
1998

Genetic Technology and Its Impact on Culpability for Criminal Actions

Marcia Johnson

Thurgood Marshall School of Law

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Recommended Citation

Marcia Johnson, *Genetic Technology and Its Impact on Culpability for Criminal Actions*, 46 Clev. St. L. Rev. 443 (1998)

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GENETIC TECHNOLOGY AND ITS IMPACT ON CULPABILITY FOR CRIMINAL ACTIONS

MARCIA JOHNSON¹

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INTRODUCTION

Despite the public's familiarity with the idea of the study and manipulation of human genes, genetics is a relatively new science.² Genetic research is genetic testing which can identify genetic disorders such as sickle cell anemia and Huntington's disease. Such identification can inform a carrier of potential and imminent health problems and this encourage early treatment and other benefits.³

¹Interim Dean and Professor, Thurgood Marshall School of Law. The author wishes to thank Elizabeth Jones, J.D., Texas Southern University and John Shavers, J.D., Texas Southern University for their research and writing assistance and Voni Welch for her typing.

²See Louis J. Elsas II, *A Clinical Approach to Legal and Ethical Problems in Human Genetics, The Randolph W. Thrower Symposium: Genetics and the Law*, 39 EMORY L.J. 811 (1990).

³*Id.*

Genetic research has also begun playing significant roles in criminal investigations.⁴ For example, "DNA fingerprints" are becoming a popular way of identifying, and in many cases, eliminating criminal suspects.⁵

Nonetheless, genetic research is not without negative influence. The Nazi racial hygienists of the 1930s and 1940s are an example of the worst that genetic research has to offer. We are thereby warned and cautioned that the power inherent in this new science has also set the stage for extraordinary abuse, including, for example, the violation of human rights through laws against discrimination and invasion of privacy.⁶

Without regard to our personal views about the potential value or harm of genetic technology, the science is here and expanding;⁷ and it is quite reasonable to expect that genetic engineering will profoundly affect the lives of people everywhere.⁸

Clearly, genetic technological advances will raise numerous questions and legal issues from employment, invasion of privacy, and insurance discrimination to moral issues involving exercise of choice in genetic engineering for the selection of gender, eye color, preferred race and other characteristics of children. This article addresses only one issue, one which our judicial system ultimately must address: the criminal responsibility one will bear for committing a crime when the actions are determined by the actor's genetic make-up. Although the focus herein is on legal implications, social implications can be startling and should not be ignored.

Part I of the article traces the roots of genetic research from Darwinism to eugenics and Nazi racial purity theories. Part II reviews theories and studies which support the concept of genetic influence on social, particularly criminal, behavior. Part III considers the impact of the genetic revolution on our criminal justice system with special emphasis on the effect on our system's fundamental concept of free will. Part IV discusses a defendant's defense to commission of crime(s) based on genetic determinism. Possible responses including alternative penalties are also discussed. Finally, Part V concludes the article.

I. USING THE EVOLUTIONARY THEORIES OF DARWINISM TO SUPPORT NAZI RACIAL HYGIENE AND EUGENICS

A. Darwinism

Almost all theories involving the origin of human evolution credit Charles Darwin's notions of survival of the fittest and natural selection ("Darwinism") as their foundation. The Nazi racial hygiene and eugenics theories began as a spin-off of Darwinism and evolved into quite different philosophies. Accordingly, Darwinism is explored first as the foundation of general theories of human evolution,

⁴*Id.*

⁵*Id.*

⁶Kimberly Nobles, *Birthright or Life Sentence. Controlling the Threat of Genetic Testing*, 65 S.COL. L. REV. 2081 (1992). Nobles declares that "left unchecked, genetic technology has the potential to wreak havoc on society."

⁷The United States Congress has initiated a study to be completed in 2004 which is charged with mapping and identifying the genes in the human chromosomal structure.

⁸Nobles, *supra* note 6, at 2084.

and second for the philosophies behind Nazi racial hygiene and eugenics, and the evolving genetic technology.⁹

1. Charles Darwin: Contrasting Natural Selection with Artificial Selection

Darwinism is based on three propositions: first, that graduations in the perfection of any organ or instinct either do now exist or could have existed, each good to its kind; second, that all organs or instincts are, in ever so slight a degree, variable; and last, that there is a struggle for existence leading to the preservation of each profitable deviation of structure or instinct.¹⁰ Charles Darwin set out to accomplish two major tasks: to work out a mechanism to show how evolution might occur, a process which he called "natural selection" and to collect enough evidence to convince people that evolution had occurred.¹¹

Under the proposition that graduations in the perfection of any organ or instinct either do now exist or could have existed, Darwin had two sub-propositions: 1) variation under domestication; and 2) variation under nature. Variation under domestication occurs when individuals of the same variety or a subvariety differ much more from each other, individuals of any one species or variety in a natural state. The difference within the variety is attributable to cultivation, which causes variations as the species continue to exist under different climates and treatments. The sameness of variation is often attributed to "natural selection" or "artificial selection."

Under "artificial selection" or "selective breeding," scientists choose those products which have the desired qualities and breed only among them, rejecting the rest.¹² Darwin concludes that greater variability within a species is actually due to domestic productions raised under conditions of life which are not uniform, and are somewhat different from those of which the parent-species had been naturally exposed.¹³ Though Darwin found no case where a variable ceased to be variable under cultivation, he did find that even our oldest cultivated plants, such as wheat, yield new varieties; and our oldest domesticated animals are still capable of rapid

⁹See Lynn Gustafson, *Fatalism and Determinism*, <http://halley.pepperdine.edu/studios/etc.adrel/ethics/deter_fatal>. Gustafson suggests that prior to Darwin's theory of natural selection, others had promoted theories which could be viewed as precursors to genetic determinism. For example, John Calvin preached that God is all-knowing and all-powerful; that God predetermines all events and humans are powerless to alter them. Calvinism predated Darwinism by about 300 years. Almost 200 years before Darwin, Sir Isaac Newton promoted the theory of natural laws. This theory is similar to Darwin and post Darwin theories of genetic determinism. Newton proposed that all things were determined by natural laws and that human beings are subject to and could not control or overcome the influence of the natural law.

¹⁰CHARLES DARWIN, *THE ORIGIN OF SPECIES BY MEANS OF NATURAL SELECTION* 435 (Avenel Books) (1979). Charles Darwin describes his propositions as indisputably true.

¹¹LINDA GAMLIN, *EYEWITNESS SCIENCE: EVOLUTION* 22 (Dorling Kindersley) (1993).

¹²*Id.* at 30.

¹³DARWIN, *supra* note 10, at 71. Darwin continues that it is clear that organic beings must be exposed during several generations to the new conditions of life to cause any appreciable amount of variation, and that when the organization has once begun to vary, it generally continues to vary for many generations.

'improvement' or modification.¹⁴ Darwin attributed the most frequent causes of variability to the forces which impact the male and female reproductive elements prior to the act of conception.¹⁵

Darwin described "natural selection" as a similar process of selective breeding which occurred in nature.¹⁶ His natural selection theory rests on the supposition that a strain of a variety over time evolves from a state in which it is similar to its parent with very slight differentiation to a strain from which it differs more. This increasing difference occurs because species naturally accumulate differences of structure in certain definite directions.¹⁷ This process mandates adaptation and given enough time, could ultimately produce a new specie.¹⁸

Natural selection rests on the premise that there is a constant struggle for existence. As a consequence of this instinct to survive, any variation, however slight, which is seen as profitable to an individual of any species, will tend to be adapted by that individual for its preservation and will generally be inherited by its offspring. This provides the offspring a better chance of surviving.¹⁹ It is on this foundation that Darwin rests his conclusions that useful variations will occur in the course of thousands of generations. When they do occur, individuals having any advantage over others would have the best chance of surviving and of procreating their kind . . .²⁰ Based on a similar rationale, any variation in the least degree injurious would be destroyed.²¹ This preservation of favorable variations and the rejection of injurious variations, represents the essence of "natural selection."²²

In light of Darwin's theory that the mating habits of animals and plants bring about a greater variety within that species, it would follow that through the process

¹⁴This examination may seem to place the greatest emphasis for explaining variation on the genetics pool; however, it leaves significant room for support of the influence of environmental and other domestication factors.

¹⁵DARWIN, *supra* note 10, at 72-73. Darwin postulates that animals and plants when kept in confinement, breed freely, whereas under natural conditions these animals or plants would never unite, this is attributed to vitiated instincts.

¹⁶GAMLIN, *supra* note 11, at 32. The three ingredients needed were variation, inheritance, and competition.

¹⁷DARWIN, *supra* note 10, at 106-07. Darwin classifies a "well-marked" variety from the parent to the child as an incipient species.

¹⁸GAMLIN, *supra* note 11, at 36.

¹⁹DARWIN, *supra* note 10, at 114-15.

²⁰*Id.* at 130-31. Consider that one generation is defined as the average time interval between the birth of parents and the birth of their offspring. If that period was even liberally construed to be sixteen years and we consider only one thousand generations (in lieu of the thousands Darwin requires for his survival theory), it would take at least 16,000 years for human beings to naturally select a useful variation.

²¹Similarly, it would take thousands of years for the deteriorious factor to be destroyed.

