INTRODUCTION

On January 8, 2011, Jared Lee Loughner sprung tragedy with his shooting rampage in Tucson, Arizona. In a matter of minutes, Loughner
killed six people, including a federal judge, and injured thirteen others, including a congresswoman.1 Within days of this scene of nationwide mourning, legal attention turned to who would represent Loughner and what Loughner’s defense would be. Evidence showed that the troubled Loughner had long planned his highly public acts, and he disclosed no remorse. Social outrage was huge, Loughner’s legal options limited.2 Yet, predictions for a defense soon surfaced: Loughner’s attorneys would likely scrutinize Loughner’s life and lineage across generations in an effort to garner him an insanity defense or avoid the death penalty.3 Indeed, a few months later, Loughner’s lawyers filed subpoenas for the public health records of twenty-two of Loughner’s relatives on his mother’s side, making requests as far back as 1893, the year Loughner’s maternal great-grandmother was born.4 Presumably, if Loughner’s relatives revealed serious mental and behavioral disorders over the course of a century, such a legacy, along with a distressed environment, could help explain Loughner’s violent propensities and the need to mitigate punishment.5


3. Lacey, supra note 2; Weiser, supra note 2. According to death penalty expert David Bruck, who has worked with Ms. Clarke, Loughner’s defense “is likely to begin a far-ranging investigation of [Loughner’s] life and family history, going back several generations to learn as much as possible about his origins, the environment in which he grew up and how he has functioned in society.” Id. Updates concerning the defense strategy indicate that Loughner’s attorneys are examining indications of mental illness among many of Loughner’s ancestors. Lacey, supra note 2.

4. Lacey, supra note 2; Katie Moisse, Jared Loughner’s Defense Team May Be Looking for Mental Illness in His Relatives, ABC NEWS, Aug. 19, 2011, http://abcnews.go.com/Health/MindMoodNews/jared-loughner-mental-illness-runs-families/story?id=14332522&singlePage=true#.T2S5mnlVU3s. It is unclear whether Loughner’s lawyers were investigating his father’s lineage as thoroughly. Lacey, supra, note 2.

5. Lacey, supra note 2 (according to expert Christopher Slobogin, “‘If the defense can show that mental illness runs in the family, they have a stronger case, one that is more convincing to the jury.’”). 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.” In general, social variables, such as socioeconomic status, consist of environmental influences on a person’s behavior. Jasmine A. Tehrani & Sarnoff A. Mednick, Crime Causation: Biological Theories, in 1 ENCYCLOPEDIA OF CRIME & JUSTICE 292, 292 (Joshua Dressler et al. eds., 2d ed. 2002). Biological variables, on the other hand, constitute “physiological, biochemical, neurological,
Defense efforts to examine behavioral genetics evidence in criminal cases are not new, of course. They can be effective but prone to sensationalism. Recent news articles, for example, have greatly embellished the defense tactics in the trial and sentencing of murderer Bradley Waldroup, given Waldroup’s specific genetic make-up or “warrior gene,” as the media (but no scientist) has dubbed it. In 2006, Waldroup brutally killed his wife’s friend and attempted to kill his wife during what the State characterized as Waldroup’s intentional and premeditated actions spurred by a domestic dispute. In the end, Waldroup shot his wife’s friend eight times and slit open her head, then moved on to attack his wife repeatedly with a machete. Waldroup’s defense requested that forensic psychiatrist William Bernet assess Waldroup, only for Bernet to discover that Waldroup possessed a particular variant of a very rare deficiency of monoamine oxidase A (MAOA). According to Bernet, this deficiency, when added to Waldroup’s history of severe child abuse, “created a vulnerability that [Waldroup] would be a violent adult.” Evidence of this gene-environment combination in Waldroup’s background also proved pivotal to jurors declining to sentence Waldroup to death. As one juror characterized some of the jury’s deliberations, “There was more to [Waldroup’s] whole life that led to that moment [of killing].” When asked if her assessment took into account Waldroup’s genetics, she responded, “Oh I’m sure . . . And his background—nature vs. nurture.”

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, of course, interrelated, as this Article emphasizes.

