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Revisiting the Legal Link between Genetics and Crime

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REVISITING THE LEGAL LINK BETWEEN GENETICS AND CRIME

DEBORAH W. DENNO*

I

INTRODUCTION

In 1994, convicted murderer Stephen Mobley became a *cause célèbre* when he appealed his death sentence before the Georgia Supreme Court.¹ According to Mobley's counsel, the trial court should have enabled Mobley to be tested for genetic deficiencies. The counsel's interest in genetics testing was prompted for unusual reasons: Mobley’s family history revealed generations of relatives with serious behavioral disorders. Indications that Mobley shared a genetic propensity for misconduct could help explain some of his troubling tendencies and why he should not be executed.² In a highly publicized decision,³ the

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¹ See generally Deborah W. Denno, *Legal Implications of Genetics and Crime Research, in Genetics of Criminal and Antisocial Behaviour* 248, 248–64 (Gregory Bock & Jamie Goode eds., 1996) (presented at the 1995 Ciba Foundation Symposium 194) (discussing the Mobley case in light of historical and contemporary arguments concerning the use of genetics evidence in criminal law cases). The news media focused on detailing the behavioral disorders across generations of the Mobley family. See, e.g., Carolyn Abraham, *DNA at 50: The First of a 3 Part Series, The Bad Seed, GLOBE & MAIL* (Toronto), March 1, 2003, at F1 (“[Mobley’s lawyer] knew that arguing a genetic defect would never earn an acquittal. No credible expert would testify that genes made Mr. Mobley kill. But if there was any evidence that bad behaviour ran in the Mobley family, it might hold up at the sentencing as a mitigating factor.”); Steve Connor, *Do Your Genes Make You a Criminal?, INDEP. ON SUN. (London)*, Feb. 12, 1995, at 19 (“‘There is no legal defence to his crime,’ says . . . Mobley’s attorney. ‘There is only the mitigating factor of his family history. His actions may not have been a product of totally free will.’ Murder, rape, robbery, suicide, ‘you name it,’ the Mobley family has had it, he says.”); Convicted Killer Seeks Brain Test, *TIMES* (London), Feb. 14, 1995, at 6 (“Violence, aggression and anti-social behaviour
Georgia Supreme Court rejected that reasoning and affirmed the trial court's holding, explaining that the genetic theory involved in Mobley's case "will not have reached a scientific stage of verifiable certainty in the near future and . . . Mobley could not show that such a stage will ever be reached."4

One year later, Mobley's family history evidence again became an issue. This time, new counsel representing Mobley filed a petition for writ of habeas corpus claiming Mobley's trial counsel were inadequate for a range of reasons: failing to research sufficiently Mobley's background for mitigating evidence, neglecting to acquire funds so that a psychologist could provide expert testimony during Mobley's sentencing phase, wrongly declining an offer of financial assistance from Mobley's father to support Mobley's genetics testing and raising an "unorthodox mitigating defense that attempted to show a possible genetic basis for Mobley's conduct."5 The habeas court vacated Mobley's death sentence on grounds that Mobley's trial counsel were ineffective;6 on appeal, though, the Georgia Supreme Court reversed and

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3. Various news accounts illustrated the degree of attention the Mobley case received. See, e.g., Mike Pezzella, Violence DNA Researchers Mum on Meeting, Hoping to Avoid Protests, BIOTECH. NEWSWATCH, Apr. 15, 1996, at 14 ("The [Mobley] case became a minor landmark when Mobley's . . . attorney . . . attempted to get Georgia to pay for a DNA analysis of Mobley in order to obtain evidence based on four generations of violence and aggressive business behavior in his family."); Babs Brockway, Mobley's Death Sentence Is Upheld, TIMES (Gainesville, Ga.), Mar. 18, 1995, at 1 ("The [Mobley] case gained international attention when [Mobley's lawyer] Summer contended his defense was hurt by Hall Superior Court Judge Andy Fuller's refusal to approve $1,000 for the tests . . . [which] could have shown that Mobley had a genetic predisposition toward violence."); Not by Our Genes Alone, NEW SCI., Feb. 25, 1995, at 3 ("Mobley's case became headline news in Britain last week, thanks to a scientific meeting on the links between genes and crime, held in London . . ."); Kam Patel, Adrian Raine & Steven Rose, Perspective: An Inside Job Or A Set-Up?, TIMES HIGHER EDUC. SUPPLEMENT, Feb. 10, 1995, at 16 ("[W]hat appears to be pretty much an open and shut case—even Mobley [sic] has never denied his guilt—has been catapulted on to the battlefield of a fierce worldwide debate."); see also Sarah Boseley, Second Front: Genes In The Dock, GUARDIAN (London), Mar. 13, 1995, at T2 ("Even if [the Georgia Supreme Court turns down Mobley's appeal], lawyers believe it is now no longer a case of whether genetic evidence will be allowed in court but when."); Connor, supra note 2 ("[Mobley's] last chance of reprieve rests with a plea from his lawyer that the murder was not the evil result of free will but the tragic consequence of a genetic predisposition."); Edward Felsenthal, Legal Beat: Man's Genes Made Him Kill, His Lawyers Claim, WALL ST. J., Nov. 15, 1994, at B1 ("The [Mobley] case seeks to break new legal ground by bringing into court a growing body of research linking genes and aggressive behavior.").

4. Mobley, 455 S.E.2d at 66.
6. Id. at 461.
reinstated the sentence, concluding counsel had been adequate. Likewise, the Georgia Supreme Court denied reconsideration of the potential for testing Mobley for genetic deficiencies, but for a somewhat different reason than it had expressed three years earlier. In the court’s view, Mobley had in fact been “able to present the genetics theory” through a relative’s testimony about the family’s generations of behavioral problems; however, even if the court had allowed genetics testing, “there had been no showing that a geneticist would have offered additional significant evidence.” In March 2005, after more appeals, Mobley was executed by lethal injection.

Mobley’s request for genetics testing spawned an international debate on the political and scientific acceptance of genetics evidence in the criminal law. Near the time of Mobley’s 1994 appeal, for example, the Ciba Foundation sponsored a symposium in London on the *Genetics of Criminal and Antisocial Behaviour.* Because the symposium examined the legal implications of genetics and crime research and contributed to the publicity surrounding the *Mobley* case, the issues discussed at Ciba are significant to this article. The

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7. Id. at 467.
8. Id. at 463–66.
9. Id. at 466; see also infra notes 41–45 and accompanying text (discussing the testimony of Joyce Ann Mobley Childers).
12. See, e.g., Mariya Moosajee, *Violence—A Noxious Cocktail of Genes and the Environment,* 96 J. ROY. SOC’Y MED. 211, 213 (2003) (“Since genetic make-up is predetermined, some might seek to make genes an excuse for misbehavior . . . . The case of Stephen Mobley . . . is a case in point.”); Sarah Boseley, *Genes’ Link To Crime May Be Cited in Court,* GUARDIAN (London), Feb. 14, 1995, at 4 (describing the difficulties and misconceptions regarding genetic predisposition to criminal behavior related by participants in the Ciba conference on the Genetics of Criminal and Antisocial Behaviour); Connor, supra note 2 (“At a closed meeting of scientists at the Ciba Foundation in London, Mobley’s family tree will again come under intense scrutiny, this time by researchers studying the link between genes and violence.”); Roger Highfield, *Scientists Can Test Fetus For Violent Gene,* DAILY TELEGRAPH (U.K.), Feb. 14, 1995, at 4 (“Discovery of a genetic link to aggression may soon have an impact on America’s legal system.”) (referring to *Mobley*); Kenan Malik, *Refutation: No Such Thing as a Born Killer,* INDEPENDENT (London), Feb. 14, 1995, at 15 (describing the *Mobley* appeal and the Ciba conference as being “[t]wo recent events [that] have revived the debate about whether criminal behaviour is genetically determined”); Colin Wilson, *Are Some People Born Criminal?*, DAILY MAIL (U.K.), Aug. 2, 2002, at 12 (considering “whether there is such a thing as a ‘criminal gene’” to be “one of the great debates of modern times”); see also Denno, supra note 2, at 251–53 (citing articles discussing the controversy surrounding the *Mobley* case).
13. The Ciba Foundation is a scientific organization now called the Novartis Foundation. Information on Novartis Foundation Symposia can be found at http://www.novartisfound.org.uk/symp.htm (last visited Sept. 1, 2005). For purposes of clarity, this article continues to refer to the Ciba Foundation in the context of discussions about the Ciba conference.
14. The three-day Ciba Foundation symposium was held on February 14–16, 1995. *Contents, in Genetics of Criminal and Antisocial Behaviour,* supra note 2, at v. The papers presented at the symposium were published in *Genetics of Criminal and Antisocial Behaviour.* Id. For the purposes of the symposium, I wrote a chapter about the *Mobley* case. See Denno, supra note 2, at 248.
15. See Denno, supra note 2, at 248.
16. For further descriptions of the debates surrounding the issue of genetics and crime outside the context of the *Mobley* case but in the wake of the Ciba conference on the Genetics of Criminal and
Ciba symposium was also relevant to the legal field as a whole because the symposium's themes squarely addressed a topic that had seemed dormant for years: the interdisciplinary links between genetics and crime. The twenty-five symposium attendees represented a range of different academic areas, including genetics, psychology, philosophy, and law. Their contributions are particularly pertinent today, at the ten-year anniversary of the first Mobley appeal and as Mobley's execution again draws public attention to his case.

Mobley's death stirs the genetics and crime debate with a key question: How have courts and litigators treated genetics evidence in criminal cases during the decade following Mobley's first trial? Much of the controversy concerning Mobley was based on the presumption that such evidence would skyrocket in use and abuse. The following pages seek to determine if such forecasts have been realized.

In essence, this article takes up where the Ciba symposium's analysis of the legal consequences of genetics and crime left off—to assess the kinds of exchanges the Mobley case would provoke today. Contrary to predictions at the time of Mobley's appeal, it appears that little has occurred in the area of genetics and crime warranting the concern that Mobley generated. Of course, the criminal justice system should remain alert to the potential hazards of genetics evidence. Yet unsupported fears could also curtail some defendants' constitutionally legitimate attempts to submit mitigating factors in their death penalty cases, in particular, genetics evidence that could validate the existence of more traditionally accepted mitigating conditions, such as mental illness. Presumably, judges and juries would be less likely to think that a defendant is feigning states such as schizophrenia or alcoholism if such disorders commonly occurred across generations of the defendant's family.