²²DARWIN, *supra* note 10, at 131.

of natural selection and combination of mating habits, certain traits would be more likely to occur while others would be less likely to occur.²³

2. Gregor Mendel: Expanding Darwinism to Eugenics

Darwinism was expanded by Gregor Mendel in his published paper discussing the laws of heredity. The paper offered explanations both for the general way in which parents transmit their characteristics as well as the frequency with which these characteristics appear among their offspring.²⁴

Mendel identified two basic laws of heredity. The first was that hereditary factors are carried individually by a parent's sex cells, and that in the fertilized egg, such factors can combine with any similar factor from the other parent.²⁵ His second law of heredity dealt with inheritance of pairs of associated factors, and how particular features or traits are handed on by parents to their offspring.²⁶ Since different offspring will inherit different combinations of features, greater variety in a population will be produced.²⁷ As a result of these studies, Gregor Mendel is generally considered the founder of modern genetics.²⁸ Mendel's laws of heredity and Darwin's theories on natural selection and survival of the fittest were used as a model in the initial studies of eugenics and racial hygiene. However, the study of eugenics and racial hygiene would ultimately expand Darwin's theories of artificial or "unnatural" selection. Darwin's theories of natural selection were predicated on the belief that nature would take its own course, and that the good would naturally win over the bad. The human species could play a part in selecting these "good" results through its mating habits, since gene availability would dictate the combinations inheritable by offspring. Darwin proposed that the bad traits would naturally become extinct because the "good" traits would survive at a high rate.

Eugenics and racial hygiene theorists support a human-determination rather than nature's determination of which traits are "good" and "bad." Thus, rather than natural evolution, theories of eugenics and racial hygiene are rooted in social evolution.

B. Eugenics

Eugenics is defined as the study of hereditary improvement by genetic control.²⁹ Francis Galton first published his theories on eugenics in 1865.³⁰ Galton, through eugenics, investigated the origins of "natural ability." In his research, Galton drew a

²³*Id.* at 173-204. Charles Darwin supports such a hypothesis in his chapter titled "Laws of Variation."

²⁴RON TAYLOR, *THE STORY OF EVOLUTION* 54-56 (Warwick Press) (1981).

²⁵*Id.*

²⁶*Id.*

²⁷*Id.*

²⁸OREL VITEZSLAV, *GREGOR MENDEL: THE FIRST GENETICIST*, (Stephen Finn trans., Oxford University Press) (1996).

²⁹THE AMERICAN HERITAGE DICTIONARY, 468 (2d ed. 1991).

³⁰DANIEL J. KELVES, *IN THE NAME OF EUGENICS: GENETICS AND THE USES OF HUMAN HEREDITY* 3 (Alfred A. Knopf ed.) (1985).

sample population, spanning two centuries, of distinguished jurists, statesmen, military commanders, scientists, poets, painters, and musicians from biographical encyclopedias.³¹ He found that a disproportionately large fraction of them were blood relatives.³² Families of reputation, he concluded, were much more likely than ordinary families to produce offspring of ability.³³ Galton concluded that heredity governed not only physical features, but also talent and character.³⁴ This study made Galton confident that it would be "quite practical to produce a highly gifted race of people by judicious marriages spanning several consecutive generations."³⁵

Pursuing this theory, Galton embarked on heredity studies which ultimately raised serious problems for his eugenics program.³⁶ It was clear from his work that in any population the distribution of a given character remained the same from generation to generation; the bell curve, for say, height was the same for children as for parents. More important, even if only members of the population at the extremes of the bell curve, were chosen for reproduction, Galton's results declared that their progeny, if left to reproduce without constraint, would ultimately regress toward the mean of the initial population.³⁷ It seemed that only by selection of those desired traits in every generation could a line continue to have the desired traits.³⁸ Galton believed it was "in consequence[,] impossible that the natural qualities of any one group would be permanently changed through the action of selection upon mere variations."³⁹

Heredity, Galton supposed, must be governed by some latent element responsible for the transmission of characters from one generation to the next.⁴⁰ Humans, he felt, were relegated to watch for opportunities to intervene by checking the former and giving free play to the latter.⁴¹

³¹*Id.* at 3-4. These studies are reported in *Hereditary Genius*, published in 1969.

³²KELVES, *supra* note 30, at 4.

³³*Id.*

³⁴*Id.*

³⁵Note that Galton's theory of mating manipulation purportedly reduces the period of genetic variation from thousands of generations (Darwin) under natural selection to three or four generations under human manipulation or eugenics.

³⁶The Galton "scientific" studies focused on socially eminent and economically secure families and helped to support the highly social stratification of the British society. This, of course, was probably helpful to his research; however, the scientific results over a long term would not.

Galton coined the term "eugenics" in 1883 to describe what he hoped would become a scientifically based approach to marriage.

³⁷KELVES, *supra* note 30.

³⁸*Id.*

³⁹*Id.*

⁴⁰*Id.*

⁴¹In effect bolstering Darwin's theory of natural selection.

These evolving theories of eugenics were used in the United States as a basis for its immigration laws during the beginning of this century. It is the application of the theories of eugenics that best illustrate its breadth.

Although racism figured greatly in the arguments against unrestricted immigration, economic factors tended to dominate the debate through 1921, when Congress — in the wake of the red scare and postwar unemployment — passed an emergency restriction act by which immigration from any European country was limited annually to three percent of the foreign-born nationalities listed in the 1910 U.S. census.⁴²

By the outbreak of the first World War, sterilization laws had gained prevalence but were highly in dispute.⁴³ For example, the courts declared that Iowa statutes favoring sterilization and some less sweeping measures in six other states were unconstitutionally stringent.⁴⁴ Advocates of eugenic sterilization who were not happy with the lower courts' rulings, sought to take the issue to the United States Supreme Court. In Virginia, eugenicists helped write a constitutionally permissible sterilization statute which was passed by that state's legislature in March, 1924.⁴⁵ The opportunity to test the statute arose when Carrie Buck, a 17-year-old girl, who seemed definable as a "moral imbecile," was committed to the Virginia Colony for Epileptics and Feeble-minded in Lynchburg.⁴⁶

Both Carrie and her mother, Emma, had been given intelligence quotient (I.Q.) tests. Each tested under the age level for eight-year-olds.⁴⁷ Moreover, Carrie already had a daughter named Vivian. Based on the I.Q. tests, Carrie was ordered to be sterilized.⁴⁸

This order would test the validity of the Virginia statute favoring sterilization of people who bore unacceptable hereditary traits because here, there were three generations through which supposedly feeble-mindedness had passed.⁴⁹ The case, known as *Buck v. Bell*, persuaded the court that Carrie, Emma, and Vivian were all feeble-minded — that the feeble-mindedness was inheritable, and had in fact been

⁴²The U.S. was not exempt from forming its own sterilization laws. It was on the forefront with its immigration laws and sterilization laws, many of which other countries such as Britain and Germany followed.

⁴³KELVES, *supra* note 30, at 110.

⁴⁴1911 Iowa Acts 129; 1913 Iowa Acts 189; 1915 Iowa Acts 202. Iowa's law grew out of the desire to improve the human race by better breeding, a concept rudimentary to eugenics. Compulsory sexual sterilization laws were seen as a step toward reaching this goal. See Catherine Ingram, *Eugenics*, <<http://recall.lib.indiana.edu/~caingram/gene.html>>.

⁴⁵1924 Va. Acts ch. 394.

⁴⁶Robert J. Cynkar, *Buck v. Bell: "Felt Necessities" v. Fundamental Values?*, 81 COLUM. L. REV. 1418 (1981).

⁴⁷*Id.*

⁴⁸Recognizing eugenic principles in the United States may have had its first legal support in 1878 when New York passed a law which authorized the state to appropriate money to open an asylum in Newark for the custodial care of feeble-minded women of childbearing age.

⁴⁹Cynkar, *supra* note 46.

passed on from one generation to the next.⁵⁰ The U.S. Supreme Court upheld the Virginia statute by a vote of eight to one.⁵¹ The decision declared that sterilization on eugenic grounds was within the police power of the state, that it provided due process of law, and that it did not constitute cruel or unusual punishment.⁵² The sole dissenter was Justice Pierce Butler, a conservative, who kept his minority opinion to himself.⁵³

The I.Q. tests used in the Carrie Buck case, have long since been discredited as indicators of general intelligence.⁵⁴ Later records indicate that Carrie's daughter, Vivian, was considered bright by her teachers.⁵⁵ By the end of the 1920s, sterilization laws were on the books in a number of American states.⁵⁶ Though now severely restricted by federal regulation, they are still on the books in some states today.⁵⁷

⁵⁰Buck v. Bell, 274 U.S. 200 (1927).

⁵¹*Id.* See also Cynkar *supra* note 46, at 1432.

⁵²*Id.*

⁵³*Buck*, 274 U.S. at 200.

⁵⁴Cynkar, *supra* note 46.