6. See infra notes X-X and accompanying text.
8. According to William Bernet, M.D., who evaluated Bradley Waldroup, “The term ‘warrior gene’ is media hype. I am not aware of any scientist or forensic expert using that term.” E-mail from William Bernet, M.D., Professor, Department of Psychiatry, Vanderbilt University School of Medicine, to Author (Mar. 25, 2012) [hereinafter Bernet E-mail].
9. Id.
13. After deliberating only eleven hours, the jury convicted Waldroup of voluntary manslaughter and attempted second-degree murder. Id.
14. Id.
15. Id.
Press accounts of the Waldroup case, however, provided the public with little more than a dramatized narrative of Waldroup’s mitigating evidence. Writing about Waldroup, articles ran with a range of unfortunate headlines: “Can Your Genes Make You Murder?” or “Pity the Poor Murderer, His Genes Made Him Do It.” These depictions wrongly fed the public’s view that most cases involving behavioral genetics evidence pertain to a defendant’s guilt-or-innocence when nearly all are geared toward the defendant’s sentence, to preclude the death penalty. The distinction is important. There are vast differences in the way evidence is used between these two phases of a case. The press also fostered a level of cause-and-effect between genetics and behavior that Waldroup’s attorneys simply never argued, twisting a media’s glint nearly exclusively on Waldroup’s genetics.

Not surprisingly, scientific advances and rising acceptance of genetics research have fueled a focus on the use of behavioral genetics evidence in criminal trials and death penalty cases. At the same time, accurate accounts are lacking and questions remain on how courts view such evidence and how attorneys select and apply it in litigation. This Article addresses those questions.

The following pages provide a unique study of all criminal cases (totalling thirty-three) that used behavioral genetics over the last four years (2007-2011). The study builds upon this Author’s prior research on all criminal cases (totalling forty-eight) that used such evidence during the preceding thirteen years (1994-2007). This combined collection of eighty-one criminal cases employing behavioral genetics evidence offers a rich context for determining how the criminal justice system has handled genetics factors over nearly two decades, but also explains why the last four years reveal particularly important trends.

In general, behavioral genetics researchers study both genetic and environmental sources of variation in human behavioral traits (for example,
mental illness and risk taking) in an effort to measure the inheritance of behavioral traits. \(^22\) Therefore, the field of behavioral genetics is broadly interdisciplinary, incorporating findings from genetics, biology, psychology, sociology, and statistics, as well as other disciplines. \(^23\) While genes influence behavior, they do not govern nor determine it. \(^24\) Rather, "genes play a vital role in the body’s development and physiology, and it is through the body, acting in response to and upon surrounding environments, that behavior manifests itself." \(^25\) Behavioral genetics evidence includes, but is not limited to, the study of the defendant’s family history as well as direct testing of the defendant’s physiological makeup by way of brain scans, for example. \(^26\) Both approaches are informative for explaining why a defendant engaged in criminally violent behavior. As one expert explained in the context of the Loughner case, for example, “‘Short of a brain scan that shows mental defect, a family history of mental illness is the most persuasive evidence that someone had significant mental problems at the time of the crime.’” \(^27\)

For decades, the concept of ties between genetics and crime has been haunted with controversy. \(^28\) As late as 1992, for example, the National Insti-
tutes of Health gained worldwide press for defunding a conference on genetics and crime due to claims that a genes-crime link stood for racism and eugenics. As one behavioral scientist recently exclaimed, for the past three or four decades “most criminologists couldn’t say the word ‘genetics’ without spitting.” Yet presently, there are at least one hundred studies indicating a tie between genetics and criminality, and criminologists are slowly being encouraged to examine the link further in light of other research on behavioral problems (such as alcoholism and mental illness) that demonstrate some kind of genetic foundation.

Most of these researchers are also quick to clarify their view on how genes and behavior intertwine. They debunk, for example, a wrong—but common—stereotype that an individual’s “genotype” or “genetic constitution” is static, as though there is a “crime gene” that “hardwires” certain people to violate the law. This perspective, however entrenched in the public’s mind, has no scientific support. Rather, an overwhelming amount of evidence shows that genes are controlled by the environment and can either enhance or heighten the likelihood of a certain behavior based on the surrounding circumstances. Thus, an individual’s genetic structure may act developmentally in the context of social variables by potentially predisposing an individual to certain behavioral tendencies, such as aggression, which may or may not result in violent criminality. For example, many people may share a genetic proclivity for aggression, but some may never act out their impulses in any physical way while others may become violent career criminals. This tight association between genetics and environment explains why Loughner’s attorneys would also look carefully at his immediate family, home, school, and peer relationships in addition to any genetic