Discussions of an interdisciplinary subject of this sort require clear terminology, especially because of the close ties between biological and social factors and the frequent muddling of the terms "biological" and "genetic." Therefore, this introduction briefly sets forth definitions of key terms according to how they are used in much of the research literature and in this article. In general, social variables, such as socioeconomic status, consist of environmental

Antisocial Behaviour, see Clive Cookson, Controversial Search for the Criminal Gene: A Conference the Americans Would not Allow, FIN. TIMES (U.K.), Feb. 14, 1995, at 8 ("Ten of the 13 speakers [at the Ciba conference] are from the US, where criminal genetics is a particularly controversial issue."); Patel et al., supra note 3, at 16 (exploring opposing viewpoints on the connections between genes and crime and the implications of such on the legal system); Richard W. Stevenson, Researchers See Gene Link to Violence but Are Wary, N.Y. TIMES, Feb. 19, 1995, at 29 ("Researchers [at the Ciba symposium] said . . . there was tentative but growing evidence of a genetic basis for some criminal and aggressive behavior. But clearly mindful of the controversy on this issue, most . . . emphasized that the 'nature versus nurture' debate was not an either-or proposition in this case."); Tom Wilkie, Genes Link to Violence and Crime Condemned, INDEP. (London), Feb. 15, 1995, HOME, at 2 (noting that the controversy surrounding the issues discussed at the Ciba symposium had "now reached the European Parliament").

17. See infra Part III.
18. Participants, in GENETICS OF CRIMINAL AND ANTISOCIAL BEHAVIOR, supra note 2, at vii.
influences on a person's behavior. Biological variables, on the other hand, constitute "physiological, biochemical, neurological, and genetic" effects on how an individual may act. Genetic factors are a subset of biological variables, distinguishable because they are inherited; in contrast, social factors are not inherited. All these categories—social, biological, and genetic—are related in interesting ways. For example, being male is a genetic attribute that strongly predicts crime. Yet most men never commit an officially recorded crime, particularly a violent crime. Likewise, other biological factors and a wide range of social factors mediate the relationship between sex and criminal behavior, so much so that social variables greatly dominate a researcher's ability to determine who among a small group of people will engage in criminality.

A common stereotype is that an individual's "genotype" or "genetic constitution" is static, as though there is a "crime gene" that "hard-wires" certain people to violate the law. But this perspective, however entrenched in the public's mind, has no scientific support. Rather, an overwhelming amount of evidence shows that "environments influence gene expression." In other words, an individual's genetic structure may act developmentally and probabilistically in the context of social variables by potentially predisposing an individual to certain behavioral tendencies, such as shyness. In turn, "genotype influences societal response," which explains, for example, why men are far more likely than women to wear a tuxedo rather than a dress at formal events. These kinds of interlinkages between genotype and the environment become helpful in assessing how genetics evidence may be viewed in a criminal law case such as Mobley.

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20. Id.

21. Id.


23. See id.


26. Denno, supra note 2, at 254; see also Holmquist, supra note 2 (referring to a "criminal gene" in the title of a news article about the Mobley case); Marrin, supra note 2 ("[Mobley's] lawyers tried to argue that [Mobley] was hard-wired to be bad.").

27. Carey, supra note 25, at 452.


Part II of this article briefly reviews the facts and legal arguments in *Mobley*. Part III addresses the primary issues that concerned the court in *Mobley*, noting that many of the original reasons for the controversy over the potential use of genetics evidence remain the same as they did in 1994. Part IV discusses the twenty-seven key genetics and crime cases occurring between 1994 and 2004, since *Mobley* spurred the topical dispute. These cases, which are surprisingly small in number, share several important characteristics: they overwhelmingly constitute murder convictions in which defendants attempted to use genetics evidence as a mitigating factor in a death penalty case (as *Mobley* did), and the evidence is introduced mostly to verify a condition (such as a type of mental illness) that is commonly acceptable for mitigation. Part V concludes that, contrary to some commentators' warnings during the first *Mobley* trial, the last decade has not revealed a legally irresponsible application of genetics factors in criminal cases. Rather, courts continue to regard genetics variables skeptically, and society still embraces the same political and moral concerns over the role of such information. At the same time, courts have failed to provide sound and conceptually consistent reasons for denying defendants' offers of genetics evidence.

Unwarranted constraints on the admissibility of genetics evidence in death penalty cases can undercut some defendants' efforts to fight their executions. For example, genetics evidence can help validate some traditionally accepted mitigating factors (such as certain psychiatric or behavioral disorders) that can otherwise be difficult for defendants to prove. By imposing unreasonable limitations on genetics arguments, the criminal justice system may be undermining the very principles and progressive thinking the cap on genetics evidence was originally intended to achieve.

II

The Stephen Mobley Case

The facts and legal arguments raised in *Mobley* provide a broad context for analyzing the applicability of genetics evidence for purposes of mitigation. On February 17, 1991, Stephen Mobley entered a Domino's Pizza store in Oakwood, Hall County, Georgia, to steal money. In the course of the robbery, he shot John Collins, the store's manager, in the back of the head as Collins begged for his life. Mobley was caught a month later and immediately confessed to the crime.  

The two court-appointed attorneys assigned to Mobley, Daniel Summer and Charles Taylor, faced a daunting dilemma. There was little about Mobley that aroused legal sympathy or provided "'traditional mitigation evidence.'"\(^{32}\)


\(^{31}\) *Turpin*, 502 S.E.2d at 463; see *infra* note 38 and accompanying text.

\(^{32}\) *Turpin*, 502 S.E.2d at 463.
Mobley's father was a multimillionaire.\(^3\) White and young (age twenty-five at the time of his crime), Mobley had recently left a home of economic privilege\(^4\) having experienced "a childhood standard of living [that] had ranged from middle class to affluent."\(^5\) Mobley's parents and sister, as well as Mobley himself, stated that he had never been neglected or abused, sexually or physically.\(^6\) Rather, Mobley showed an early and continuous history of personal and behavioral disorders that became ever more troubling with age. As a young child, Mobley cheated, lied, and stole. Such conduct worsened in adolescence, resulting in prison sentences for forgery and culminating in numerous armed robberies during Mobley's mid-twenties. Following this years-long crime spree, Mobley robbed and murdered Collins. While awaiting trial for Collins's death, Mobley's aggression was out of control: He fought continually with other inmates, sodomized his cellmate, tattooed the word "Domino" on his own back, and verbally taunted and threatened prison guards. As a youth and as an adult, seemingly no amount of counseling or punishment could contain Mobley's outbursts.\(^7\)

Mobley did have one advantage at the time of his trial—his attorneys, Summer and Taylor,\(^8\) proved to be creative and concerned advocates determined to put forward the best case that someone like Mobley could possibly have. According to Summer's account of his trial tactics, he and Mobley "realized that they had no legal defense to the armed robbery and murder charges because of Mobley's numerous confessions, and they also recognized that they had no traditional 'mitigating' evidence that they could offer the jury to convince them to spare [Mobley's] life."\(^9\) In light of these circumstances, Summer attempted to collect a wide range of other information in order to provide some kind of explanation for Mobley's history and disposition.\(^10\) In the course of analyzing Mobley's family, for example, Summer

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33. Denno, supra note 2, at 251.
34. Id.; Turpin, 502 S.E.2d at 463–64.
35. Turpin, 502 S.E.2d at 464.
36. Id. at 463. Journalist Tom Junod depicted Mobley's comfortable childhood in blunter terms: Deprivation? Want? Hey, they may explain your typical murderer, your average everyday ghetto shooter, but they sure . . . don't explain Tony Mobley. Nothing does. Sure, his father's hard and his mother harder; sure, they divorced when Tony was at a delicate age; sure, he resents . . . his older sister. But please, Dr. Freud, you have to believe him: There is nothing any of them did—father, mother, sister, grandpa, grandma, maiden aunt—to deserve him. He didn't get beat, he didn't get [sexually abused]; no, beating and [sexual abuse], they were what he did, and that's how it has always been.

37. Turpin, 502 S.E.2d at 463-64; Denno, supra note 2, at 251–52; Daniel A. Summer, The Use of Human Genome Research in Criminal Defense and Mitigation of Punishment, in GENETICS AND CRIMINALITY: THE POTENTIAL MISUSE OF SCIENTIFIC INFORMATION IN COURT 182, 189 (Jeffrey R. Botkin et al. eds., 1999).
38. Turpin, 502 S.E.2d at 463.
39. Summer, supra note 37, at 189; see also Turpin, 502 S.E.2d at 463–66 (recognizing the lack of available mitigating evidence in Mobley's background).
40. Turpin, 502 S.E.2d at 463–66.
interviewed Joyce Ann Mobley Childers, the first cousin of Mobley’s father. At Mobley’s sentencing hearing, Ms. Childers testified that four generations of Mobleys—including Mobley’s uncles, aunts, and a grandfather—consistently engaged in acts of violence, aggression, and behavioral disorder. Such behavior ranged from serious crimes (murder and rape) to extreme spousal abuse, alcoholism, explosive temperaments, and antisocial conduct. At the same time, a substantial number of Mobleys were highly successful at business. This split created a family reputation of peculiar renown: the Mobleys were either behaviorally disturbed or business achievers, and, in a number of cases, they were both.

What instigated Stephen Mobley’s violence? No one knew, but Summer attempted to find out. He and Taylor requested experts and financial support of $1,000 so that scientific tests could be conducted to determine if Mobley showed any kind of genetic or neurochemical imbalance.