⁵⁵*Id.*

⁵⁶Cynkar, *supra* note 46 at n. 76. On April 10, 1991, the Iowa legislature passed "An act to prevent the procreation of habitual criminals, idiots, feeble-minded and imbeciles." This law allowed for the sterilization of "criminals, rapists, idiots, feeble-minded, imbeciles, lunatics, drunkards, drug fiends, epileptics, syphilitics, moral and sexual perverts, and diseased and degenerate persons." The law went on to state, "such an operation [ligation of the Fallopian tubes or vasectomy] shall be performed upon every convict or inmate of such institution who has been convicted of prostitution . . . or who has been twice convicted of other sexual offenses, including soliciting." The necessity for sterilization was investigated in cases that did not involve crime, like lunatics and epileptics. This is contrasted by a person who has been convicted of two felonies, they are to be sterilized without any investigation. The excerpt from the law is interesting because prostitution involves the sexuality of women. This part of the law seems to reflect some of the same concerns that were evident in 1887. "The very possibility that poor women might use their bodies unconventionally threatened the biological understanding of gender as fixed and immutable." A person who is convicted or prostitution once is sterilized. This illustrates the concern that people felt. By eliminating these women's reproductive rights the question of their gender role is, in some ways, eliminated.

⁵⁷Richard A. Estacio, *Sterilization of the Mentally Disabled in Pennsylvania: Three Generations Without Legislative Guidance are Enough*, 92 DICK. L. REV. 409 (1988). See also Jon Gottshall, *The Cutting Edge: Sterilization and Eugenics in California, 1909-1945*, <<http://www.nayzak.com/~jgott/article.htm>> stating:

Few people today realize that at one time in this century it was not uncommon for mental institutions to order the sterilization of those they deemed unfit for parenthood, with or without the consent of the patients or their families. These operations were often justified in the name of eugenics, a branch of science that arose around the turn of the century and which posited that the control of human reproduction could improve both individuals and society. Although the eugenic policies of Nazi Germany, which included sterilization, are fairly well-known, America paved the way. In the years before WWII, thousands of people in the United

By the end of the 1920s, sterilization laws were on the books in a number of American states.⁵⁸ Though now severely regulated by federal regulation. In Virginia, the overwhelming majority of those persons sterilized were poor and probably as many as half of them were black.⁵⁹ Thus, in practice, eugenic theories have been employed as a scientific buttress for social, economic, and political horrors.

C. Nazi Racial Hygiene (Nazism)

In order to see more clearly how possible it is that current leadership and current social policy can take a scientific idea and mold it into something very different than what it began. It is necessary to understand the history and foundation of the Nazi racial hygiene movement. Often, it is the social and political variables which make it necessary to safeguard against influences of racism, including the separation of

States underwent forced sterilization. But this policy was not applied uniformly in the United States. One state led all others in the scope of implementation: California.

The state of Indiana enacted the first sterilization legislation in 1907. Other states were to eventually enact similar legislation, but the hub of activity soon moved to west coast, where that state's first sterilization law was enacted in 1909. Like many Midwestern transplants, this practice found itself less restricted in the Golden State, and by 1921, more eugenic sterilizations had been performed in California than in the rest of the United States combined (see table 1). Also, unlike in many other states, California's sterilization law suffered no judicial setbacks in the years before 1927, when such eugenic legislation was upheld as constitutional by the United States Supreme Court. The policies endured and became a model for others, both American and foreign, to imitate.

Although it was carried out on a significant scale well into the 1930's and even beyond, eugenic sterilization arose as a policy issue in California and the rest of the nation during the Progressive Era, which began around the beginning of the twentieth century and lasted until 1920. This was a time of reform movements stretching across many fronts, most stemming from a desire to purify or ameliorate the conditions of a changing nation. The role of the state was being redefined in response to a society under the stress of urbanization, industrialization, heavy immigration, and other forces. In this context, eugenics promised a straightforward plan for eliminating disorder and degeneracy. Eugenics stressed the application of science to human heredity and breeding in order to improve the human species both mentally and physically. Some Progressives referred to eugenics as "the science and the art of being born." Human sterilization may be carried out for many reasons. It may be as punishment, perhaps in the form of castration for repeat sex offenders. It may be for social reasons, when individuals are kept from having children because they are completely unable to care for them, either physically, emotionally, or financially. But when the state sterilizes an individual because he is seen to be genetically defective and therefore likely to pass his defects on to offspring, this is eugenic sterilization. And this was the type of sterilization that may California policymakers wanted to carry out.

⁵⁸*Id.*

⁵⁹See Beverly Horsburgh, *Schrdegreesodinger's Cat, Eugenics and the Compulsory Sterilization of Welfare Mothers: Deconstructing an Old/New Rhetoric and Constricting the Reproductive Right to Natality for Low-Income Women of Color*, 17 CARDOZO L. REV. 531 (1996).

persons based on skin color and national origin and the maintenance of class status quos, in integrating new ideas or policies into any system.

Nazi racial hygiene theories are rooted in Darwinism; social Darwinists in Germany sought to justify the creation of a certain political order by the unnatural development of a natural order.⁶⁰ Nazi racial hygiene was based on the perceived need for state intervention to stop what was seen as the beginnings of a purported "degeneration" of the human species.⁶¹

The degeneration of the race feared by German social Darwinists was said to have come about for two reasons: first, because medical care for "the weak" had begun to destroy the natural struggle for existence; and second, because the poor and misfits of the world were beginning to multiply faster than the talented and fit.⁶²

Nazi Alfred Ploetz, the founder of racial hygiene, offered the philosophy that medical care for the weak allowed individuals, who otherwise would never have survived under Darwin's theory of "survival of the fittest," to both survive and reproduce.⁶³ His conclusion that medical care helped individuals, but endangered the larger community, has been called the foundation of the racial hygiene movement.⁶⁴ Ploetz's solution to such counterselection was to focus on ways to control human breeding.

Biology played an important part in Nazi ideology.⁶⁵ Biology provided the foundation for National Socialism.⁶⁶ Hitler himself called his revolution "the final step in the overcoming of historicism and the recognition of purely biological values."⁶⁷ In 1929, a group of German physicians formed the National Socialist Physician's League to coordinate Nazi medical policy and to purify the German medical community of the influence of the so-called Jewish Bolshevism.⁶⁸ The league listed among its primary goals the promotion of knowledge of racial hygiene, racial science, and eugenics. The league summarized its principal task as one of providing the Nazi party and future state leadership with experts in all areas of public health and racial biology.⁶⁹

The rising tide in favor of purification had become increasingly visible by the time sterilization was legalized in Germany, in 1933.⁷⁰ The new sterilization laws

⁶⁰*Id.*

⁶¹KELVES, *supra* note 30.

⁶²*Id.* at 18-20.

⁶³*Id.*

⁶⁴*Id.*

⁶⁵KELVES, *supra* note 30.

⁶⁶*Id.*

⁶⁷*Id.*

⁶⁸ROBERT N. PROCTOR, RACIAL HYGIENE, MEDICINE UNDER THE NAZIS 65 (1988). Doctors joined the Nazi party for differing reasons. Many of these doctors were young and had aspirations for quick mobility, making a name for themselves in the medical community through the Nazi party.

⁶⁹*Id.*

⁷⁰*Id.* at 101.

allowed for sterilization only of supposedly "homozygous" carriers of genetic disease. Sterilization of "recessive" carriers was forbidden and remained punishable as a criminal offense.⁷¹

However, this "presupposed . . . that the various indications for which one could be sterilized — feeble-mindedness, schizophrenia, alcoholism, were single-gene traits that followed the simple rules of Mendelian genetics. Today we know such a notion is virtually meaningless."⁷² Nevertheless, there continues to be significant research in genetics with the view toward isolating single-gene traits. Much of the research is geared toward physical disorders, but a significant amount focuses on behavioral traits.

D. *The Crime Gene: Learning from History*

Although scientists have been able to identify the gene for sickle-cell anemia, Downs syndrome, and other genetic disorders, no one has isolated a "criminal" gene. However, certain genealogical designs have been linked to violent behavior.⁷³ It has been suggested that a number of methods can be used to eliminate "negative" traits. If violent behavior was deemed such a trait, it could presumably be isolated and eliminated by way of modern genetic technology or genetic engineering.

Through a process called "gene splicing," a gene can be taken from any organism and inserted into the genetic information of bacteria.⁷⁴ This is known as the recombinant DNA technique.⁷⁵

Opponents of such engineering argue, among other things, that a person predisposed of certain biases, such as race, gender, or class, would not realistically be able to analyze someone of a different background from their own in a neutral manner. Even if a person was not race-biased, there are certain societal biases which would always play a role in this analysis.

As seen through the origin of eugenics, and racial hygiene, the ideas were used presumably in an effort to help society recognize negative traits and to improve society by these traits. Through eugenics, gene alteration began in earnest with the legal sterilization of persons with "bad" genes so that they could not pass them on to their children.⁷⁶

Similarly, the Nazi racial hygiene theory began with the idea of sterilizing persons with "bad" genes so that they would not be passed onto their children. However, the Nazi theory was so burdened by its social definition of positive and negative traits that not only was the application of this theory wrought with bias, but it eventually led to the wholesale murdering of people based solely on their race.

⁷¹*Id.*

⁷²PROCTOR, *supra* note 68, at 101-102.