29. See infra note 107.
31. Id.
32. CAREY, supra note 23, at 68.
34. CAREY, supra note 23, at 452.
35. Behavioral Genetics Evidence, supra note 19, at 323-24; see also Terrie E. Moffitt, Genetic and Environmental Influences on Antisocial Behaviors: Evidence from Behavioral-Genetic Research, in 55 ADVANCES IN GENETICS 41 (Jeffrey C. Hall ed., 2005) (analyzing the interaction between genes and the environment with respect to antisocial behavior).
36. Criminologists focus on the myriad pathways that offenders may persist or desist in their criminal activities. See, e.g., JOHN H. LAUB & ROBERT J. SAMPSO, SHARED BEGINNINGS, DIVERGENT LIVES: DELINQUENT BOYS TO AGE 70 (2003).
factors (such as mental illness) in order to better assess why he engaged in such violence.37

Part I of this Article gives a backdrop to the introduction of behavioral genetics evidence in criminal court cases by examining the varying reactions and outcomes in two earlier cases involving two substantially different defendants—Stephen Mobley (whose evidence was rejected) and Susan Smith (whose evidence was accepted). For example, much of the controversy surrounding Mobley’s case stemmed from the assumption that attorneys would abuse behavioral genetics evidence to support their positions and that courts would countenance the distortions.38 This Article concludes that such predictions are, with rare exceptions, unfounded.

Part II discusses the thirty-three behavioral genetics and crime cases that this Author studied between June 1, 2007, and July 1, 2011.39 These cases share two important characteristics. First, they all constitute murder convictions in which (with one exception) defendants attempted to use genetics evidence as a mitigating factor in a death penalty case (as Stephen Mobley and Susan Smith did). Second, the behavioral genetics evidence is introduced mostly to verify a condition (such as a type of mental illness) that is commonly acceptable for mitigation.40 Thus, the question now is not whether courts will accept behavioral genetics factors (they overwhelmingly do), but rather what role those factors will play in particular cases in the context of mitigation evidence. As this Author’s findings show, for example, in no case was behavioral evidence used as an aggravating factor, nor as a vehicle for predicting that the defendant will be a danger in the future. Compared to prior cases, attorneys are more likely to submit such evidence to indicate a defendant’s inheritance of substance or alcohol abuse. These results debunk arguments that such evidence will be legally detrimental to a defendant. Indeed, this Study’s results indicate that, at the very least, behavioral genetics evidence has no decipherable impact on a defendant’s case or, at most, it becomes an effective tool along with a range of other kinds of variables in rendering a defendant ineligible for the death penalty. Courts also appear willing to accept behavioral genetics evidence as part of a defendant’s mitigation story, even if genetics renders that story a more troubling one in terms of the defendant’s purported propensities.

Part III compares this Study of thirty-three cases to the Author’s prior study of forty-eight cases in order to examine how behavioral genetics evidence has been used by courts over the past two decades as well as the

37. Moisse, supra note 4.
38. Turpin v. Mobley, 502 S.E.2d 458, 461 (Ga. 1998); see also infra notes 83-109 and accompanying text.
39. See infra Part II.
40. See infra Part II.
changes in its use over the last four years.\textsuperscript{41} Overall, courts appear far less skeptical about accepting behavioral genetics evidence, and they do so in the majority of cases in which defense attorneys attempt to offer it. In contrast to past years when courts often questioned the applicability or relevance of such information, recent findings indicate that their focus has turned to whether the evidence, when used with other factors in mitigation, can outweigh the aggravating factors that support a death sentence.

It remains to be seen whether or how such trends will be affected by \textit{Pinholster v. Cullen},\textsuperscript{42} the Supreme Court’s recent decision restricting prisoners’ efforts to seek federal habeas relief under the Antiterrorism and Effective Death Penalty Act (AEDPA).\textsuperscript{43} Some of the cases in this Article’s study have already been impacted by \textit{Pinholster}.\textsuperscript{44} Regardless, behavioral genetics evidence seems, on the surface, to have reached a status commensurate with other kinds of evidence without the baggage of abuse with which it has typically been associated.

This Article has a number of caveats, of course, particularly given the subject matter. Because nearly all of the eighty-one cases in this Author’s studies involve death sentences, comparisons across time can be a challenge. Litigation and appeals can go on for many years, and outcomes may be continually shifting,\textsuperscript{45} hence the potential effect of \textit{Pinholster}. Any assessment of “trends,” therefore, must be taken in context because it may reflect in part outcomes in cases originating in different years or even decades. Nonetheless, clear changes within this Article’s sample are evident, and the focus is on those that are real rather than potentially random.

