent and the Problem of Framing Effects." *Ethical Theory and Moral Practice* 14, no. 5 (2011): 517–31. https://doi.org/10.1007/s10677-011-9266-y.

Hansen, Pelle Gouldborg, and Andreas Maaløe Jespersen. "Nudge and the Manipulation of Choice: A Framework for the Responsible Use of the Nudge Approach to Behaviour Change in Public Policy." *European Journal of Risk Regulation* 4, no. 1 (2013): 3–28. https://doi.org/10.1017/S1867299X00002762.

Hargreaves, Stuart. "'Relational Privacy' & Tort." *William & Mary Journal of Women and the Law* 23, no. 3 (2017): 433.

Hautala, Laura. "How Sharing Your DNA Solves Horrible Crimes... and Stirs a Privacy Debate." *CNET*, July 2, 2019. https://www.cnet.com/news/how-sharing-your-dna-solves-horrible-crimes-and-stirs-a-privacy-debate/.

Hazel, J. W., E. W. Clayton, B. A. Malin, and C. Slobogin. "Is It Time for a Universal Genetic Forensic Database?" *Science* 362, no. 6417 (November 23, 2018): 898. https://doi.org/10.1126/science.aav5475.

Hernandez, Danielle. "Ancestry.Com Is Quietly Transforming Itself Into A Medical Research Juggernaut." *Huffington Post*, December 6, 207AD. https://www.huffpost.com/entry/ancestrycom-medical-research-juggernaut_n_7008446.

Hooker, Brad. "Rule Consequentialism." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta, Winter 2016. Metaphysics Research Lab, Stanford University, 2016. https://plato.stanford.edu/archives/win2016/entries/consequentialism-rule/.

Hurd, Heidi M. "The Moral Magic of Consent Special Issue: Sex and Consent, Part I." *Legal Theory* 2, no. 2 (1996): 121–46.

Innocence Project. "DNA's Revolutionary Role in Freeing the Innocent in the U.S.," April 18, 2018. https://www.innocenceproject.org/dna-revolutionary-role-freedom/.

Innocence Staff. "DNA Testing Identifies Actual Perpetrator in 1996 Idaho Falls Rape and Murder, Confirming Christopher Tapp's Innocence." *Innocence Project*, July 17, 2019. https://www.innocenceproject.org/christopher-tapp-exoneration/.

James, Randy. "A Brief History of DNA Testing." *Time*, June 19, 2009. http://content.time.com/time/nation/article/0,8599,1905706,00.html.

Kahn, Jonathan. "Race, Genes, and Justice: A Call to Reform the Presentation of Forensic DNA Evidence in Criminal Trials." *Brooklyn Law Review* 74, no. 2 (December 1, 2008): 325–75.

Kaiser, Jocelyn. "New Federal Rules Limit Police Searches of Family Tree DNA Databases." *Science | AAAS*, September 25, 2019. https://www.sciencemag.org/news/2019/09/new-federal-rules-limit-police-searches-family-tree-dna-databases.

Kovaleski, Serge F. "Killers' Families Left to Confront Fear and Shame." *The New York Times*, February 5, 2012, sec. U.S. https://www.nytimes.com/2012/02/05/us/killers-families-left-to-confront-fear-and-shame.html.

Lageson, Sarah Esther. "Privacy Concerns Don't Stop People from Putting Their DNA on the Internet to Help Solve Crimes." *The Conversation*, June 7, 2019. http://theconversation.com/privacy-concerns-dont-stop-people-from-putting-their-dna-on-the-internet-to-help-solve-crimes-118091.

Lange, Jeva. "Michelle McNamara's Tantalizing Roadmap for Finding a Long Lost Serial Killer." *The Week*, March 19, 2018. https://theweek.com/articles/761206/michelle-mcnamaras-tantalizing-roadmap-finding-long-lost-serial-killer.

Lehigh, Scot "Bulger Chose the Code of the Street," *Boston Globe*, Dec 4, 2002, p. A19.

Lynch, Jennifer. "California Supreme Court Upholds the State's Problematic Arrestee DNA Collection Law." *Electronic Frontier Foundation*, April 2, 2018. https://www.eff.org/deeplinks/2018/04/california-supreme-court-upholds-arrestee-dna-collection-law.