In an effort to bolster the demonstrated need for funding, Summer introduced into evidence a then-recent article by Han Brunner and others, published in the prestigious journal Science. The article (and other publications following it) reported the results of genetics testing of a Dutch kindred of four generations. The kindred included fourteen males affected by a syndrome characterized by borderline mental retardation and serious behavioral dysfunction. Brunner and his co-authors had sufficient documentation on eight of these males to note more specific and consistent disorders among them, including impulsivity, verbal and physical aggression, and violence. A number of the kindred’s males also had committed serious crimes. One man had raped his sister and, after he was institutionalized,
stabbed the institution’s warden in the chest. Another man habitually forced his sisters to undress at knife point, while another tried to kill his boss. Yet two more were arsonists and several regularly groped or grasped female family members.51 Tests on these males showed a defect on the X chromosome, known as monoamine oxidase A (MAOA) deficiency, which was passed from mother to son and linked to regulating aggression.52

According to Summer, it seemed reasonable to investigate whether Mobley was also afflicted by the MAOA deficiency or by a comparable kind of disability. Indeed, a co-author of the Science article53 had volunteered to perform genetics testing on Mobley to determine whether Mobley shared the same or a similar kind of genetic mutation.54 Other researchers offered to assess whether Mobley demonstrated abnormal levels of additional kinds of chemicals that can be linked to aggression, such as serotonin, noradrenaline, and adrenaline.55 As the Supreme Court of Georgia explained,

[Summer’s] strategy in the penalty phase centered around the following theme: Mobley has a personality disorder that has affected his behavior since he was a child, this behavior may be the result of a genetic problem that he cannot control, the jury should show him mercy because people with personality disorders tend to “mellow out” as they age, and Mobley has accepted responsibility for his crimes by cooperating with the police and offering to plead guilty.56

Of course this plan failed in Mobley’s case.57 Yet the implications of the court’s holding raise many issues that were underscored by the Ciba symposium58 and that remain relevant today.

III
ISSUES RAISED BY MOBLEY

A. Mobley Themes at Ciba

Several themes that emerged at the Ciba symposium were fueled specifically by Mobley. First, the symposium’s mere occurrence highlights the unusual interdisciplinary concern with the possible link between genetics and crime.59 The second theme was the narrowness with which the press and public viewed the Mobley case, focusing mainly on the tie between the case and the Brunner article in Science. This emphasis was unfortunate but not surprising, partly

51. Brunner et al., X-Linked, supra note 48, at 1035.
52. Brunner et al., Abnormal Behavior, supra note 47, at 578–79.
53. See id. at 578.
54. Denno, supra note 2, at 252. The co-author who volunteered to test Mobley was Xandra Breakefield. Id.
55. Id.
57. See supra notes 8–11 and accompanying text.
58. See supra notes 12, 16 and accompanying text.
because Mobley’s counsel had introduced Brunner’s study into evidence in support of a request for funds for genetic and neurochemical testing of Mobley.60 Yet medical analyses of Mobley were intended to be far broader than simply an investigation of MAOA deficiency, in part because Mobley did not appear to fit the common characteristics of an individual suffering from MAOA deficiency syndrome. At the Ciba symposium61 and in the Mobley case itself,62 commentators emphasized that Mobley’s tested IQ was average, a sharp contrast to the borderline IQ shown by the males in Brunner’s study.63 Likewise, Mobley’s disorder, if it had any genetic basis whatsoever, seemed to be transmitted through males, not through females.64 Therefore, the proposed Mobley evaluations were geared toward uncovering a wide range of neurochemical imbalances, the origins of which could be biological or even environmental.

The Ciba symposium prompted interest in a third theme—the future legal use of genetics evidence. A symposium chapter, Legal Implications of Genetics and Crime Research,65 estimated that after Mobley, attorneys would increasingly attempt to introduce genetics evidence in criminal cases.66 This estimate was not based on the perceived quality or moral acceptability of the evidence, but simply on a belief that defense counsel would progressively investigate scientific discoveries in their various efforts to provide mitigation for their death row clients.67

B. Mobley Themes Since Ciba

Historically, genetics evidence has been no stranger to law.68 Now, however, the themes of the Ciba symposium take on new significance as research grows. Genetics studies are gaining in sophistication,69 and criminal defense attorneys are becoming more interdisciplinary.70

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60. See supra notes 46–47 and accompanying text. The MAOA deficiency issue has come about in other cases. See Appelbaum, supra note 47, at 25–27.
61. Denno, supra note 2, at 252.
62. Turpin v. Mobley, 502 S.E.2d 458, 463 (Ga. 1998) (“[P]sychological reports showed that Mobley had an average IQ…. Although some psychological reports early in Mobley’s childhood suggested that he might have a learning disability or organic brain disorder, later reports found no evidence of either.”).
63. Brunner et al., Abnormal Behavior, supra note 47, at 578.
64. Denno, supra note 2, at 251 & fig.1.
65. Id. at 248.
66. Id. at 252.
67. Id. at 252–55.
68. It is beyond the scope of this article to analyze either the research or the publications examining the link between genetics and crime in legal cases. For a few overviews of this literature, see CAREY, supra note 25; Denno, supra note 2; Jones & Goldsmith, supra note 29; Moffitt, supra note 28; see also Matthew Jones, Overcoming the Myth of Free Will in Criminal Law: The True Impact of the Genetic Revolution, 52 DUKE L.J. 1031, 1039–40 (2003) (describing XYY Syndrome-related studies in the context of the early history of genetic defenses in criminal trials).
69. For recent research reviews, see CAREY supra note 25, at 431–57; Tehrani & Mednick, supra note 19, at 292–302; Moffitt, supra note 28, at 41–104; Terrie E. Moffitt, The New Look of Behavioral
Despite the enhanced acceptance of genetics research, however, genetics evidence continues to be plagued by the same problems and concerns that were raised ten years ago at the Ciba symposium. Such concerns include the following: (1) the historical association of genetics evidence with abuses by the Nazis during the Holocaust; (2) the meaning accorded the evidence in terms of the potential chilling of society's notions of free will; (3) the possible stigmatizing effect of such evidence, exemplified by past efforts to screen and genetically follow targeted children or to corral through preventive detention those individuals deemed genetically predisposed to violence; (4) the absolution of societal responsibility for the social and economic factors that lead to crime if legal actors find a “genetics” defense acceptable; and (5) suggestions that juries may be more readily swayed in court by genetic or biological studies because such research seems more objective and precise than social or behavioral factors. All five issues, which remain unresolved, influence how the criminal justice system perceives genetics research.

At the same time, however, modern research continues to emphasize the importance of environmental effects on behavior, thereby debunking the common myth that an individual's genetic structure is static. Indeed, during the past decade, criminological investigations have increasingly incorporated genetic, biological, and social factors as vehicles for understanding crime. When these studies employ many different kinds of variables, their results show that genetics and biology continually accentuate the significance of social factors on behavior—so much so that the three interactive categories (“genetic,” “biological,” and “social”) are often difficult to separate and decipher. In light of these kinds of discoveries, the next part examines cases that have used genetics evidence since the time Mobley was decided.

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70. See Summer, supra note 37, at 182–90.
71. Of course, there are vastly different types of genetics evidence, ranging from family history to modern medical testing. It is artificial to aggregate all the research under one heading. This type of lumping also confuses debates about when and where the evidence should be appropriately applied. The umbrella heading of “genetics evidence” is used in this article, however, to make general points, while recognizing that the points made could differ in their accuracy depending on the type and quality of evidence being discussed.
72. Denno, supra note 2, at 254; see also infra note 189 (describing the reactions to a 1995 University of Maryland conference on The Meaning and Significance of Research on Genetics and Criminal Behavior, in which the public and some conference participants voiced many of these same five concerns).
73. See Denno, supra note 24.
74. Denno, supra note 2, at 254.
75. For examinations of the relationship among these variables, see Carey supra note 25; Denno, supra note 24; Jones & Goldsmith, supra note 29; Moffitt, supra note 28.
IV

GENETICS EVIDENCE CASES: 1994–2004

The various arguments about the role of genetics in the criminal law are still largely theoretical. Genetics evidence has not gained widespread acceptance in current case law despite *Mobley* and the few decisions since that have resembled it. Those criminal cases that have used genetics evidence, however, reflect the interdisciplinary efforts of attorneys to help explain defendants’ behaviors. Twenty-seven criminal cases have referred to genetics evidence over the past decade—that is, since *Mobley* was first decided in 1994 to the end of 2004.76

A. An Overview of the Genetics Evidence Cases

The Appendix77 and Charts 1–378 give an aggregate overview of the cases involving the twenty-seven male defendants. As Chart 1 shows, most of the cases are appellate court decisions in which the defendant either received the death penalty (twenty-one cases) or life in prison (three cases).79 This

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76. These cases, which are summarized in the Appendix and in Charts 1–3, *infra*, were compiled using legal research databases only. Other cases may exist in which genetic predisposition evidence was at issue or potentially could have been at issue; however, such cases were either not published or were not made known publicly in a way that made them readily verifiable. (A general internet search turned up references to cases in which genetics evidence was relevant; in most instances, however, efforts to locate such cases on Westlaw or LexisNexis were unsuccessful.) The twenty-seven cases discussed in this article also do not include *Mobley*, 455 S.E.2d 61 (Ga. 1995), which already has been examined in some detail, or other decisions in which genetics evidence may have been an issue in a context not relevant to this article. For example, in *People v. Rodriguez*, 764 N.Y.S.2d 305 (N.Y. Sup. Ct. 2003), the New York Supreme Court held a defendant may be compelled to provide a blood sample for DNA testing so the defendant’s DNA could be compared to DNA evidence from a crime scene. *Id.* at 311–15. The court ruled that the defendant’s DNA could be used only for that criminal proceeding, however, and could not be placed into a DNA database for comparison with DNA evidence from other unsolved crimes. Results of DNA testing must be kept confidential—defendant has an “exclusive property right” to control dissemination of his genetic makeup.” *Id.* at 311. In essence, the opinion concerns privacy rights and DNA samples, as well as ways in which genetic material has been abused in the past. *Id.* at 307–15.