⁷³LAWRENCE TAYLOR, *BORN TO CRIME: THE GENETIC CAUSES OF CRIMINAL BEHAVIOR* (1984).

⁷⁴ALVIN AND VIRGINIA SILVERSTEIN, *THE GENETICS EXPLOSION* 84-85 (Four Winds Press) (1980).

⁷⁵*Id.*

⁷⁶A.G. Roper, *Ancient Eugenics*, Vol. 32, *MANKIND QUARTERLY* 383 (June 1, 1992), where the author traces the history of sterilization back to ancient Greece. See printing at <<http://ra.nilenet.com/~tmw/files/eugenics.html> June 11, 1996>.

History notwithstanding, 'born to crime theorists' have linked limbic brain disease and temporal lobe epilepsy, XYY chromosomal deviation, premenstrual syndrome, and testosterone imbalance to violent behavior.⁷⁷ Arguably, the presence of all or any of these factors could be sufficient to support its designation as a crime gene.

II. GENETIC INFLUENCES ON CRIME

Much time and effort has been devoted to finding the empirical causes of criminal behavior. Early attempts to find such causal factors centered around studies of anatomical differences believed at the time to exist between criminals and non-criminals. As time passed, these often crude and scientifically unsophisticated studies gave way to more sound techniques. Today, very sophisticated genetic and behavioral studies have given rise to modern theories of the cause or causes of criminal behavior. The major studies center around three doctrines: free will, biological determinism, and genetic essentialism.

Cesare Lombroso was one of the earliest students of criminal behavior. He based his studies upon his belief in the existence of a physically atavistic criminal.⁷⁸ Lombroso believed that criminals had distinguishable physical characteristics and that the likelihood for criminal behavior could be determined by comparison of a person's physical characteristics to those of known criminals.⁷⁹ Furthermore, Lombroso believed that the propensity to commit a given crime would be manifested in physical characteristics different from the physical characteristics of both non-criminals and persons who committed other types of crime.⁸⁰ For example, a rapist would have different physical characteristics than a murderer.⁸¹ Based upon his studies, Lombroso concluded that crime was caused by physical characteristics and not due to a person's ability or inability to exercise free will choices to engage in criminal behavior.⁸² He theorized that since crime was caused by physical characteristics, criminals did not deserve punishment.⁸³

Following Lombroso's studies were those conducted by Charles Goring, a turn-of-the-century English prison physician.⁸⁴ Goring concluded that Lombroso's atavistic criminal did not exist.⁸⁵ He believed instead that the existence of criminal

⁷⁷*Id.*

⁷⁸J.Q. WILSON & R.J. HERRNSTEIN, *CRIME & HUMAN NATURE* 73 (Simon & Schuster) (1985).

⁷⁹*Id.* at 73.

⁸⁰*Id.*

⁸¹*Id.*

⁸²*Id.* at 74.

⁸³WILSON & HERRNSTEIN, *supra* note 78, at 74.

⁸⁴*Id.* at 75. Goring's studies involved more than 3000 male inmates and control groups of nonprisoners. Whereas Lombroso's studies involved only measurements of physical characteristics, Goring's study included data on nonphysical aspects, including occupation, family, ethnicity, age, and education.

⁸⁵*Id.* at 76.

tendencies probably exist in all people in varying degrees.⁸⁶ According to Goring, when criminal tendencies combined with low intelligence, criminal behavior was the likely result.⁸⁷ Goring was convinced that heredity rather than environmental factors, was a greater determinant of a person's propensity to commit crime.

E.A. Hooton, an American physical anthropologist,⁸⁸ considered the effect of sociological characteristics such as marital status, education, and occupation.⁸⁹ Hooton's conclusions included elements of the conclusions of both Lombroso and Goring.⁹⁰ Hooton concluded that the larger the criminal, the more serious the crimes he was likely to have committed. Hooton believed "that physical inferiority is of principally hereditary origin, that these hereditary inferiors naturally gravitate into unfavorable environmental conditions, and that the worst or weakest of them yield to social stresses which force them into criminal behavior."⁹¹

The results of modern twin and adoption studies have led many behaviorists to conclude that there is a significant correlation between genetic factors and behavior. Such findings favor the doctrines of genetic essentialism and biological determinism and disfavor the doctrine of free will as related to the causation of criminal behavior. The doctrine of biological determinism is based upon the notion that conduct is always the product of some matrix of causal factors that necessarily determines choice.⁹² Genetic essentialism adopts the idea that personal traits are predictable and permanent, determined at conception and "hard-wired" into the human constitution.⁹³ The doctrine of free will is based upon the premise that all human behavior is produced through the intent and agency of the individual.⁹⁴ Our system of justice, guilt, and punishment is based upon this doctrine of free will.⁹⁵

A. Twin Studies

The study of twins has become a widely used approach in attempts to distinguish between genetic and environmental influences upon behavior. The premise upon which these studies are based is comprised of several logical assumptions. The first assumption takes into account the genetic differences between identical (monozygotic) twins and fraternal (dizygotic) twins.⁹⁶ From the known differences

⁸⁶*Id.*

⁸⁷WILSON & HERRNSTEIN, *supra* note 78, at 76-77.

⁸⁸*Id.* at 77. Hooton conducted a study on the characteristics of criminals in ten states involving more than 10,000 convicted male criminals and about 4000 noncriminals. His study involved the categorization of physical characteristics.

⁸⁹*Id.* at 77-78.

⁹⁰*Id.* at 77.

⁹¹WILSON & HERRNSTEIN, *supra* note 78, at 78.

⁹²*Id.*

⁹³Maureen P. Coffey, Note, *The Genetic Defense: Excuse or Explanation?*, 35 WM. & MARY L. REV. 353, 358 (1993).

⁹⁴*Id.*

⁹⁵TAYLOR, *supra*, note 73, at 32.

⁹⁶*Id.*

between the genetic makeup of identical twins and the genetic makeup of fraternal twins, several predictions can be made about the effects of genetics and environment upon behavior. Twins who are raised together share prenatal and postnatal environments. If behavior is genetically based, it would be expected that there would be a greater correlation between the behavioral patterns of identical twins than between those of fraternal twins. A trait that is entirely controlled by genes would always be present in both identical twins or always absent in them. Because they share identical genetic material, it would be impossible for such a trait to be present in one twin but absent in the other. On the other hand, a trait which is controlled completely by environment might or might not be present in either twin, while not necessarily in both.

Independent studies based upon these assumptions have yielded similar results. In the 1920s, Dr. Johannes Lange, a German physician, conducted a study on thirty pairs of same-sex twins in which at least one of the pair was a known criminal.⁹⁷ Of the thirty pairs, thirteen were identical and seventeen were fraternal.⁹⁸ Lange found that in ten of the thirteen pairs of identical twins, both individuals were criminal.⁹⁹ In only two of the seventeen pairs of fraternal twins both individuals were criminals.¹⁰⁰

The largest study of twins conducted in the United States is "The Minnesota Study of Twins Reared Apart" which was conducted by behavioral researchers at the University of Minnesota.¹⁰¹ More than 100 sets of identical twins and triplets participated in the study, which concentrated on measurable similarities and differences between identical twins who were separated early in their lives and reared apart.¹⁰² Whereas earlier studies concentrated upon differences in strictly behavioral characteristics, the Minnesota Twin Study measured many different traits such as IQ, anthropometric differences, mental abilities, and social attitudes, among others.¹⁰³ A number of factors were controlled to enhance the reliability of the study's results. For example, whereas most of the older studies were limited to

⁹⁷ROPER, *supra* note 76, at 90.

⁹⁸*Id.*

⁹⁹*Id.*

¹⁰⁰Following Lange's study, Heinrich Kranz conducted a study involving 32 pairs of identical twins, 43 pairs of same-sex fraternal twins, and 50 pairs of different-sex fraternal twins. In each pair of twins, at least one of the pair had been imprisoned for a criminal offense. Kranz, like Lange before him, tested the likelihood that if one of a pair of twins engaged in criminal behavior, the other did also. He concluded that the correlation was 34% for identical twins, 12% for the same-sex fraternal twins, and 0% for different-sex fraternal twins.

At least one controversial study revealed that twins who engaged in delinquent activities were more likely to associate with friends who were predisposed to engage in delinquent activity. This finding was interpreted as an indication that inherited traits which predisposed some twins to delinquent behavior also predisposed them to friendships with others who were predisposed to delinquent behavior.

¹⁰¹Thomas J. Bouchard, Jr. et. al., *Sources of Human Psychological Differences: The Minnesota Study of Twins Reared Apart*, 250 SCIENCE 223 (1990).

¹⁰²*Id.* This study began in 1979.