Machado, Helena, and Susana Silva. "Informed Consent in Forensic DNA Databases: Volunteering, Constructions of Risk and Identity Categorization." *BioSocieties* 4, no. 4 (2009): 335–48. https://doi.org/10.1017/S1745855209990329.

Marks, Andrea. "DNA Search Method That Caught Golden State Killer No Longer Available." *Rolling Stone* (blog), May 23, 2019. https://www.rollingstone.com/culture/culture-news/dna-search-method-that-caught-the-golden-state-killer-no-longer-available-839315/.

McCarthy, Mary. "Am I My Brother's Keeper? Familial DNA Searches in the Twenty-First Century." *The Notre Dame Law Review* 86, no. 1 (2011): 381.

Mehaffey, Trish. "Distant Relative Learns Her DNA Led to Arrest in Michelle Martinko Slaying." *The Gazette*, March 22, 2019. https://www.thegazette.com/subject/news/public-safety/distant-relative-brandie-jennings-learns-her-dna-led-to-arrest-in-michelle-martinko-slaying-jerry-lynn-burns-20190322.

MIT Technology Review. "The DNA Database Used to Find the Golden State Killer Is a National Security Leak Waiting to Happen." Accessed November 18, 2020. https://www.technologyreview.com/2019/10/30/132142/dna-database-gedmatch-golden-state-killer-security-risk-hack/.

Moore, Adam D. "Privacy: Its Meaning and Value." *American Philosophical Quarterly* 40, no. 3 (2003): 215–27.

Moran, Kimberlee Sue. "Damned by DNA — Balancing Personal Privacy with Public Safety." *Forensic Science International* 292 (November 1, 2018): e3–4. https://doi.org/10.1016/j.forsciint.2018.09.011.

Murphy, Erin, and Jun Tong. "The Racial Composition of Forensic DNA Databases." *California Law Review* 108 (August 8, 2019): 63. https://doi.org/10.2139/ssrn.3477974.

Murphy, Heather. "Most White Americans' DNA Can Be Identified Through Genealogy Databases." *The New York Times*, October 11, 2018, sec. Science. https://www.nytimes.com/2018/10/11/science/science-genetic-genealogy-study.html.

Murtagh, Kevin. "Punishment." In *Internet Encyclopedia of Philosophy*. Accessed October 6, 2020. https://iep.utm.edu/punishme/.

Nagel, Thomas. *Mortal Questions*. Canto Classics. Cambridge: Cambridge University Press, 2012. https://doi.org/10.1017/CBO9781107341050.

Nathanson, Stephen. “Act and Rule Utilitarianism.” Accessed October 13, 2020. https://iep.utm.edu/util-a-r/.

Negley, Glenn. “Philosophical Views on the Value of Privacy.” *Law and Contemporary Problems* 31, no. 2 (1966): 319–25.

Nelkin, Dana K. “Moral Luck.” In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta, Summer 2019. Metaphysics Research Lab, Stanford University, 2019. https://plato.stanford.edu/archives/sum2019/entries/moral-luck/.

Nellis, Ashley. “The Color of Justice: Racial and Ethnic Disparity in State Prisons.” Washington, D.C.: The Sentencing Project. Accessed November 9, 2020. https://www.sentencingproject.org/publications/color-of-justice-racial-and-ethnic-disparity-in-state-prisons/.

Nelson, Mark. “Making Sense of DNA Backlogs - Myths vs. Reality.” *National Institute of Justice*, July 15, 2010. https://nij.ojp.gov/topics/articles/making-sense-dna-backlogs-myths-vs-reality.

Niedzwiecki, Emily, Sara Debus-Sherrill, and Michael B Field. “Understanding Familial DNA Searching: Coming to a Consensus on Terminology.” National Institute of Justice, April 2016.

Noggle, Robert. “The Ethics of Manipulation.” In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta, Summer 2020. Metaphysics Research Lab, Stanford University, 2020. https://plato.stanford.edu/archives/sum2020/entries/ethics-manipulation/.