77. See infra p. 239.
78. See infra pp. 221, 222, 224.
breakdown in disposition is critical because it indicates that genetics evidence is submitted primarily as a mitigating factor in death penalty cases rather than as a defense relating to the defendant’s level of culpability at the trial court level. The criteria for evaluating and admitting mitigating evidence are far broader and more flexible than those used for defenses.50

CHART 1:
SEVERITY OF SENTENCING BY NUMBER OF CASES

<table>
<thead>
<tr>
<th>SENTENCE</th>
<th>NUMBER OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death (21)</td>
<td></td>
</tr>
<tr>
<td>Life (3)</td>
<td></td>
</tr>
<tr>
<td>Acquitted (1)</td>
<td></td>
</tr>
<tr>
<td>35 years (1)</td>
<td></td>
</tr>
<tr>
<td>Driving license revoked (1)</td>
<td></td>
</tr>
</tbody>
</table>


80. Mitigation evidence can be introduced during the penalty phase of a death penalty case to support attorneys’ explanations for why a defendant should not be executed. LINDA E. CARTER & ELLEN KREITZBERG, UNDERSTANDING CAPITAL PUNISHMENT LAW 137 (2004). The evidence, which is typically introduced through the use of expert testimony, focuses on a potentially wide range of individualized circumstances—for example, that the defendant had no prior criminal record, came from an abusive home, is remorseful, will not be dangerous in the future, is young, has a mental disorder, or suffers from any one of various life circumstances. Id. at 137-38. Although the Supreme Court permits substantial flexibility in the kind of evidence that can be admitted for mitigation purposes, the Court also allows states considerable discretion in how that evidence can be structured. Id. A substantial case law and literature on this topic are discussed in detail elsewhere. See generally id. at 137-56 (providing a general overview of the key cases and literature on mitigation evidence in death penalty cases).
Chart 2 indicates that most of the genetics evidence is applied to validate the existence of a serious condition, typically a mental illness or addiction, which the defendant could introduce as mitigating evidence in a death penalty case or at trial, irrespective of the genetics issue. For example, the majority of cases involve a mental disorder of some sort, such as depression (three cases), "mental illness" in general (three cases), or other problems reflecting a range of conditions. Notably, four cases concern a defendant's arguing a genetic predisposition to alcoholism.81

81. See infra Chart 2 and app. Genetics evidence has been used to validate the existence of a wide range of serious conditions. See Dennis ex rel. Butko, 378 F.3d at 895 (Berzon, J., concurring) (mental illness); Landrigan, 272 F.3d at 1228–29 (predisposition towards violence); Hendricks, 864 F. Supp. at 935 (mental illness); Fudge, 120 S.W.3d at 602–03 (violence towards women); DeAngelo, 2000 WL 973104, at *6 (bipolar disorder); Rogers, 783 So. 2d at 996 (porphyria); Armstrong, 700 N.E.2d 970 (alcoholism); Franklin, 656 N.E.2d at 761 (mental illness, predisposition towards violence); Sanchez, 734 N.E.2d at 922 (alcohol tolerance); Hammerli, 662 N.E.2d at 456 (severe mood disorder); Stevens, 770 N.E.2d at 750 (dissociative disorder); Benefiel, 716 N.E.2d at 913 (schizotypal personality disorder); Manning, 03-1982 (La. 10/19/04); 885 So. 2d at 1097 (alcoholism); Billiot, 655 So. 2d at 8 (schizophrenia); Ferguson, 20 S.W.3d at 509 (depression); Timmendequas, 737 A.2d at 71 (pedophilia); Hartman, 476 S.E.2d at 342 (alcoholism); Hughbanks, 99 Ohio St. 3d 365, 2003-Ohio-4121, 792 N.E.2d 1081, at ¶ 113 (schizophrenia); Spivey, 692 N.E.2d at 165 (extra Y chromosome); Wilson, 1994 WL 558568, at *43 (alcoholism); Von Dohlen, 602 S.E.2d at 741–42 (depression, mental disorders); Cauthern, 145 S.W.3d at 588 (impulsive behavior); Davis, 2004 WL 253396, at *4 (depression, mental illness); Maraschiello, 88 S.W.3d at 598 (delusional disorder); Alley, 958 S.W.2d at 140–43 (physical abnormalities, neurosis, Multiple Personality Disorder); Hall, 160 S.W.3d at 32–33 (Fetal Alcohol Syndrome, Fragile X Syndrome, Klinefelter's Syndrome, extra Y chromosome); Arausa, No. 07-02-0396-CR, 2003 WL 21803322, at *4 (propensity of abused to become abusers).
CHART 2:
REASONS FOR INTRODUCING GENETICS EVIDENCE BY NUMBER OF CASES

Types of Condition Evidence

- Alcoholism
- Depression
- Mental illness
- Schizophrenia
- Predisposition towards violence
- Extra Y chromosome (XYY)
- Violence towards women
- Used to differentiate from mental illness
- Severe mood disorder
- Schizotypal personality disorder
- Propensity of abused to become abusers
- Porphyria
- Physical abnormalities
- Pedophilia
- Neurosis
- Multiple personality disorder
- Klinefelter's syndrome (XXY)
- Impulsive behavior
- Fragile X syndrome
- Fetal alcohol syndrome
- Dissociative disorder
- Delusional disorder
- Bipolar disorder
- Alcohol tolerance
- Mental disorders

Number of Cases

Winter/Spring 2006
Chart 3 provides information on the nature of the evidence the defendant seeks to admit. Most of the information is based on some kind of expert evaluation or family history (eleven cases each, respectively), rather than a medical study of the defendant. This revelation is important to the extent that both the judiciary and the public appear more concerned about the direct medical testing of a defendant than, for example, descriptive accounts of the defendant's family history. Regardless, both direct testing and family history strongly reflect environmental influences.

**CHART 3:**

**NATURE OF EVIDENCE SOUGHT TO BE ADMITTED BY NUMBER OF CASES**

<table>
<thead>
<tr>
<th>Nature of Evidence</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert evaluation (11)</td>
<td>11</td>
</tr>
<tr>
<td>Family history (11)</td>
<td>11</td>
</tr>
<tr>
<td>Behavioral history (2)</td>
<td>2</td>
</tr>
<tr>
<td>Medical records (2)</td>
<td>2</td>
</tr>
<tr>
<td>Medical studies (1)</td>
<td>1</td>
</tr>
<tr>
<td>No evidence (1)</td>
<td>1</td>
</tr>
<tr>
<td>Not described (1)</td>
<td>1</td>
</tr>
</tbody>
</table>

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82. See infra Chart 3 and app. Chart 3 illustrates the frequency with which defendants sought to admit different forms of genetics evidence. The total number will be more than the number of examined cases (twenty-seven), because in some cases the defense attempted to introduce more than one form. Defendants sought to admit expert testimony regarding a direct evaluation of the defendant in eleven instances. See DeAngelo, 2000 WL 973104, at *6; Rogers, 783 So. 2d at 995; Hammerli, 662 N.E.2d at 456; Stevens, 770 N.E.2d at 750; Manning, 03-1982 (La. 10/19/04); 885 So. 2d at 1097; Billiot, 655 So. 2d at 8; Timmendequas, 737 A.2d at 71; Hughbanks, 99 Ohio St. 3d 365, 2003-Ohio-4121, 792 N.E.2d 1081, at ¶ 113; Spivey, 692 N.E.2d at 165; Alley, 958 S.W.2d at 140-43; Hall, 160 S.W.3d at 32-33. Defendants also attempted to introduce evidence regarding their family histories in eleven instances. See Hendricks, 864 F. Supp. at 935; Rogers, 783 So. 2d at 995; Armstrong, 700 N.E.2d at 970; Franklin, 656 N.E.2d at 761; Sanchez, 734 N.E.2d at 922-23; Benefiel, 716 N.E.2d at 913; Hartman, 476 S.E.2d at 342; Wilson, 1994 WL 558568, at *43; Cauthern, 145 S.W.3d at 588; Davis, 2004 WL 253396, at *4; Marasciullo, 88 S.W.3d at 598. Defendants attempted to introduce evidence regarding their behavioral histories twice. See Landrigan, 272 F.3d at 1228-29; Ferguson, 20 S.W.3d at 509. Defendants also attempted to introduce their medical records in two instances. See Benefiel, 716 N.E.2d at 913; Von Dohlen, 602 S.E.2d at 741-42. One defendant attempted to introduce medical studies as evidence. See Arausa, 2003 WL 21803322, at *4. One case did not describe the nature of the evidence sought to be introduced. See Fudge, 120 S.W.3d 600. Finally, one case examined did not involve the introduction of genetics evidence, genetics being mentioned only in passing. See Dennis ex rel. Butko, 378 F.3d at 895 (Berzon, J., concurring).

83. For further discussion of the tendency of individuals to overplay the powerful effect of biology on behavior, see Deborah W. Denno, *Commentary, in UNDERSTANDING CRIME: A MULTIDISCIPLINARY APPROACH* 175, 175-80 (Susan Guarino-Ghezzi & A. Javier Treviño eds., 2005).
Lastly, the Appendix includes seven cases that make only passing references to genetics evidence. Typically in these cases courts merely listed the genetics evidence among the mitigating factors offered by the defense during the sentencing or penalty phases of a death penalty trial. In the remaining twenty cases, genetics evidence is an issue of varying significance. Even when the genetics evidence is not pivotal, however, subtleties in the opinions of all twenty-seven cases may provide some insight concerning courts' future stances towards genetic and environmental factors as mitigation.

B. Tactical Strategies for Using Genetics Evidence

As a tactical strategy, the twenty-seven cases showed genetics evidence employed in three primary ways: (1) to support a claim of ineffective assistance of counsel, (2) to provide proof and diagnosis of a defendant's genetic condition, or (3) to indicate some likelihood of the defendant's future dangerousness. Any association between the type of strategy and the court's acceptance of the genetics evidence is difficult to garner, given the range of other factors influencing these cases.

1. Ineffective Assistance of Counsel

Nine cases involved petitions and appeals by defendants based on claims of ineffective assistance of counsel. In some of these cases, the court held that including genetics evidence was a valid defensive strategy. In *Stevens v. State*, for example, defendant's counsel had presented the defendant as a "passive victim of abuse," based in part on testimony from a psychologist who stated the defendant's genetic predisposition was partly to blame for his behavior. The court held that this defense strategy was sound and affirmed the lower court's denial of post-conviction relief.

Other ineffective assistance of counsel claims were based on the failure to present genetics evidence adequately. The court in *Von Dohlen v. State* remanded the defendant's case due to his counsel's failure to sufficiently prepare a defense expert witness for sentencing-phase testimony regarding the extent of the defendant's mental illness. The remand was based in part on

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84. *DeAngelo*, 2000 WL 973104, at *6; *Rogers*, 783 So. 2d at 997; *Manning*, 03-1982 (La. 10/19/04); 885 So. 2d at 1097; *Timmendequas*, 737 A.2d at 71; *Wilson*, 1994 WL 558568, at *43; *Davis*, 2004 WL 253396, at *4; *Maraschiello*, 88 S.W.3d at 598. Although these cases reference genetics evidence only in passing, some of the cases are relevant nonetheless to discussions that appear elsewhere in this article's analysis.

85. 770 N.E.2d at 739.

86. *Id.* at 754.