There is another concern this Study raises. Cases involving behavioral genetics also incorporate many other factors about the defendant—biological, sociological, and environmental—in addition to the nature of the crime and the defendant’s criminal history. The jury’s weighing of these aggravating and mitigating factors in a death penalty case is an intricate process. Therefore, this Study’s results do not purport to suggest that the inclusion of behavioral genetics evidence caused any particular case outcome; this kind of causal mechanism is impossible to isolate or measure exactly as it would be for any other kind of variable. That said, case comparisons can help steer conclusions in one direction or another about whether behavioral genetics evidence can make a contribution.

\textsuperscript{41} See \textit{infra} Part III.
\textsuperscript{42} 131 S. Ct. 1388 (2011).
\textsuperscript{44} See \textit{infra} notes X-X and accompanying text.
\textsuperscript{45} For example, this Article’s study of thirty-three cases included two cases in the Author’s prior pre-2007 study of forty-eight cases because the two cases were involved in ongoing litigation that affected the acceptance of behavioral genetics evidence. Likewise, two additional cases were affected by the United States Supreme Court’s recent decision in \textit{Cullen v. Pinholster}, 131 S. Ct. 1388, which is discussed more thoroughly in Part III.
Overall, most courts seem to focus on screened and scientifically acceptable studies or information on behavioral genetics. Their primary emphasis also concerns how a defendant’s genetic makeup and environment might bear on that defendant’s punishment. Within the next decade or so, as this interactive gene-environment research becomes even more scientifically sound, courts will find it ever more useful. After all, as the following pages demonstrate, a gene is not just a gene. It is only one part of a defendant’s story.

I. HOW DOES THE GENE-ENVIRONMENT INTERACTION WORK?

Behavioral geneticists generally classify the link between genetics and the environment in three primary ways. “Passive gene-environment correlation” occurs when parents, the source of their children’s genes, are also one key source for the content of their children’s environment. For example, parents of superior intellect may transmit to their children not only strong cognitive capabilities, but also mentally stimulating surroundings. “Evocative gene-environment correlation” exists when individuals with different genotypes evoke different responses from people and therefore change their environment. Thus, a cooperative child may elicit substantially different reactions from parents and teachers than an aggressive child in part because of the differences in how the two children behave. “[A]ctive gene-environment correlation” arises when individuals seek experiences consistent with their genetically transmitted abilities and behaviors so that they can create a complementary environment. Thrill-seekers, for example, may select jobs or hobbies that reinforce their inherited proclivities, such as parachuting, mountain climbing, etc.

Substantial research also shows that as individuals age, genetic influences on their behavior strengthen while shared environmental factors wane. This pronounced impact of genetic makeup is an unsurprising finding given that individuals acquire greater control over their choices and surroundings as they become more independent from their parents and fami-
lies. 53 In essence, then, age is accompanied by increases in active gene-environmental correlational processes and decreases in passive gene-environmental correlational processes. 54

In criminal cases, evidence concerning behavioral genetics covers all three types of gene-environment classifications. It includes, for example, the study of a defendant’s physiological makeup as well as family history for potential associations with a range of disorders including violence, mental illness, depression, mental retardation, alcoholism, and substance abuse. The presence of such disorders in a defendant’s family can indicate that they may have also been genetically transmitted to the defendant.

A. Balancing Aggravating and Mitigating Factors

In a capital case, behavioral genetics evidence can be used in one of two ways: first, during the guilt-or-innocence phase in which the State must prove a defendant committed an alleged crime beyond a reasonable doubt; and/or second, during the penalty phase when the jury has found the defendant guilty of the capital crime and then hears evidence of aggravation from the State and mitigation from the defense when determining whether a defendant should be sentenced to death. 55 In order to ensure consistency in comparing cases, this Article focuses on the use of behavioral genetics evidence during the penalty phase irrespective of whether some cases also raised such evidence during the guilt-or-innocence phase. The penalty phase of a capital case is typically far better documented than the guilt-or-innocence phase, which may have occurred years before and may not have been fully explicated either in a court case or some other accessible format. 56

There is a critical distinction between the way evidence is used in the guilt-or-innocence phase and how it is used during the penalty phase. The guilt-or-innocence phase involves a factual determination of whether a defendant committed the crime. In contrast, the penalty phase concerns “the moral and normative choice” of whether a defendant “deserve[s] to die.” 57