¹⁰³*Id.*

subjects of one country or geographical region, the Minnesota study involved twins from the United Kingdom, Australia, Canada, China, New Zealand, Sweden, and West Germany, as well as from the United States.¹⁰⁴ This diversity among persons studied sought to compensate for variations that could be attributable to differences in national or regional culture. The study also involved the careful determination of whether each set of twins studied was identical or fraternal.¹⁰⁵ Such determinations greatly reduced the chances that members of a given set of twins would be included in the wrong group due to misclassification of zygosity. The findings of the Minnesota study were made more reliable by controlling such factors as the time of separation of the twins and education levels of the adoptive parents.¹⁰⁶ The Minnesota study led some researchers to the general conclusion that genetics, rather than environment, has a much greater effect upon psychological traits.¹⁰⁷ Specifically, University of Minnesota researchers found that differences in psychological traits, which could be caused by environmental factors, showed no significant variations between identical twins reared apart and identical twins reared together.¹⁰⁸

Although the researchers involved in the Minnesota Twin Study emphasized the similarities in psychological traits between identical twins reared apart, their findings also indicated that "a significant contribution of shared environment is found for the personality trait of social closeness, and possibly religious interests and values."¹⁰⁹ Even in the evaluation of their findings, the researchers at the University of Minnesota admit that "[t]he proximal cause of most psychological variance probably involves learning through experience . . ."¹¹⁰ Such indications suggest that environment has a greater influence upon some behavioral traits than upon others.

As twin studies have increased in sophistication and reliability, researchers have been fairly consistent in their belief that genetic makeup has a much greater influence upon behavior than environment. Indeed, the findings of most twin studies strongly indicate that genetics are, to a great extent, determinative of behavior.¹¹¹ On

¹⁰⁴*Id.*

¹⁰⁵*Id.*

¹⁰⁶Bouchard, *supra* note 101.

¹⁰⁷*Id.*

¹⁰⁸*Id.* at 226.

¹⁰⁹*Id.* at 223.

¹¹⁰*Id.* For example, the researchers conducting the Minnesota Twin study found that " . . . in the current environments of the broad middle-class in industrialized societies, two-thirds of the observed variance of IQ can be traced to genetic variation. That leaves one-third of the variance of IQ attributable to environmental variation. The same researchers also wrote that the remarkable similarity in [identical twins reared apart] in social attitudes (for example, traditionalism and religiosity) does not show that parents cannot influence those traits, but simply that this does not tend to happen in most families."

¹¹¹Bouchard, *supra* note 101. None of the twin study findings so far have been sufficient to indicate that environmental factors do not have any influence upon behavior. In fact, the opposite is true. Careful reading of twin study results provides considerable room for the conclusion that environmental factors deserve significant consideration when studying the empirical causes of behavior, whether such behavior is criminal or otherwise.

the other hand, researchers conducting the Minnesota Twin Study wrote that ". . . in the current environments of the broad middle-class in industrialized societies, two-thirds of the observed variance of IQ can be traced to genetic variation."¹¹² Furthermore, "if the genome impresses itself on the psyche largely by influencing the character, selection, and impact of experiences during development — if the correct formula is nature via nurture — then intervention is not precluded even for highly heritable traits, but should be the more effective when tailored to each specific child's talents and inclinations."¹¹³

The Twin Studies findings support, to some extent, the theories of biological determinism and genetic essentialism, and tend to discredit the doctrine of free will. Proponents of biological determinism believe that many traits are directly inherited. Among those traits are dangerousness, aggressive personality, and the tendency to commit arson.¹¹⁴ Biological determinists consider findings such as those resulting from twin studies as indications that social problems — including crime — are due to genetic makeup rather than environmental factors.¹¹⁵

¹¹²That leaves one-third of the variance of IQ attributable to environmental variation. The same researchers also wrote that "the remarkable similarity in [identical twins reared apart] in social attitudes (for example, traditionalism and religiosity) does not show that parents cannot influence those traits, but simply that this does not tend to happen in most families." Finally, they stated: If this view is correct, the developmental experiences of [identical] twins are more similar than those of [fraternal] twins. However, even [identical twins reared apart] tend to elicit, select, seek out, or create very similar effective environments and, to that extent, the impact of these experiences is counted as a genetic influence.

¹¹³Bouchard, *supra* note 101, at 226-27.

¹¹⁴Rochelle C. Dreyfuss & Dorothy Nelkin, *The Jurisprudence of Genetics*, 45 VAND. L. REV. 313, 320 (1992).

¹¹⁵*See* Crime Genes: The Danish Adoption Studies, *The Gene Letter*, V. 1, Issue 3, November 1996, (Mednick et al., 1987) describing the "Danish Adoption Studies," as a series of longitudinal studies comparing the criminal records of adopted children with the criminal records of their biological parents and their adoptive parents. The study was based on Denmark's reportedly excellent records of adoptions. In a study of 3691 adopted boys, those whose biological parents (usually fathers) had been convicted of crimes were more likely themselves to be convicted of crimes than were adopted children whose biological parents had had no trouble with the law. Neither the children nor their adoptive parents knew about the criminal records of the biological parents, so the children's actions did not result from parental expectations based on beliefs about inheritance. There was no relation between the criminal behavior of adopted boys and criminal behavior of their adoptive parents. (Crimes among women in Denmark were too few for analysis)."

"The phrase 'more likely to be convicted' requires some interpretation, however. Thirteen percent of male adoptees whose parents had never been convicted had one or more convictions, including 3% who had three or more. Seventeen percent of those whose parents had one conviction, 20% of those whose parents had two convictions, and 25% of those whose parents had three or more convictions were convicted at least once. Most did NOT become chronic offenders (three or more convictions). About 3% of those whose parents had no convictions, 4% whose parents had one conviction, 5% whose parents had two convictions, and 9% whose parents had three convictions became chronic offenders. About 9% of the Danish male population have been convicted of felonies. This means that even those adopted males whose parents had no convictions had a higher rate of conviction (13%) than the general population, suggesting an environmental effect of adoption itself. Furthermore, 375 (91%) of the 419 adopted males whose biological parents had three or more convictions did not become

B. Adoption Studies

Similar in technique to twin studies and similar in their indications of the causal bases of criminal behavior are adoption studies. As in twin studies, there are several basic assumptions about behavioral patterns based upon whether behavior is determined by genetics or by environment. One assumption is that if genetics is determinative of criminal behavior, children born to criminal biological parents would show a greater predisposition to criminal behavior than would adoptees born to noncriminal biological parents. This would be expected to be true whether or not the adoptive parents were criminals. If on the other hand, criminal behavior is determined by environment, one would expect that adoptees whose adoptive parents were criminals would show a greater predisposition to criminal behavior, whether or not their biological parents were criminals.

The most comprehensive adoption study completed to date was one conducted in Denmark.¹¹⁶ The study was based upon all non-familial adoptions in Denmark from 1924 and 1974.¹¹⁷ The results of the study were based upon no fewer than 10,000 parents broken down into four categories, and 13,000 adoptees.¹¹⁸ If either parent had a criminal conviction, the parents were counted as criminals.¹¹⁹ Of the adoptees who had neither biological nor adoptive criminal parents, 13.5% had at least one conviction.¹²⁰ This percentage rose to 14.7 for adoptees who had criminal adoptive but non-criminal biological parents.¹²¹ The jump in percentages of adoptees who had at least one criminal conviction was observed for adoptees who had criminal

habitual offenders. At the same time, 747 (3%) of the 2492 boys whose parents had no convictions actually became habitual offenders. The total figures--44 habitual offenders descending from parents who were habitual offenders versus 747 habitual offenders descending from parents who had never had a brush with the law--suggest that genetics may be an unlikely answer to most crime."

"Furthermore, the Danish studies showed a relationship between behaviors of children and their biological parents only with regard to property crime. There were too few violent crimes in Denmark to demonstrate any parent-child relationship for violent crime. It is somehow difficult to imagine "genes" for burglary, fraud, or insider stock trading. What the adoption studies may point to instead is a genetic contribution to temperament, rather than to specific behaviors. Basic underlying traits, such a risk-taking, risk-aversion, refusal to obey authority, shyness, boldness, etc. may be affected by a combination of many different genes ("multigenic" or "polygenic" causation). These temperamental traits are neither good nor bad in themselves, refusal to obey authority, for example, may lead to invention, scientific innovation, or new artistic styles in a nurturing environment, or to crime in a poor environment. The result of this interaction between genes and environment is called "multifactorial" causation. Most behaviors, and also many common diseases such as cancer, are probably multifactorial. It is impossible in most cases to assign a weight to the genetic and the environmental components."

¹¹⁶Bouchard, *supra* note 101, at 228.

¹¹⁷*Id.*

¹¹⁸Dreyfuss & Nelkin, *supra* note 114, at 320.

¹¹⁹*Id.*

¹²⁰*Id.*

¹²¹Bouchard, *supra* note 101.

biological parents but not criminal adoptive parents (20%).¹²² The highest percentage of adoptees who had a criminal conviction (24.5%) was observed from those who had criminal adoptive parents as well as criminal biological parents.¹²³ The results also showed that biological parents who had three or more convictions were three times more likely to produce chronically criminal sons than were biological parents who had no convictions.¹²⁴

The percentage of adoptees who had a criminal conviction was higher for those reared by criminal adoptive parents than for those who had neither criminal adoptive parents nor criminal biological parents.¹²⁵ It should be noted, however, that the percentage of adoptees who had criminal biological and adoptive parents was 24.5% compared to 20% of adoptees who had criminal biological parents, but noncriminal adoptive parents.¹²⁶ Like the twin studies discussed earlier, the results of the Denmark adoptive study indicate that genetics has a strong influence upon but is not the sole determinant of an individual's predisposition to criminal behavior.