87. *Id.* at 755. *Stevens v. State*, 770 N.E.2d at 739, may be seen as implicit approval of a genetics defense because the court did not consider a defense theory partially based on genetics evidence to constitute ineffective assistance of counsel. Yet the theory was obviously considered unsuccessful, nonetheless.


89. *Id.* at 746.
subsequent testimony from the expert witness that if he had been given certain medical and psychiatric records that were available before the trial, he would have diagnosed the defendant with a far more serious mental illness.\textsuperscript{90} These records indicated, in part, the defendant’s genetic predisposition for mental disorders.\textsuperscript{91}

In other cases, however, courts placed less importance on genetics evidence. In particular, these courts rejected defendants’ petitions or appeals claiming their counsels’ ineffectiveness in failing to offer mitigating genetics evidence during the penalty phase. In State v. Ferguson,\textsuperscript{92} for example, the defendant argued that his counsel should have investigated and presented information concerning the defendant’s genetic predisposition to a major depressive disorder.\textsuperscript{93} The court concluded that because sufficient mitigation evidence had been introduced, the loss of this additional predisposition evidence did not constitute ineffective assistance of counsel.\textsuperscript{94} In Benefiel v. State,\textsuperscript{95} the genetics evidence involved the defendant’s predisposition to a personality disorder.\textsuperscript{96} Testimony regarding this predisposition had been offered during the guilt phase, and the court was satisfied that the jury had been able to consider it in the sentencing phase, even though it was not reintroduced; its absence from that phase had therefore not affected the jury’s sentencing recommendation.\textsuperscript{97} In People v. Franklin\textsuperscript{98} the court held that, even if the defendant’s counsel had investigated and offered such mitigating evidence as the defendant’s “family’s history of mental illness and violence,” it would have made no difference to the jury’s recommended sentence.\textsuperscript{99} Similarly, in Landrigan v. Stewart\textsuperscript{100} the court determined that evidence of the defendant’s alleged genetic predisposition to violence would have been unlikely to affect the outcome of the defendant’s case.\textsuperscript{101}

Landrigan’s procedural aspects are particularly interesting because the appellate court opinion cites Mobley as precedent.\textsuperscript{102} Timothy Landrigan was

\begin{itemize}
\item \textsuperscript{90} Id. at 741.
\item \textsuperscript{91} Id. at 741–42.
\item \textsuperscript{92} 20 S.W.3d 485 (Mo. 2000).
\item \textsuperscript{93} Id. at 509.
\item \textsuperscript{94} Id.
\item \textsuperscript{95} 716 N.E.2d 906 (Ind. 1999).
\item \textsuperscript{96} Id. at 913.
\item \textsuperscript{97} Id.
\item \textsuperscript{98} 656 N.E.2d 750 (Ill. 1995).
\item \textsuperscript{99} Id. at 761.
\item \textsuperscript{100} 272 F.3d 1221, 1221 (9th Cir. 2001), vacated, \textit{reh'g en banc granted}, 397 F.3d 1235 (9th Cir. 2005). The Ninth Circuit recently issued an order on this case. Landrigan v. Schriro, 441 F.3d 638 (9th Cir. 2006)(en banc)(affirming in part and reversing in part district court’s denial of a capital habeas petition because defendant demonstrated colorable claim of ineffective assistance of counsel during penalty phase based on counsel’s failure to investigate and present mitigating evidence including defendant’s family history and mental illness, which could have resulted in a sentence other than death).
\item \textsuperscript{101} Landrigan, 272 F.3d at 1228.
\item \textsuperscript{102} Id. at 1228 n.4 (citing Turpin v. Mobley, 502 S.E.2d 458, 458 (Ga. 1998)).
\end{itemize}
convicted of murder and sentenced to death in 1993.\textsuperscript{103} After the Arizona Supreme Court affirmed Landrigan’s conviction and sentence\textsuperscript{105} and the district court rejected Landrigan’s petition for habeas corpus relief, Landrigan appealed to the Ninth Circuit Court of Appeals.\textsuperscript{106} Landrigan’s numerous postconviction appeals and petitions were based in part on a claim of ineffective assistance of counsel, arguing trial counsel did not investigate and introduce mitigating evidence during the trial and sentencing phases.\textsuperscript{107} At sentencing, Landrigan refused to allow his counsel to present mitigation evidence.\textsuperscript{108} Only after sentencing did Landrigan state that he would have cooperated with his trial counsel’s efforts to present mitigating evidence regarding his alleged genetic predisposition, had the issue been raised.\textsuperscript{109}

The three-judge appellate panel denied Landrigan’s ineffective assistance of counsel claim and affirmed the district court’s decision. The appellate panel determined that Landrigan had not only ignored his counsel’s advice regarding the introduction of mitigating evidence, but that he had actively thwarted his trial counsel’s efforts to present his case in an advantageous manner.\textsuperscript{110} The panel also noted the state courts’ skepticism that Landrigan would have permitted a defense that included mitigating genetics evidence, “given Landrigan’s apparently adamant insistence that mitigating evidence not be presented” during trial.\textsuperscript{111} Citing \textit{Mobley v. Head}\textsuperscript{112} and \textit{Turpin v. Mobley},\textsuperscript{113} the panel emphasized that the “rather exotic . . . genetic violence theory” proposing that “Landrigan’s biological background made him what he is” would not have affected the outcome of his trial, even if the theory had been introduced.\textsuperscript{114} As the panel explained, “although Landrigan’s new evidence can be called mitigating in some slight sense, it would also have shown the court that it could

\textsuperscript{103} State v. Landrigan, 859 P.2d 111, 112 (Ariz. 1993).
\textsuperscript{104} \textit{Turpin}, 502 S.E.2d at 460.
\textsuperscript{105} \textit{Landrigan}, 859 P.2d at 118.
\textsuperscript{106} \textit{Landrigan}, 272 F.3d at 1223.
\textsuperscript{107} According to an amended brief filed on January 8, 2001, mitigating factors would have included evidence that “[Landrigan’s] brain does not work the way it is supposed to due to genetics and \textit{in utero} exposure to alcohol and other toxic substances.” Corrected Brief of Appellant at 22, Landrigan v. Stewart, 272 F.3d 1221 (9th Cir. 2001) (No. 00-99011) [hereinafter \textit{Corrected Brief of Appellant}]. This condition “was exacerbated due to abandonment and other emotional detachments that [Landrigan] experienced when he was a baby, as well as substance abuse as a youth and as an adult.” \textit{Id}.
\textsuperscript{108} \textit{Landrigan}, 272 F.3d at 1225.
\textsuperscript{109} \textit{Id} at 1228.
\textsuperscript{110} \textit{Corrected Brief of Appellant}, at 61. Landrigan’s counsel on appeal argued that trial counsel made only a minimal effort to gather mitigating evidence, and that “all the signals were there . . . to recognize [Landrigan’s brain dysfunction], conduct an investigation . . . and present it to the court at the sentencing hearing.” \textit{Id}.
\textsuperscript{111} \textit{Id}.
\textsuperscript{112} 267 F.3d 1312 (11th Cir. 2001).
\textsuperscript{113} 502 S.E.2d 458 (Ga. 1998).
\textsuperscript{114} \textit{Landrigan}, 272 F.3d at 1228 n.4. Landrigan refuted the panel’s reliance on the \textit{Mobley} cases in a subsequent supplemental brief. Supplemental Brief of Petitioner-Appellant at 2, Landrigan v. Stewart, 397 F.3d 1235 (9th Cir. 2005) (No. 00-99011). Citing a wide range of research for support, the brief emphasized that Landrigan’s genetic predisposition does not render violent behavior a certainty, but simply indicates a higher risk for antisocial tendencies. \textit{Id} at 1.
anticipate that he would continue to be violent."115 Given Landrigan’s reluctance to express remorse or provide the reasons for his crimes, “assuring the court that genetics made him the way he is could not have been very helpful.”116

Following the appellate panel’s decision, Landrigan filed petitions arguing that the panel had erred in its consideration of “only one component of the mitigating evidence: genetic predisposition to violence.”117 According to one petition, Landrigan’s “organic brain dysfunction” was not exclusively the result of genetics, but also of his “in utero exposure to alcohol and other toxic substances, and early disruptive relations in his biological and adoptive families.”118 The petition also noted that the panel had ignored precedent in which an Arizona trial court had considered a defendant’s genetic history in its imposition of life imprisonment rather than the death penalty.119 As a result, the panel’s reference to genetics evidence as a novel theory might indicate that “the law has not caught up to the science.”120 In addition, Landrigan took issue with the appellate panel’s implication that evidence of Landrigan’s genetic history did him more harm than good, since his history indicated a high likelihood of “future dangerousness.”121 Contending the panel had “converted the mitigating evidence offered regarding Landrigan’s biological and genetic background from a shield into a sword,” the petition noted that “future dangerousness” is not a statutory aggravating circumstance under Arizona law.122

Recently, the Ninth Circuit Court of Appeals ordered that Landrigan’s case be reheard by the en banc court.123 The final outcome could have implications for other kinds of cases, irrespective of the types of genetics evidence they may

115. Landrigan, 272 F.3d at 1229.
116. Id.
117. Petitioner-Appellant’s Petition for Panel Rehearing and Rehearing En Banc at 3, Landrigan v. Stewart, 397 F.3d 1235 (9th Cir. 2005) (No. 00-99011) [hereinafter Petitioner-Appellant’s Petition].
118. Id. Respondents-Appellees argued, however, that the appellate court properly limited its consideration of mitigating factors to genetics evidence, since it was the only evidence presented to the state court in support of Landrigan’s ineffective assistance of counsel claim during the first post-conviction relief proceeding. Respondents–Appellees’ Supplemental Brief at 7-10, Landrigan v. Stewart, 397 F.3d 1235 (9th Cir. 2005) (No. 00-99011).
120. Petitioner-Appellant’s Petition, at 13. In further support of this assertion, appellant’s counsel submitted a supplemental letter calling the court’s attention to recent scholarship related to the use of biopsychosocial research in the legal system. Jeffrey L. Kirchmeier, A Tear in the Eye of the Law: Mitigating Factors and the Progression Toward a Disease Theory of Criminal Justice, 83 OR. L. REV. 631 (2004).
122. Id. at 16. Attorneys for the appellee responded by arguing that the appellate court did not present the genetic predisposition as evidence of future dangerousness, but simply indicated it was unlikely to have affected the outcome of the trial. Respondents-Appellees’ Response to Petitioner–Appellant’s Petition for Panel Rehearing and Rehearing En Banc at 13, Landrigan v. Stewart, 397 F.3d 1235 (9th Cir. 2005) (No. 00-99011).
123. Landrigan v. Stewart, 397 F.3d 1235, 1235 (9th Cir. 2005).
use. Like Mobley, Landrigan touches on many of the key and varied issues pertaining to the use of genetics evidence.