Perrin, Andrew. “About Half of Americans Are OK with DNA Testing Companies Sharing User Data with Law Enforcement.” *Pew Research Center* (blog), February 4, 2020. https://www.pewresearch.org/fact-tank/2020/02/04/about-half-of-americans-are-ok-with-dna-testing-companies-sharing-user-data-with-law-enforcement/.

Prosser, William L. “Privacy.” *California Law Review* 48, no. 3 (1960): 383–423.

Rainey, James. “Familial DNA Testing Puts Elusive Killers behind Bars. But Only 12 States Use It.” *NBC News*, April 28, 2018. https://www.nbcnews.com/news/us-news/familial-dna-puts-elusive-killers-behind-bars-only-12-states-n869711.

Ram, Natalie, and Jessica L. Roberts. “Forensic Genealogy and the Power of Defaults.” *Nature Biotechnology* 37, no. 7 (July 2019): 707+.

Ram, Natalie. “Genetic Privacy after Carpenter.” *Virginia Law Review* 105, no. 7 (2019): 1357–1426.

Regalado, Anthony. “Help Us Catch Killers Is Now the New Advertising Angle for DNA Companies.” MIT Technology Review, March 27, 2019.

https://www.technologyreview.com/2019/03/27/1194/help-us-catch-killers-is-now-the-new-advertising-angle-for-dna-companies/.

Regan, Priscilla M. *Legislating Privacy : Technology, Social Values, and Public Policy*. Book Collections on Project MUSE. Chapel Hill: The University of North Carolina Press, 1995. https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1592&site=ehost-live.

Richards, David A.J. "Rights and Autonomy." *Ethics* 92, no. 1 (1981): 3–20.

Rivera-Castro, Faviola. "Natural Duties." In *The Cambridge Rawls Lexicon*, edited by David A. Reidy and Jon Mandle, 548–50. Cambridge: Cambridge University Press, 2014. https://doi.org/10.1017/CBO9781139026741.142.

Robinson, Eric P. "Appropriation." In *The First Amendment Encyclopedia*. Free Speech Center at Middle Tennessee State University. Accessed March 2, 2021. https://www.mtsu.edu/first-amendment/article/891/appropriation.

Rosen, Jeffrey. "Genetic Surveillance for All?" *Slate Magazine*, March 17, 2009. https://slate.com/news-and-politics/2009/03/genetic-surveillance-for-all.html.

Rothstein, Mark A., and Meghan K. Talbott. "The Expanding Use of DNA in Law Enforcement: What Role for Privacy?" *The Journal of Law, Medicine & Ethics* 34, no. 2 (June 1, 2006): 153–64. https://doi.org/10.1111/j.1748-720X.2006.00024.x.

"Same Crime, More Time." *Georgia State University Research Magazine*, April 29, 2020. https://news.gsu.edu/research-magazine/spring2020/incarceration.

Sandel, Michael J. *Justice : What's the Right Thing to Do?* 1st ed. New York: Farrar, Straus and Giroux, 2009.

Savill, Richard. "Nephew's DNA Traps Killer 15 Years Later." *The Daily Telegraph*. July 5, 2003. https://www.telegraph.co.uk/news/uknews/1434910/Nephews-DNA-traps-killer-15-years-later.html.

Smith v. Maryland, 442 U.S. 735 (1979)

Sederstrom, Jill. "The Predator Lurking Outside: The Dangerous Training Ground Where Many Prolific Serial Killers Get Their Start." Oxygen Official Site, August 20, 2019. https://www.oxygen.com/martinis-murder/why-peeping-toms-escalate-serial-killers-like ted-bundy-btk.

Seidman, Louis Michael. "Soldiers, Martyrs, and Criminals: Utilitarian Theory and the Problem of Crime Control." *The Yale Law Journal* 94, no. 2 (1984): 315–49. https://doi.org/10.2307/796227.

The Sentencing Project. "Report to the United Nations on Racial Disparities in the U.S. Criminal

Justice System," March 2018. https://www.sentencingproject.org/publications/un-report-on-racial-disparities/.

Singer, Peter. "Famine, Affluence, and Morality." *Philosophy & Public Affairs* 1, no. 3 (1972): 229–43.