C. XYY Chromosome Studies

A normal human cell contains forty-six chromosomes arranged in twenty-three pairs.¹²⁷ Twenty-three chromosomes are contributed by each parent during fertilization.¹²⁸ The twenty-third pair of chromosomes determine the sex of the individual.¹²⁹ Females receive two X chromosomes, and normal males receive one X and one Y chromosome.¹³⁰ For some reasons which are yet unknown, some males receive an extra Y chromosome for an XYY chromosome configuration.¹³¹

XYY chromosome studies arose as the result of a 1965 report which revealed that 3.5% of male inmates in a Scottish institution for dangerous criminals had the XYY chromosome configuration compared to 0.1% of the males in the general population.¹³² This finding led to speculation that the extra Y chromosome was somehow linked to a heightened propensity to engage in criminal behavior.¹³³ Subsequent studies revealed that XYY males were more than four times as likely to

¹²²*Id.*

¹²³*Id.*

¹²⁴*Id.*

¹²⁵*Id.*

¹²⁶Bouchard, *supra* note 101.

¹²⁷Susan Horman, *The XYY Supermale and the Criminal Justice System: A Square Peg in a Round Hole*, 25 LOY. L.A. L. REV. 1343, 1346 (1992).

¹²⁸*Id.*

¹²⁹*Id.* at 1347.

¹³⁰*Id.*

¹³¹*Id.*

¹³²Horman, *supra* note 127, at 1343.

¹³³*Id.*

have criminal records than were XY males.¹³⁴ The studies also revealed that XYY males generally scored lower on intelligence tests and had lower levels of educational achievements than XY males.¹³⁵ Further analysis indicated that the lower intelligence and educational levels were responsible for less than one-half of the XYY males' increased propensity to engage in criminal behavior.¹³⁶

The percentage of XYY males in penal institutions were disproportionately high, being greatly outnumbered by XY males in the same institutions.¹³⁷ However, having an extra Y chromosome did not guarantee criminal behavior.¹³⁸

¹³⁴See *Analytical Framework for Understanding Criminological Theory*, <<http://biff.econ.uoguelph.ca/soc/8630314.html>>. A weakness of the XYY chromosomal effect on criminal behavior is cited by the fact that a majority of the carriers of the extra Y chromosome were found to be less aggressive than fellow XY prisoners. There is also evidence that the extra Y chromosome was more prevalent among guards than prisoners and that the XYY genotype is actually more prevalent among the general public than the prison population.

¹³⁵Intelligence, recurs from the earliest studies, as a determining factor indicating criminal propensities. The debate here is intellect versus education.

¹³⁶*Analytical Framework*, *supra* note 134.

¹³⁷*Id.*

¹³⁸Philip R. Reilly, *A Look Back at Eugenics*, THE GENE LETTER, (visited September 12, 1998 <<http://www.geneletter.org/1196/eugenics.html>>. The author reports that:

Genetic testing re-entered the debate over biological factors in crime in 1968 when Patricia Jacobs, a leading cytogeneticist, reported that among the inmates of Carstairs prison, a facility in Scotland that held offenders who were also retarded or mentally ill, there was a 20 fold excess of individuals with an extra Y chromosome, a recently discovered condition. Speculation that such men tended to be criminals was fueled by the fact that they are unusually tall, have rather coarse facial features, often exacerbated by severe acne, and tend to score in the low normal range on standardized intelligence tests. That is, XYY men tend to look like the 1930s Hollywood prototype of a thug.

The original report from Carstairs prison stimulated many other studies, some of which also found an excess of XYY persons in prison populations. The suggestion that the syndrome might explain the behavior of several infamous mass murders, especially Richard Speck, a Chicago man who killed eight nurses, fascinated the media. Psychiatrists and attorneys took up the subject, generating hundreds of articles reflecting on persons genetically programmed to commit crime. In 1979, further studies showed that the excess of XYY persons in prison populations was most likely attributable to a somewhat lower intelligence and to sentencing bias within the justice system. Despite these sophisticated studies, the notion of a criminal chromosome entered American folklore.

III. GENETIC DETERMINISM AND THE CRIMINAL JUSTICE SYSTEM

A. *Impact on Criminal Justice System*

As medical and biological scientists struggle with the developing genetic studies and conclusions, the law has also begun to wrestle with their scientific confusion.¹³⁹ The study of genetics and its resulting theories has long been the subject of scientific debate.¹⁴⁰ Currently, genetic concepts are being incorporated in legal doctrine.¹⁴¹ This emerging synthesis of scientific genetic principles with legal theory presents many challenges to core legal precepts.¹⁴²

The current criminal justice system is predicated on the notion of free will.¹⁴³ Free will clearly justifies concepts of retribution and punishment as reinforcement of the fundamental theory that people are to be held accountable for their own actions. In criminal justice, legislatures determine what acts are criminal and define the punishment for the violation of such laws.¹⁴⁴ Punishment is generally excused when the individual who commits the act is unable to form the requisite free will to choose to do the legally permissible rather than the impermissible act.¹⁴⁵ If the American criminal justice system adopted the genetics determinism theory, it would necessarily create a new class of criminal defendants who would be excused from culpability because they could not have exercised free will.¹⁴⁶

The very notion regarding the criminality of an act is based on whether it is subsequently "excused" in reliance on society's concept of the strength of human volition, or free will, versus the power of external causation, or determinism.¹⁴⁷ Our current legal system attempts to reconcile the foundations of the genetic determinists with that of free will.¹⁴⁸ It does so by presuming free will and therefore imputing criminal responsibility while allowing deterministic influence of uncontrollable behavior as an exculpatory defense or mitigation of punishment.¹⁴⁹ A stark example of various court's reconciliation of the legal concept of free will and determinism can

¹³⁹See generally, Maureen P. Coffey, Note, *The Genetic Defense: Excuse or Explanation?* 35 WM. & MARY L. REV. 354 (1993). See also Lisa Seachrist, *Testing Genes: Physicians Wrestle with the Information that Genetic Tests Provide*, 148 SCIENCE NEWS 394 (1995). The author notes that even highly respected physicians "are not prepared to deal with all the possible results and implications of the genetics."

¹⁴⁰See generally, *Genetics: The Warning of History*.

¹⁴¹Dreyfuss & Nelkin, *supra* note 114.

¹⁴²*Id.* at 338.

¹⁴³*Id.* at 356.

¹⁴⁴*Id.* at 357.

¹⁴⁵*Id.*

¹⁴⁶Coffey, *supra* note 139.

¹⁴⁷Dreyfuss & Nelkin, *supra* note 114, at 358.

¹⁴⁸*Id.* at 360.

¹⁴⁹*Id.*

be seen by examining the holdings of *Robinson v. California*,¹⁵⁰ *Baker v. State Bar*,¹⁵¹ and *In re Ewaniszyk*.¹⁵²

In *Robinson*, the Court rejected the constitutionality of a law which made the status of narcotic addiction a state criminal offense.¹⁵³ The Court held that a law making a disease a criminal offense would be in violation of the Eighth and Fourteenth Amendments' prohibition against cruel and unusual punishment.¹⁵⁴ Finding narcotic addiction was an illness, the Court reversed the California Court's conviction. The Court, distinguishing the criminality of illness from the criminality of wrongdoing or "irregular behavior" which may be caused by such illness, found the *Robinson* conviction and punishment unconstitutional.

The issue of culpability for wrongdoing or behavior which occurs as a result of suffering from an illness was addressed by the Supreme Court of California in 1989. John David Baker, an attorney, admitted abusing alcohol and cocaine while practicing law. During the course of his illness, he misappropriated funds from at least 10 different client accounts. He also committed various other unethical acts. The state bar found that Baker's misfeasance "was a direct result of his addiction to cocaine and alcohol." Baker confessed that he had been informed that he had a genetic predisposition to addiction. The court found that such a genetic predisposition neither excused the wrongdoing nor did it serve as an absolute bar to punishment. However, the court determined that the defendant's impaired free will could mitigate the punishment assessed if, and only to the extent that, the circumstances of the misconduct were such that the conduct would not recur. The ruling both acknowledges the impact of genetic predisposition on free will but requires some evidence that genetic determinism was somehow overcome. This suggests that the court's leniency would only be employed if the defendant was able to control his genetic influences through some exercises of free will. The court affirmed its embrace of the genetic predisposition prerequisite as a basis for mitigation of punishment one year later in *In re Ewaniszyk*.

Richard Ewaniszyk was an attorney who misappropriated funds of several clients within his first year of practice. He attributed his actions to his drug and alcohol addiction which he claimed he had overcome. His claim was supported by the evidence of doctors, family and friends. There was no evidence that Ewaniszyk's addiction was the result of a genetic predisposition. In rejecting Ewaniszyk's mitigation, the court distinguished *Baker* on several grounds, including Baker's genetic predisposition to alcoholism. Because the facts of the two cases were similar, except for the genetic factor, it appears that the court's finding of Baker's genetic predisposition to alcoholism proved compelling.

Although courts have taken into consideration genetic predisposition or determinism factors when deciding the punishment to be assessed for a criminal

¹⁵⁰*Robinson v. California*, 370 U.S. 660 (1962).