Before addressing more fully Landrigan's arguments and the broader matter of how genetics evidence should play a role in the criminal justice system, it is helpful to put Landrigan in context with other genetics and crime cases. In Hendricks v. Calderon, the court remanded because defense counsel had not offered mitigating evidence of the defendant's predisposition to mental illness during the penalty phase. In doing so, the court suggested that mitigating evidence regarding the defendant's "difficult life" (including his genetic predisposition to mental illness) might have affected the case's outcome regarding sentencing. This argument was at odds with the reasoning in Benefiel, Landrigan, and Franklin, in which genetics evidence had been offered and admitted.

Conversely, genetics evidence suggesting a predisposition to impulsive behavior was proffered by the defendant's counsel but omitted by the trial court in Cauthern v. State. In rejecting the defendant's claim that he was prejudiced by the omission of this mitigating evidence, the court noted that the defendant's stepsiblings experienced similarly abusive upbringings but did not appear to suffer from violent inclinations. Alley v. State was comparatively dismissive of genetics evidence. But the court readily accepted the testimony of medical experts who saw no need to investigate the possibility of genetic problems during their evaluation of the defendant despite their statements that he suffered from various physical problems that could potentially "point to a syndrome with genetic origin." The experts' decision was particularly notable given their acknowledgment that certain genetic conditions can potentially influence people's behavior.

124. See infra Part V.
125. 864 F. Supp. 929 (N.D. Cal. 1994), aff'd, 70 F.3d 1032 (9th Cir. 1995).
126. 70 F.3d at 1045. The court rejected the defendant's claim that his counsel was ineffective for failing to present this same evidence during the guilt phase. Id.
127. Id.
128. The reasoning in Hendricks markedly contrasts with the arguments presented in State v. Hartman, 476 S.E.2d 328 (N.C. 1996). Hartman argued the trial court's restructuring of his requested jury instruction regarding his family history of alcoholism prevented the jury from considering relevant mitigating evidence—specifically, Hartman's genetic predisposition to alcohol abuse. Id. at 342. The trial court instead submitted the following instruction: "Consider whether the defendant is an alcoholic." Id. Stated this way, Hartman posited, the jury "was more likely" to view Hartman's alcoholism "simply as weakness or unmitigated choice." Id. The court rejected this argument, holding that a "catchall mitigating circumstance" instruction that had been submitted was sufficient to address any such concerns. Id.
130. Id. at 609.
132. Id. at 149–50.
133. Id. at 143.
134. Id.
2. Proof and Diagnosis of Genetic Conditions

A second use of genetics evidence is to prove or support a diagnosis of a genetic condition. The cases in which genetics evidence was employed for this purpose demonstrate the challenges of applying legal principles to complex scientific information. Dennis ex rel. Butko v. Budge\textsuperscript{135} mentions genetics evidence in a different venue—the concurring opinion—which in that case comments on the difficulty of distinguishing mental illness from "the myriad ... memories, experiences and genetic predispositions that go to make up each individual's unique personality."\textsuperscript{136} The concurrence also emphasizes the criminal justice system's difficulty in handling and interpreting mental health issues: "We as judges and lawyers attempt to capture these philosophical dilemmas in words that can have very different meanings to different people, and that often may not respect the concepts that mental health professionals would use to capture cognitive and volitional capacity."\textsuperscript{137}

The challenges arising when applying legal principles to scientific evidence are well documented, and genetic variables are no exception.\textsuperscript{138} For one, courts are reluctant to embrace genetics evidence, which may be due in part to the seemingly arbitrary standards for determining what constitutes mitigation and the vague criteria for diagnosis of genetic conditions. Even among the relatively small number of cases analyzed in this article, for example, there is great variety in the types of mitigating factors proposed.\textsuperscript{139}

In most cases in which the defendant's counsel offers genetics evidence, the information consists almost wholly of the defendant's family history.\textsuperscript{140} It stands to reason, of course, that a defendant's family members could suffer from the same genetic condition(s) as the defendant. Yet proof limited to family history seems to invite responses such as that of the Tennessee Court of Criminal Appeals, which emphasized in Cauthern that the defendant's stepsiblings did not suffer from the alleged predisposition.\textsuperscript{141} Even in cases such as State v.

\textsuperscript{135} 378 F.3d 880 (9th Cir. 2004), cert. denied, stay denied, Dennis v. Budge, 542 U.S. 959 (2004).

\textsuperscript{136} Id. at 895.

\textsuperscript{137} Id.

\textsuperscript{138} See generally Denno, supra note 2, for an overview of some of these challenges.

\textsuperscript{139} See supra Chart 2; infra app. These types of mitigating factors include predispositions to alcoholism, depression, impulsive behavior, violence, and aggression. See supra Chart 2 and supra note 71 (discussing the different types of genetics evidence). The conditions range from the specific (such as XXY Syndrome, porphyria, and bipolar disorder) to the general (for example, mental disorders, personality disorders, mood disorders, and "genetic defects"). See supra Chart 2 and supra note 81 (listing the ways genetics evidence validates the existence of serious conditions).


\textsuperscript{141} Cauthern, 145 S.W.3d at 609.
Hughbanks, in which the court acknowledged the negative effects of a family history of mental illness on a defendant, such mitigating evidence does not appear likely to affect the outcome of the case. In some circumstances, proving a genetic predisposition through family history may even backfire. In rejecting the defendant's ineffective assistance claim in Landrigan, the Ninth Circuit stated: "It is highly doubtful that the sentencing court would have been moved by information that [the defendant] was a remorseless, violent killer because he was genetically programmed to be violent, as shown by the fact that he comes from a family of violent people, who are killers also." Citing Franklin, the Ninth Circuit further warned, "although [defendant's] new evidence can be called mitigating in some slight sense, it would also have shown the court that it could anticipate that he would continue to be violent." Of course, this argument takes on a double-edged-sword rationale that wrongly presumes a genetic attribute is static. Despite the questionable accuracy of this presumption, such arguments appear to be highly persuasive to courts and the public alike.

Nor does genetics evidence appear to flag the attention of the trial court when proof other than family history is offered. In Arausa v. State, the defendant had requested appointment of a psychiatrist in part to help him assess the mitigation value of a research study that indicated a genetic predisposition among victims of abuse to become abusers. The appellate court skirted the genetics issue, finding no error in the trial court's rejecting the defendant's request: the defendant's original request for a court-appointed

143. In Hughbanks, id. at ¶ 134, and at least two other cases, State v. Spivey, 692 N.E.2d 151 (Ohio 1998), and State v. Wilson, No. Civ.A. 92CA005396, 1994 WL 558568 (Ohio Ct. App. Oct. 12, 1994), the courts did not expressly reject mitigating evidence regarding genetics, but held that the aggravating circumstances of the crime outweighed any mitigating factors. Family history was not specifically offered as proof of a genetics defense in Spivey and Wilson. Spivey involved a diagnosis of XY Syndrome. 692 N.E.2d at 165. A defense expert testified that although the syndrome itself does not cause aggression, the defendant's family environment exacerbated his condition and resulted in his criminal behavior. Id. Wilson merely listed the defendant's genetic predisposition to alcoholism among the mitigating factors presented during the penalty phase, and offered no further information concerning its origins. 1994 WL 558568, at *13 n.5.
144. Landrigan, 272 F.3d at 1228–29.
146. Landrigan, 272 F.3d at 1229. The Franklin court further concluded the following:
The proffered evidence regarding defendant's psychological problems and his family's violent and psychological history was not inherently mitigating. Although this evidence could have evoked compassion in the jurors, it could have also demonstrated defendant's potential for future dangerousness and the basis for defendant's past criminal acts. The evidence of defendant's mental illness may also have shown that defendant was less deterrable or that society needed to be protected from him.
147. See supra note 122 and accompanying text for other commentary on the double-edged-sword dilemma in Landrigan; see infra Part V for further discussion of this issue in the context of additional conceptual problems with the genetics evidence cases.
149. Id. at *2.
medical health expert had been based on a need to analyze the defendant's competency, not the research study.150 In State v. Maraschiello,151 the defendant claimed his genetic predisposition for a delusional disorder (as demonstrated by his family history) was exacerbated by Gulf War Syndrome.152 This appellate court also followed the lead of the trial court in avoiding the matter of genetics. The testimony pertaining to Gulf War Syndrome had been excluded on unrelated grounds, and the defendant's alleged predisposition did not come up again at trial (or on appeal).153 Only in Hendricks v. Calderon154 did an appellate court consider it a mistake not to offer as mitigation evidence pretrial hearing testimony on the defendant's genetic predisposition to mental illness and its aggravation by an abusive childhood.155

3. Future Dangerousness

Evidence regarding genetic predispositions brings with it the third use of genetics evidence in the criminal law: the debate over the prediction of future dangerousness,156 as discussed in Franklin157 and Landrigan.158 In many of the cases this article analyzes, genetics evidence takes the form of an individual's predisposition toward some condition or behavior.159 This approach does not, of course, guarantee the afflicted individual will develop that condition or engage in that behavior; it indicates merely that the likelihood of occurrence may be heightened. For example, in State v. Spivey,160 the doctor who diagnosed the appellant with XYY Syndrome testified that this abnormality put the defendant "at risk for committing criminal acts, but that the syndrome itself did not cause him to be aggressive and to commit violent acts."161 Instead, the defendant's family environment was faulted for triggering his preexisting tendencies toward violence.162

The issue of future dangerousness was explored in further detail in State v. DeAngelo,163 in which several psychiatrists evaluated the mental condition of an