Song, Yun S, Anand Patil, Erin E Murphy, and Montgomery Slatkin. "Average Probability That a 'Cold Hit' in a DNA Database Search Results in an Erroneous Attribution." *Journal of Forensic Sciences* 54, no. 1 (January 2009): 22–27. https://doi.org/10.1111/j.1556-4029.2008.00917.x.

Stern, Jacob, and Sarah Zhang. "The Victims Left Behind by Genetic Genealogy." *The Atlantic*, January 27, 2021. https://www.theatlantic.com/science/archive/2021/01/genetic-genealogy-race/616171/.

Sunstein, Cass R. "The Ethics of Nudging." *Yale Journal on Regulation* 32, no. 2 (2015): 413.

Susser, Daniel, Beate Roessler, and Helen Nissenbaum. "Online Manipulation: Hidden Influences in a Digital World." *SSRN Electronic Journal*, January 1, 2018. https://doi.org/10.2139/ssrn.3306006.

Suter, Sonia M. "All in the Family: Privacy and DNA Familial Searching." *Harvard Journal of Law & Technology* 23, no. 2 (2010): 309.

Thaler, Richard H., and Cass R. Sunstein. *Nudge : Improving Decisions about Health, Wealth, and Happiness*. New Haven: Yale University Press, 2008.

"United States Department of Justice Interim Policy: Forensic Genetic Genealogical DNA Analysis and Searching," n.d., 8.

United States v. Miller, 425 U.S. 435 (1976)

Valentino-DeVries, Jennifer, Natasha Singer, Michael H. Keller, and Aaron Krolik. "Your Apps Know Where You Were Last Night, and They're Not Keeping It Secret." *The New York Times*, December 10, 2018, sec. Business. https://www.nytimes.com/interactive/2018/12/10/business/location-data-privacy-apps.html.

Villasenor, John. "What You Need to Know about the Third-Party Doctrine." *The Atlantic*, December 30, 2013, sec. Technology. https://www.theatlantic.com/technology/archive/2013/12/what-you-need-to-know-about-the-third-party-doctrine/282721/.

Wells, William, Ashley K Fansher, and Bradley A Campbell. "The Results of CODIS-Hit Investigations in a Sample of Cases With Unsubmitted Sexual Assault Kits." *Crime and Delinquency* 65, no. 1 (2019): 122–48. https://doi.org/10.1177/0011128717732506.

Weiss, Marcia J. “Beware! Uncle Sam Has Your DNA: Legal Fallout from Its Use and Misuse in the U.S.” *Ethics and Information Technology* 6, no. 1 (2004): 55–63. https://doi.org/10.1023/B:ETIN.0000036159.90081.cc.

Whittaker, Zack. “GEDmatch Confirms Data Breach after Users’ DNA Profile Data Made Available to Police.” *Tech Crunch*, July 22, 2020. https://techcrunch.com/2020/07/22/gedmatch-investigating-dna-profile-law-enforcement/.

Wickenheiser, Ray A. “Forensic Genealogy, Bioethics and the Golden State Killer Case.” *Forensic Science International: Synergy* 1 (January 1, 2019): 114–25. https://doi.org/10.1016/j.fsisyn.2019.07.003.

Wood, Alex. “DNA, Genealogy Led to Arrest in Series of Rapes.” *Journal Inquirer*. June 10, 2020. https://www.journalinquirer.com/crime_and_courts/dna-genealogy-led-to-arrest-in-series-of-rapes/article_27b25296-ab2d-11ea-8b3e-472861ca42e0.html.

Yancey-Bragg, N’dea. “DNA Is Cracking Mysteries and Cold Cases. But Is Genome Sleuthing the ‘Unregulated Wild West?’” *USA TODAY*. Accessed October 12, 2020. https://www.usatoday.com/story/news/nation/2019/05/14/heres-how-dna-cracking-cold-cases-and-exonerating-innocent/1159571001/.

Zhang, Sarah. “A DNA Company Wants You to Help Catch Criminals.” The Atlantic, March 29, 2019. https://www.theatlantic.com/science/archive/2019/03/a-dna-company-wants-your-dna-to-catch-criminals/586120/.