¹⁵¹*Baker v. State Bar*, 781 P.2d 1344 (Cal. 1989).

¹⁵²*In re Ewaniszyk*, 788 P.2d 690 (Cal. 1990).

¹⁵³*Robinson*, 370 U.S. at 660.

¹⁵⁴The court specifically illustrates its position by comparing a law making drug addiction a crime to a law making "it a criminal offense for a person to be mentally ill, or a leper, or to be afflicted with a venereal disease." *Id.* at 666.

violation, they have been careful to stay within certain boundaries. Those boundaries appear to be drawn where the defendant can prove that the scientific community has clearly established a quantifiable genetic factor which inhibited his or her free will. But how will our system of justice react to genealogical advances if biological traits for violent behavior are supported by conclusive scientific data of genetic determinism?

The presumption favoring free will might initially, at least, survive the scientific isolation of genetic characteristics for violent behavior. However, a direct linkage between an identifiable gene and criminal activity could effectively rebut that presumption. The burden would be on the defendant to prove that his behavior was genetically predetermined. He would also have to prove that this predisposition impaired his ability to act alternatively.

B. Impairment

Courts have recognized that "an accused is not criminally responsible if his unlawful act was the product of mental disease or mental defect."¹⁵⁵ In addition, "[E]xculpation entails an 'abnormal condition of the mind which substantially effects mental or emotional processes and substantially impairs behavior controls' and which 'made the effective or decisive difference between doing and not doing the act.'"¹⁵⁶ A defense resting on the inability to exercise free will ". . . is negated if the power of self-restraint is not diminished significantly."¹⁵⁷ In his partial dissent in the *Gaskins*¹⁵⁸ case, Senior Circuit Judge Fahy states:

The criminal law . . . is an expression of the moral sense of the community. The fact that the law has, for centuries, regarded certain wrong-doers as improper subjects for punishment is a testament to the extent to which that moral sense has developed. Thus, society has recognized over the years that none of the three asserted purposes of the criminal law — rehabilitation, deterrence and retribution — is satisfied when the truly irresponsible, those who lack substantial capacity to control their actions, are punished.¹⁵⁹

When considering the concept of impairment due to genetic influence, some review of the concept of predisposition is advised since American courts have long considered the impact of predisposition to commit crime. Commonly considered in cases where the defense of entrapment is invoked, the U.S. Supreme Court has explained its role. In *United States v. Burkley*¹⁶⁰ the Court explained that the ultimate fact to be determined in the defense of entrapment is whether the defendant was "predisposed" to commit the crime with which he is charged.

¹⁵⁵*Gaskins v. United States*, 410 F.2d 987 (D.C. Cir. 1967).

¹⁵⁶*Id.*

¹⁵⁷*Id.* at 989.

¹⁵⁸*Id.* at 994.

¹⁵⁹*Id.*

¹⁶⁰*United States v. Burkley*, 591 F.2d 903 (D.C. Cir. 1979).

The interrelationship between impairment and predisposition has also been considered in mental defect cases. For example, the significance of mental impairment to criminal responsibility has long been fundamental to the defense of insanity. The general rule for impunity on the basis of insanity is that the person is not responsible for criminal conduct when, at the time of the conduct, he was unable to appreciate that the conduct was wrong due to a mental disease or defect.¹⁶¹ This conclusion was predicated on certain other suppositions, one being that the mere existence of a factor which could modify behavior is insufficient to excuse a person from culpability.¹⁶² It is the coupling of the existence of, say, substance addiction or genetic "defect" with the powerlessness to refrain from committing the action which would support exculpation.¹⁶³

C. *The Defendant's Burden*

Nearly all American jurisdictions recognize one form of a general defense of insanity.¹⁶⁴ The general principle of the defense may be stated as follows:

An actor is excused for his [or her] conduct constituting an offense, if as a result of

- (1) a mental disease or defect,
- (2) the actor
 - (a) does not perceive the physical nature or consequences of his conduct,
 - (b) does not know his [or her] conduct is wrong or criminal, or
 - (c) is not sufficiently able to control his [or her] conduct so as to be held accountable for it.¹⁶⁵

The criminal defense of genetic determinism could be similarly based. That is:

Genetic Determinism. An actor is excused for his [or her] conduct constituting an offense if, as a result of

- (1) genetic predisposition
- (2) the actor
 - (a) does not perceive the physical nature or consequence of his [or her] conduct,
 - (b) does not know his conduct is wrong or criminal, or
 - (c) is not sufficiently able to control his [or her] conduct so as to be held accountable for it.

To meet the burden of this defense, the defendant must be able to show that a gene or combination of genes produced a condition severe enough that the actor could not act within the zone of normalcy identified by society. Second, the defendant would need to show that the predisposition caused such delusion in

¹⁶¹United States v. Lyons, 731 F.2d 243 (5th Cir., 1984).

¹⁶²*Id.* at 245.

¹⁶³*Id.*

¹⁶⁴Paul H. Robinson, *Criminal Law Defenses*, Crim. L. Def., Section 173, Ch. 5B.

¹⁶⁵*Id.*

perception that the actor could not perceive the effect of the conduct. The defendant could also show that the predisposition caused an inability to perceive the actual nature of his act. Whether the marred perception affects the grasp of the physical nature of the consequences of the act, the actor would be excused from culpability. Arguably under this element, the genetic predisposition would have caused a mental defect sufficient to meet the burden of proving insanity.

The defendant could show that although he or she understood the physical nature and consequence of the act, they did not understand the legal or moral character of the act. Under this rule, that failure could constitute an exculpatory condition. Generally, the actor must be totally unaware of any substantial risk that the conduct is wrong or criminal. If the lack of awareness is created because of genetic make-up defect, then the defendant's conduct would be excused.

The third element of the defense is most directly related to the genetic determinist theory as it absolves the actor of culpability because based on his or her genetic map, he could not have acted other than he did. It is this theory which most challenges a basic American belief; that is, that people can choose to act or not act in certain ways.¹⁶⁶ This 'ultimate control' concept of free will would recognize a possible predisposition but would require that actor to exercise the requisite amount of restraint to overcome the predisposition.

The defendant, relying on a genetic determinism defense, then, must be able to negate the ability to control the conduct to which he was predisposed. The impairment of the ability to control the act must be distinguished from a normal person's failure to act to control his urges.

Similar to the irresistible impulse criteria, the actor need not suffer an overpowering urge to act. The actor may have a normal urge, but may lack the ability to control the urge.

D. Responses to the Defense

Once the defendant meets his burden of proving that he suffers a genetic design and that such design constituted a genetic disease or defect which rendered him unable to exercise free and independent will to restrain from committing the offense, the question becomes how the criminal justice system would respond. Under our system of laws, excuses are based on a "causal theory."¹⁶⁷ Specifically, "[W]hen an agent is caused to act by a factor outside his control, he is excused; only those acts not caused by some factor external to his will are unexcused."¹⁶⁸

If a person cannot be held responsible for his action due to genetic determinism, the absence of free will would command the finding of not guilty. Indeed, according

¹⁶⁶See generally Stephen J. Morse, *Culpability and Control: Symposium: Act and Crime, Acts, Choices and Coercion*, 142 U. PA. L. REV. 1587 (1994); Some claim that responsibility resides in the ability to choose. *Id.* at 1602.

¹⁶⁷Michael S. Moore, *Causation and the Excuses*, 73 CAL. L. REV. 1091 (1985).

¹⁶⁸Maureen P. Coffey, Note, *The Genetic Defense: Excuse or Explanation?*, 35 WM. & MARY L. REV. 354, 357 (1993) citing Michael S. Moore, *Causation and the Excuses*, 73 CAL. L. REV. 1091 (1985).

to our concept of judicial fairness, the actor could not be punished,¹⁶⁹ lest there be a direct conflict with the mandates of the Eighth Amendment.¹⁷⁰

Nonetheless, in *State v. Wilson*¹⁷¹ the Supreme Court of South Carolina upheld a capital sentence for a man found guilty of murder but mentally ill. Notwithstanding, the Eighth Amendment, a defendant who asserts the defense of genetic determinism, even upon a finding of genetic predisposition sufficient to impair resisting an impulse, could be subject to punishment. Punishment could result even though Anglo legal theories recognize that lack of free will or compulsion should be exculpatory.

E. Cruel and Unusual Punishment

The Eighth Amendment prohibition against cruel and unusual punishment is directed at the method or kind of punishment imposed.¹⁷² In a concurring opinion, the court in *Powell v. Texas* focused on the difference between punishment for having a condition (status) or for committing a crime.¹⁷³ As discussed earlier, the *Robinson* court barred punishment for an addiction, even a voluntary addiction. Reasoning that addiction is an illness which could be contracted innocently or involuntarily, it compared addiction to the status of having a common cold, a status which could not be the basis for a criminal conviction.¹⁷⁴

In *Powell*, the court stated:

Punishment for a status is particularly obnoxious, and in many instances can reasonably be called cruel and unusual, because it involves punishment for a mere propensity . . . the mental element is not simply one part of the crime, but may constitute all of it. This is a situation universally sought to be avoided in our criminal law . . .¹⁷⁵

However, the real issue here is not whether the Eighth Amendment prohibits punishing a person for being ill, but whether it prohibits punishment when the actor commits the crime due to an overwhelming genetic compulsion. Indeed, it has been suggested that persons who are "hard-wired" to perform as they do, arguably can never be justly punished or motivated to conform. Thus, a genetic predisposition to criminality should be a full defense, much like other conditions that obviate mens rea.¹⁷⁶ However, one of "the most basic purposes of the criminal law is that of preventing a person from injuring others or, perhaps to a lesser degree, himself."¹⁷⁷ The criminal justice system has addressed the issue of punishing a defendant

¹⁶⁹Dreyfuss & Nelkin, *supra* note 114.