150. Id. at *4.
152. Id. at 599.
153. Id. at 599-611.
154. 864 F. Supp. 929 (N.D. Cal. 1994), aff'd, 70 F.3d 1032 (9th Cir. 1995).
155. Id. at 934-35.
156. Future dangerousness and other issues raised by genetics evidence are discussed in People v. Rodriguez, 764 N.Y.S.2d 305 (N.Y. Sup. Ct. 2003), which concerns defendants' privacy rights in the context of the recent trend to collect DNA samples. See supra note 76 for a more detailed account of Rodriguez.
158. Landrigan v. Stewart, 272 F.3d 1221, 1229 (9th Cir. 2001) vacated, reh'g en banc granted, 397 F.3d 1235 (9th Cir. 2005), aff'g in part, rev'g in part, Landrigan v. Schriro, 441 F.3d 638 (9th Cir. 2006)(en banc).
159. See supra Chart 2; infra app.
160. 692 N.E.2d 151 (Ohio 1998).
161. Id. at 165.
162. Id.
individual who had been acquitted of criminal charges because he was unable to recognize or control the wrongfulness of his behavior.\textsuperscript{164} The evaluating experts disagreed on their diagnoses and treatment recommendations for the individual, as well as their assessment of the risk he posed to the public if released.\textsuperscript{165} The court ultimately determined the individual should be committed to a maximum security psychiatric unit because he was a danger to society.\textsuperscript{166} As the court stated, “[p]sychiatric predictions of future dangerousness, while of some value, must not be unduly relied upon. The court’s main concern must be the protection of society, and not necessarily therapeutic goals.”\textsuperscript{167}

\textit{DeAngelo} and comparable kinds of cases illustrate the strain between the legal and mental health fields when they consider genetic information. Such tension is accentuated because genetics evidence is typically introduced into trials through testimony from mental health professionals.\textsuperscript{168} Establishing consistent criteria for assessing the expertise of these witnesses is therefore likely to be a critical step toward the general acceptance of genetics evidence. In \textit{DeAngelo},\textsuperscript{169} for example, the court questioned the credentials and objectivity of at least one testifying psychiatrist.\textsuperscript{170} In turn, the court in \textit{People v. Hammerli}\textsuperscript{171} likewise seemed dubious of the defense’s expert witness testimony.\textsuperscript{172} The court emphasized that although the defendant’s treating psychiatrist had diagnosed the defendant with depression (yet had noted improvement), all four defense experts “found defendant to be legally insane at the time of the murder and were able with hindsight to fit defendant’s actions into their various diagnoses.”\textsuperscript{173} As the court explained, each of the experts detected “in defendant’s behavior facts to support [that expert’s] own opinion.”\textsuperscript{174} In \textit{Billiot v. State},\textsuperscript{175} the court exhibited a more overt lack of deference toward the treating mental health expert, who diagnosed the defendant with a genetic predisposition. Instead, the court relied on the combined testimony of the majority of expert witnesses in determining that the defendant was competent to be executed.\textsuperscript{176} Acknowledging that the lone, treating mental health expert who testified otherwise “had done more recent

\begin{footnotesize}
\begin{enumerate}
\item 164. Id. at *1.
\item 165. Id. at *3–6.
\item 166. Id. at *11.
\item 167. Id.
\item 168. See supra Chart 3; infra app.
\item 169. 2000 WL 973104, at *1.
\item 170. Id. at *11.
\item 172. Id. at 458.
\item 173. Id.
\item 174. Id.
\item 175. See Billiot v. State, 655 So. 2d 1, 13 (Miss. 1995) (stating that the expert’s testimony was not outcome-determinative, although the testimony reflected the broadest and most recent research on the defendant).
\item 176. Id. at 17.
\end{enumerate}
\end{footnotesize}
and more extensive research on the issue of [defendant's] sanity," the court nonetheless refused to give that witness's testimony greater weight than that of the other witnesses.\textsuperscript{177} In \textit{People v. Armstrong},\textsuperscript{178} the court concluded that a social worker had lacked the expertise to testify concerning the defendant's genetic predisposition to alcoholism.\textsuperscript{179} Perhaps \textit{Armstrong} could be interpreted as indicating that the genetic predisposition evidence might have received greater consideration if the testifying witness had the necessary expertise.

Even among qualified experts, however, conflicting diagnoses are another factor likely to hinder general acceptance of genetics evidence. The drawbacks of such incongruity are indicated in cases such as \textit{Hall v. State}.\textsuperscript{180} In \textit{Hall}, psychologists for the defense testified that the defendant suffered from various genetic afflictions; in contrast, the state's psychologist offered directly opposing testimony, asserting that the defendant did not exhibit the symptoms of any such disorders.\textsuperscript{181} Not surprisingly, courts are quick to point out such disparities. The \textit{DeAngelo}\textsuperscript{182} court, for example, noted the psychiatrists' inability to agree on a diagnosis of the defendant,\textsuperscript{183} an outcome that encouraged the court to have him committed.\textsuperscript{184}

Overall, this analysis of the last decade's twenty-seven genetics evidence cases shows how courts generally have continued to constrain the admissibility or use of genetic factors, even as mitigation in the penalty phase of a death penalty trial. Thus, there is little to no indication that genetics evidence has reinforced concerns expressed in the context of \textit{Mobley}, most particularly worries that actors in the criminal justice system would increasingly and irresponsibly rely on such evidence in their decision-making. So far, evidentiary rules and procedures continue to keep the evidence in such a safe place substantively that a major concern may be that defendants do not have available the full range of mitigating factors to which they are constitutionally entitled in death penalty cases.

\textbf{V}

\textbf{CONCLUDING COMMENTS}

In 1994, \textit{Mobley v. State}\textsuperscript{185} garnered substantial notice because of defense counsel's strenuous efforts to test for genetics evidence for mitigation in

\textsuperscript{177} \textit{Id.} at 13.
\textsuperscript{178} 700 N.E.2d 960 (Ill. 1998).
\textsuperscript{179} \textit{Id.} at 970.
\textsuperscript{181} \textit{Id.} at 30.
\textsuperscript{183} \textit{Id.} at *11.
\textsuperscript{184} \textit{Id.}
\textsuperscript{185} 455 S.E.2d 61 (Ga. 1995).
Stephen Mobley's death penalty case.\footnote{186} According to some commentators at the time, if such testing had been allowed, it could encourage political and moral abuses of such highly controversial information.\footnote{187} Yet the survey here of the twenty-seven cases that have used genetics evidence in the decade following Mobley shows no apparent basis for these worries.\footnote{188} Genetics evidence is seldom offered. When attorneys do attempt to introduce it during the penalty phase of a death penalty trial, most courts still question its applicability.

In essence, since Mobley, little has changed legally in the area of genetics and crime. The topic remains controversial for many of the same reasons it did ten years ago.\footnote{189} Likewise, the press and public still seem confused about the meaning and role of mitigating evidence in death penalty cases.\footnote{190}

\footnote{186: See supra note 12 and accompanying text.} \footnote{187: See Denno, supra note 2, at 254 (outlining the political and moral concerns over genetics evidence); see also supra note 12 (discussing potential abuses in the context of the Mobley case); infra note 189 (discussing potential abuses in the context of the 1995 University of Maryland conference on The Meaning and Significance of Research on Genetics and Criminal Behavior).} \footnote{188: See supra Part IV; infra app.} \footnote{189: Few conferences on the topic of genetics and crime have occurred since the Ciba symposium. For example, shortly after the Ciba symposium took place, the University of Maryland held a conference on The Meaning and Significance of Research on Genetics and Criminal Behavior. David Wasserman, a legal scholar and organizer of the conference, noted at the time, "There are a hell of a lot of people attending this conference who think the dangers of genetic research are as great in the long term as the dangers of atomic energy." Pezzella, supra note 3; see also Wade Roush, Conflict Marks Crime Conference, 269 SCIENCE 1808, 1808 (1995) ("The [Maryland] conference . . . has been protested, canceled, rescheduled, and otherwise dogged by controversy ever since it was first planned . . ."). Previously, the conference had been cancelled because of the controversial nature of the topic. Abraham, supra note 2 ("In 1992, just a year before Mr. Summer seized on the Dutch family study, the U.S. National Institutes of Health cancelled a conference on crime and genetics at the University of Maryland after black groups protested that such research was racially motivated."); Cookson, supra note 16, at 8 ("Public pressure forced the US National Institutes of Health to cancel a conference on [genetics and behavior] in 1992 after opponents of the research detected racial overtones in some of the proposed contributions."); Pezzella, supra note 3 ("Even participants [of the Maryland conference] found the meeting somewhat distasteful. Paul R. Billings, a professor at Stanford University . . . said he feared the current concentration on genetics could bring back the kind of eugenics movement that was espoused by the Nazis."); Richard W. Stevenson, Researchers See Gene Link To Violence But Are Wary, N.Y. TIMES, Feb. 19, 1995, at 29 ("[The Maryland] conference was called off after critics said that it was too accepting of the idea that inherited personality traits were the primary causes of crime and violence and that it would promote the notion that criminals could be identified by genetic markers."); Tom Wilkie, Scientist Denounces Criminal Gene Theory, INDEPENDENT (London), Feb. 13, 1995, HOME, at 2 ([The Maryland conference] was seen as overtly racist.").} \footnote{190: This confusion was particularly apparent at the time of the Stephen Mobley case. Some news media referred to the genetics evidence as a culpability defense, not as a basis for mitigation. See Moosajee, supra note 12, at 213; Robert Davis, 'We Live in an Age of Exotic Defenses', USA TODAY, Nov. 22, 1994, at 1A ("Stephen Mobley blames his genes for making him kill . . . [E]xperts say these defenses are typical of the bizarre and unusual rationales that increasingly are being heard in courtrooms across the USA as defendants try to find something—anything—to blame."); Felsenthal, supra note 3 ("In a novel and highly controversial defense, [Mobley's lawyers] are arguing that Mr. Mobley's genes may have predisposed him to commit crimes."); Holmquist, supra note 2; Marrin, supra note 2. But see Abraham, supra note 2 ("[P]eople are concerned [the argument] nullifies the idea of free will and responsibility. But I'm not using it as a defense, per se, but as a mitigating factor—you know, 'If you're thinking about putting this guy to death, think about this.'") (quoting Daniel Summer); Connor, supra note 2 ("There is no legal defence to his crime," says . . . Mobley's attorney. 'There is only the mitigating factor of his family history."). On occasion, the media also assumed Mobley founded his appeal on having a genetic disorder, although the appeal was based on the denial of his motion for funding to test for any genetic disorder. See Boseley, supra note 3; Malik, supra note 12.}
A key question remains, however. What is the overall framework courts use to rationalize their skepticism regarding genetics evidence? Not all courts have viewed genetics evidence negatively. In Von Dohlen v. State,192 for example, the court considered such information (in conjunction with other evidence) sufficiently compelling to remand the defendant’s case for resentencing: the defendant’s counsel had not provided a testifying expert with records that indicated, among other things, the defendant’s genetic predisposition for mental disorder.192 Von Dohlen is one of a number of exceptions,193 however, among a larger group of cases that have rendered genetics evidence insignificant.

Like Mobley, courts have provided various reasons for excluding a defendant’s offer of genetics information, including the following: (1) counsel had already submitted sufficient mitigation evidence and additional data on the defendant’s genetic proclivities would probably not have affected the outcome of the defendant’s case;194 (2) genetics evidence has questionable credibility when compared to other evidence introduced at trial;195 particularly when testimony from different experts conflicts;196 (3) the theory of a link between genetics and violence is “unorthodox”197 or “exotic”198 (4) genetics evidence can cut against a defendant’s case because it suggests the defendant will continue to be violent;199 and (5) genetics evidence does not comport with some courts’ theories of criminal responsibility, which may emphasize, for example, the protection of society over “therapeutic goals.”200

There is little or negligible foundation for any of these five rationales, however. First, there is only a fragile basis for questioning the credibility or impact of genetics evidence when such evidence is so rarely admitted into court. Indeed, part of the controversy over the admissibility of genetics research has usually involved the opposite claim—that because of its aura of scientific sophistication and precision, genetics information would weigh too heavily on a jury and have a disproportionate effect on a case’s disposition. The extent of

192. Id. at 741–46.
193. See also supra notes 154–55 and accompanying text (discussing Hendricks v. Calderon, 864 F. Supp. 929 (N.D. Cal. 1994), aff’d, 70 F.3d 1032 (9th Cir. 1995) and Fudge v. State, 120 S.W.3d. 600 (Ark. 2003)). See also infra app.
194. See, e.g., Landigran v. Stewart, 272 F.3d 1221 (9th Cir. 2001), vacated, reh’g en banc granted, 397 F.3d 1235 (9th Cir. 2005), aff’d in part, rev’d in part, Landigran v. Schirro, 441 F.3d 638 (9th Cir. 2006) (en banc); Mobley v. State, 455 S.E.2d 61 (Ga. 1995); People v. Franklin, 656 N.E.2d 750 (Ill. 1995); State v. Ferguson, 20 S.W.3d 485 (Mo. 2000).
198. Landigran, 272 F.3d at 1228 n.4.
199. Id. at 1229.
this influence would be particularly significant if the evidence were compared to other, more traditionally accepted, mitigating information. For example, there are compelling arguments that some genetics evidence could be relevant and useful if applied in a limited way, such as buttressing other proffered mitigating conditions, as in cases when the defendant's veracity concerning the existence of a condition is questioned.

Likewise, courts' rendering of genetic factors as "unorthodox" or "exotic" is ironic, given that courts themselves perpetuate this supposed status of unusualness. Regardless, a factor need not be conventional in order for it to be considered mitigating. The claim of "exoticism" is also dubious on its face. Genetics evidence has a long history in legal cases, even if that past was controversial or has seemingly been forgotten by modern courts, such as those deciding *Mobley v. State* and *Landrigan v. Stewart*.

The double-edged-sword aspect of genetics evidence stressed by some courts has also long been acknowledged. But this dilemma characterizes many other mitigating factors, for example, those available to juvenile offenders. In *Roper v. Simmons*, the Supreme Court held that the Eighth and Fourteenth Amendments prohibited the execution of persons aged younger than eighteen at the time their crimes were committed. The Court reasoned that relative to adults, juveniles are more immature and irresponsible, vulnerable to negative pressures from their peers and environment, and fragile and unstable in their identities. Although these disparities explained why juveniles may be less culpable, they also heightened the likelihood that juveniles would engage in impulsive thinking and criminality. In other words, the very factors that argued against juveniles' eligibility for the death penalty also made them more prone to misconduct. Youth can be a double-edged sword, although the Court has taken steps to contain that possibility.

Similarly, courts that exclude genetics evidence because it does not mesh with their theory of criminal responsibility seemingly confuse the requirements for mitigating evidence with other criminal law doctrines. This problem also...

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201. Denno, *supra* note 2, at 253–54; *see also supra* note 72 and accompanying text (discussing the five stated problems concerning the use of genetics evidence in criminal cases).

202. *See supra* note 81 (listing the ways that genetics evidence validates the existence of a serious condition); *infra* app.

203. *See infra* app. (listing Alley v. State, 958 S.W.2d 138, 142 (Tenn. Crim. App. 1997) and Billiot v. State, 655 So. 2d 1, 8 (Miss. 1995)).

204. *See supra* note 68 and accompanying text.

205. 455 S.E.2d 61 (Ga. 1995).

206. 272 F.3d 1221 (9th Cir. 2001), *vacated, reh'g en banc granted, 397 F.3d 1235 (9th Cir. 2005), aff'g in part, rev'g in part*, Landrigan v. Schriro, 441 F.3d 638 (9th Cir. 2006) (*en banc*).

207. *See Denno, supra* note 2, at 254; *supra* note 122 and accompanying text (discussing the double-edged-sword issue in the context of the *Landrigan* case).


209. *Id.* at 578 ("The Eighth and Fourteenth Amendments forbid imposition of the death penalty on offenders who were under the age of 18 when their crimes were committed.").

210. *Id.* at 569-70.

211. *Id.*
arose when the media covered the *Mobley* case. Basically, some journalists and commentators treated mitigation in a death penalty case synonymously with criminal defenses pertaining to a defendant’s culpability.\(^{212}\) The admissibility criteria for mitigation, however, are far more encompassing than criminal defenses because the criteria serve substantially different goals.\(^{213}\)

Part of the general difficulty with these cases also involves courts’ apparent ignorance of the interactions among social, biological, and genetic variables. This oversight is exemplified in *Landrigan v. Stewart*.\(^{214}\) The defendant’s counsel noted that Landrigan’s “organic brain dysfunction” stemmed from the effects of both genetic and environmental sources,\(^{215}\) yet the court primarily emphasized the exclusion of the genetics component.\(^{216}\) As this article has noted, however, biological, genetic, and social variables are highly interactive and difficult to separate without creating artificial categories.\(^{217}\)

Overall, this article has taken a relatively narrow view of the use of genetics evidence, thereby excluding or limiting a number of topics of interest: (1) the question of whether such evidence should be applied outside the context of mitigation in death penalty cases; (2) the doctrinal differences in how the evidence has been implemented within the mitigation context (for example, the differences between the evidentiary requirements necessary for proving a claim of ineffective assistance of counsel as opposed to future dangerousness); (3) a comparison of courts’ treatment of genetic factors with other kinds of social and behavioral research (even though much of the criticism of genetics evidence could pertain to social science evidence in general); (4) a comparison of the different types of genetics factors used in cases; or (5) an analysis of the broader philosophical debates and exchanges concerning the role of genetic factors in the criminal justice system and theoretical models of criminal responsibility. All these issues are significant, but they exceed this article’s scope.

At the same time, the topic of genetics and crime will not go away. Although courts do not appear to be exploiting genetics information in the way commentators on *Mobley* feared, the criminal justice system still lacks a sound conceptual framework for handling genetics research no matter what it decides to do with it. The warnings of the past are important to heed. As surveyed attorneys agreed over a decade ago in the context of *Mobley*, “the question is not if this kind of genetic testing is admissible as mitigating evidence in criminal trials, but when.”\(^{218}\)

\(^{212}\) See supra note 190 and accompanying text.

\(^{213}\) See supra note 80 and accompanying text.

\(^{214}\) 272 F.3d 1221 (9th Cir. 2001), vacated, reh’g en banc granted, 397 F.3d 1235 (9th Cir. 2005), aff’g in part, rev’g in part, Landrigan v. Schriro, 441 F.3d 638 (9th Cir. 2006) (en banc).

\(^{215}\) See supra note 118 and accompanying text.

\(^{216}\) See supra note 117 and accompanying text.

\(^{217}\) See supra note 75 and accompanying text.

### Case

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<th>State v. Manning, 03-1982 (La. 10/19/04); 885 So. 2d 1044, cert. denied, Manning v. Louisiana, No. 04-8851, 2005 U.S. LEXIS 3059 (U.S. Apr. 4, 2005).</th>
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<tr>
<td>Defendant was convicted of first-degree murder and sentenced to death. 885 So. 2d at 1057. At the sentencing phase, a forensic psychiatrist offered mitigation expert testimony, stating that during a psychiatric evaluation, defendant “minimized his alcohol problems, which may have stemmed from a genetic predisposition.” Id. at 1096–97. Defendant appealed to the Louisiana Supreme Court on claims unrelated to the genetics evidence. His conviction was affirmed. Id.</td>
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<td>Genetic predisposition was mentioned only in passing.</td>
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<td>Defendant was convicted of murder and armed robbery and sentenced to death. 602 S.E.2d at 740. His convictions and sentence were affirmed on direct appeal, and he applied for post-conviction relief, arguing that during the sentencing phase, a psychiatrist for the defense had understated defendant’s mental illness. Id. at 741. At the post-conviction relief hearing, the psychiatrist testified that he had seen certain medical and psychiatric records (which had been available before the trial), he would have diagnosed the defendant with a more serious mental illness. This diagnosis would have been based in part on records indicating a possible genetic basis for defendant’s chronic depression, as well as on an overall genetic predisposition for mental disorders. Id. at 741–42. The hearing judge denied relief, but on appeal the South Carolina Supreme Court reversed and remanded for a new sentencing hearing, holding that defense counsel’s lack of preparation prevented a defense expert witness from accurately depicting defendant’s mental condition at the time of the crime. Id. at 746.</td>
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<td>Genetic predisposition was not a pivotal issue, but may have formed some of the basis for remand.</td>
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<td><em>Cauthern v. State</em>, 145 S.W.3d 571 (Tenn. Crim. App. 2004).</td>
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<td><em>Davis v. State</em>, No. M2003-00744-CCA-R3-PC, 2004 WL 253396 (Tenn. Crim. App. Feb. 11, 2004).</td>
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<td><em>State v. DeAngelo</em>, No. CR 97010866S, 2000 WL 973104 (Conn. Super. Ct. June 20, 2000).</td>
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