¹⁷⁰U. S. Constitution, amend. VIII.

¹⁷¹*State v. Wilson*, 413 S.E.2d 19 (S.C. 1992).

¹⁷²*See Powell v. Texas*, 392 U.S. 514, 531 (1968).

¹⁷³*Id.* at 542.

¹⁷⁴*Id.* (citing *Robinson v. California*, 370 U.S. 660 (1962)).

¹⁷⁵*Powell*, 392 U.S. at 543.

¹⁷⁶Dreyfuss & Nelkin, *supra* note 114, at 167.

¹⁷⁷*Lyons*, 731 F.2d at 246.

incapable of exercising sufficient control over his behavior. For example, in *Gaskins v. United States*,¹⁷⁸ Judge Fahy opined that:

none of the three asserted purposes of the criminal law—rehabilitation, deterrence, and retribution—is satisfied when the truly irresponsible, those who lack substantial capacity to control their actions, are punished.

What rehabilitative function is served when one who is mentally incompetent and found guilty is ordered to serve a sentence in prison? Is not any curative or restorative function better achieved in such a case in an institution designed and equipped to treat just such individuals?¹⁷⁹

Although the Eighth Amendment bars cruel and unusual punishment, it does not bar medical treatment for people with addictions or other afflictions, including genetic predispositions. The difference is the laws' disposition of one convicted of crime and one acquitted by reason of insanity. Specifically:

[T]he former is ordinarily imprisoned, followed by release into the community when his sentence is ended. The latter is committed to a mental institution, where there is greater opportunity for rehabilitation before he returns to the community and therefore greater likelihood of advantage to the individual as well as to the community.¹⁸⁰

On the other hand, some scholars have challenged the fairness of the punishment meted out when a defendant is found not guilty by reason of insanity.¹⁸¹ Professors Goldstein and Katy of Yale University argued in opposition to the insanity defense, as well as on other grounds, on the basis that the punishment to which the criminally insane were subjected were often much more severe than had they been found guilty.¹⁸² They argued that "unlike the acquittal of self-defense which means liberty, the acquittal of the insanity defense means deprivation of liberty for an indefinite term in a mental institution."¹⁸³ The effect of this result arguably is to punish the mentally ill. This counters Anglo-Saxon law which has historically upheld the maxim that "[o]ur collective conscience does not allow punishment where it cannot impose blame."¹⁸⁴

This notwithstanding, where the issue is one of insanity, medical science advances can arguably treat and perhaps even cure the disorder. Where the issue is one of genetics, the question is whether institutionalization for genetic makeup would be any different from imprisonment since there is currently no treatment for a criminally influential genetic defect. Aside from long term institutionalization as a

¹⁷⁸*Gaskins*, 410 F.2d at 994.

¹⁷⁹*Id.*

¹⁸⁰*Id.* at 994.

¹⁸¹See Jonas Robitscher & Andrew Ky Haynes, *In Defense of the Insanity Defense Symposium: Law and Psychiatry, Part I*, 31 EMORY L.J. 9 (1982).

¹⁸²*Id.* at 34.

¹⁸³*Id.*

¹⁸⁴*Id.* at 9 (citing *Durham v. United States*, 214 F.2d 862, 876 (D.C. Cir. 1954)).

means of restraining people genetically predisposed to committing crimes, the justice system could consider genetic engineering as a means of eliminating the offending gene altogether as an alternative to traditional punishment to reach an important goal of punishment . . . deterrence.

Genetic engineering is the scientific process of altering the genetic properties of living cells.¹⁸⁵ It has been said that "[A] permanent, genetic defect raises concerns different from, a curable infection, which goes away after treatment."¹⁸⁶ "An infectious agent is outside 'self,' whereas a genetic defect is an integral part of 'self' and implies chronicity for the patient . . ."¹⁸⁷ According to some commentators, [M]any technical hurdles have been cleared in identifying and treating single-gene defects while the treatment and/or redesign of complex polygenetic human traits will take longer.¹⁸⁸ Whatever length of time it takes for scientists to be able to re-engineer complex genes or to identify all the human genes in the human body, one thing is clear: the day will come when these things will be accomplished. Among the consequences of such scientific advances are eugenic implications. While genetic engineering is said to have as a primary "obligation 'to confer benefits and remove harms,'"¹⁸⁹ eugenics is often "described as a social movement to improve the human species through the use of technology."¹⁹⁰ In fact, "[E]ugenics may be classified as either negative or positive. Negative eugenics seeks to reduce or eliminate deleterious genes, while positive eugenics encourage desirable or superior traits."¹⁹¹ The effect would be that society's identification of bad genes would instigate the elimination thereof.

Whether genetic engineering or genetic therapy, it could be an approach to rehabilitating persons compelled to violence.

As discussed earlier in this article, the criminal justice system has already recognized the mitigation of punishment for persons with genetic predisposition resulting in criminal activity.¹⁹² Mitigation, then, is also a means of addressing society's need for punishing the offender while recognizing the import of genetic determination.

¹⁸⁵Gerald Coleman, *Genetic Engineering: Should Parents Be Allowed to Design their Children?*, 34 How. L.J. 153 (1991).

¹⁸⁶Louis J. Elsas II, *A Clinical Approach to Legal and Ethical Problems in Human Genetics*, 39 EMORY L.J. 811, 818 (1990).

¹⁸⁷*Id.*

¹⁸⁸John R. Harding, Jr., *Beyond Abortion: Human Genetics and the New Eugenics*, 18 PEPP. L. REV. 471, 477 (1991).

¹⁸⁹*Id.* at 486.

¹⁹⁰*Id.*

¹⁹¹*Id.* at 478 (citing van Loon, A BUDDHIST PERSPECTIVE, GENETICS AND SOCIETY, 148, 154-55 (G. Oosthuizen, H. Shapiro & S. Strauss eds. 1980), distinguishing "genetic therapy, which seeks to alter or eliminate genes which cause negative characteristics, and genetic engineering, which seeks to promote positive traits").

¹⁹²*See Baker*, 781 P.2d at 1344.

IV. CONCLUSION

Our criminal justice system is rooted on the principle that a person who commits a crime must be punished. That principle rests on the theory that a person exercises free will — that he or she is able to choose not to commit the crime. When a person is without such ability because her mental faculties are so impaired that she cannot exercise free will, then that person is not subject to criminal culpability.

Technological advances in genetics is creating the probability of finding and identifying genes linked to violence.¹⁹³ Once genes for behavior are identified, many geneticists believe a person's genetic predisposition to violent behavior can be shown. When that predisposition is so compelling that a person cannot overcome the compulsion to act in accordance with noncriminal behavior, then he or she is not responsible for his or her actions. A criminal defendant suffering such a genetic predisposition could be found not guilty by reason of genetic determinism.

Once the burdens of proof are met, the justice system is faced with balancing its duties to remove unsafe persons from the public and its obligations to comply with the Eighth Amendment of the United States Constitution. The options are several, including:

1. Once found not guilty, the defendant could be released back into society.
2. The defendant could be found guilty but genetically impaired and confined in a penal institution.
3. The defendant can be committed to a genetic treatment center.
4. The defendant can be isolated in some sort of genetic compound.
5. Genetic therapy or genetic engineering and
6. Mitigation of punishment

Of course, there are significant problems which the genetics industry poses for our society. The costs of genetic testing may make the "gene defense" available only to the wealthy. Gene engineering and splicing could eliminate gene pool diversity. Gene experimentation could result in discrimination between a race of the "superior" genes against a race of the 'inferior' genes. Determining which gene is good and which is bad is couched in social, economic, racial, and other biases. Genetic determination itself has social implications, including creating in a person the belief that they are limited by their genealogical map. These are all issues that a responsible society must address as the technology develops, because it will develop.¹⁹⁴

"In the long run, the issue is not the genetic knowledge itself, but what kind of soil that knowledge grows in. It was not bad genetic knowledge that led the Nazis astray; it was their culture of racism and anti-semitism that allowed that knowledge to flourish and take root."¹⁹⁵

¹⁹³Although there has been much talk of a "crime gene," crime is an invention of society. From time to time, society alters its views on what constitutes crime and therefore to focus on a "crime gene" would be counterproductive.

¹⁹⁴See Walter Truett Anderson, *Why Eugenics is Here to Stay*, <<http://www.pacificnews.org/jinn/stories/columns/hersies/950727-eugenics.html>>.

¹⁹⁵Daniel Callahan, *The Genetic Revolution*, 66-Jun. N.Y. St. B.J. 30, 31 (1994).