54. McGue, supra note 24, at 288.
56. This Author did attempt to trace back over numerous, at times undocumented or published, proceedings and trials to determine when and how behavioral genetics evidence was first used in the thirty-three cases under study. However, given the hit-or-miss nature of the venture, it appeared that any picture pieced together could be unreliable or misleading.
57. Blume & Paavola, supra note 55, at 915.
It is within this death penalty context that most of the cases analyzed in the Author’s study also raised ineffective assistance of counsel claims. In order to assess the validity of these kinds of claims, the Supreme Court in *Strickland v. Washington* established a two-pronged test: first, counsel’s performance must actually be “deficient,” and second, the defendant must show that this deficient performance “prejudiced” the defendant. Of course this *Strickland* test and its interpretations are far more intricate than what is presented here for the purpose of establishing basic guidelines.

In addition to rules attempting to ensure the quality of a defendant’s representation, the great majority of death penalty states require that a fact-finder consider and weigh both aggravating and mitigating circumstances in the case. This balancing is critical to determining whether a defendant should be sentenced to death. In most jurisdictions, aggravating circumstances must outweigh mitigating circumstances for a defendant to be sentenced to death. However, the Supreme Court has also upheld a Kansas death penalty statute that allowed jurors to impose the death penalty when aggravating circumstances were not required to outweigh mitigating circumstances, including when aggravating and mitigating circumstances were equally distributed. Regardless, if a defendant challenges a death sentence, a reviewing court must reweigh the aggravating evidence against the totality of available mitigating evidence.

Under *Strickland*, an ineffective assistance of counsel claim has merit only if “counsel’s conduct so undermined the proper functioning of the adversarial process that the trial [including the sentencing phase] cannot be relied on as having produced a just result.” To succeed on such a claim, the defendant must show that his trial counsel’s conduct was unreasonable under the circumstances and resulted in prejudice against him. The sentence will be disturbed only if a reviewing court finds a “reasonable probability” that, absent counsel’s errors, the verdict or sentence would have been different. A court must therefore determine whether there is a reasonable probability that if trial counsel had presented the omitted mitigating evi-

58. See infra Chart 2.
64. *Id.* at 694.
65. *Id.*
vidence, the fact-finder would have concluded that the balance of aggravating and mitigating circumstances did not warrant the death penalty.\textsuperscript{66}

Mitigating evidence usually includes information about a capital defendant’s background and life prior to his crime.\textsuperscript{67} In contrast, the prosecution’s presentation of aggravating evidence includes those circumstances surrounding a crime and a defendant’s prior criminal record.\textsuperscript{68} Death penalty jurisdictions vary with respect to the types of aggravating and mitigating circumstances they enable a fact-finder to consider. Common statutory aggravating factors include the following: commission of an offense in an “[e]specially heinous, cruel or depraved manner,” “[u]se, threatened use or possession of a deadly weapon,” or commission of an offense expecting to receive something of “pecuniary value.”\textsuperscript{69} Statutory mitigating factors can include the “age of the defendant” or the “defendant’s capacity to appreciate the wrongfulness of the defendant’s conduct.”\textsuperscript{70} According to the Supreme Court, defendants can also present mitigating evidence relevant to “any aspect of [the] defendant’s character or record and any of the circumstances of the offense that the defendant proffers as a basis for a sentence less than death.”\textsuperscript{71} This is a highly open-ended standard that allows a full range of factors for a defendant to introduce. Guidelines for how to weigh or balance these factors is similarly flexible. In an effort to structure what could be a full range of information—including many different types of scientific tests and theories—attorneys often attempt to combine it all into a compelling “story.”\textsuperscript{72}

B. Mitigation Stories

A defendant’s “mitigation story”\textsuperscript{73} can be critical to whether a defendant will be executed. Mitigation is far-reaching and subjective; it can in-

\textsuperscript{66} Malone v. State, 168 P.3d 185, 229 (Okla. 2007).

\textsuperscript{67} Id. at 223. For a recent perspective on the use of mitigation evidence, see Jeffrey Toobin, \textit{The Mitigator: A New Way of Looking at the Death Penalty}, NEW YORKER, May 9, 2011, at 32.

\textsuperscript{68} Malone, 168 P.3d at 229.


\textsuperscript{71} Kansas v. Marsh, 548 U.S. 163, 174 (2006) (internal quotation marks omitted) (quoting Lockett v. Ohio, 438 U.S. 586, 604 (1978)); see also id. at 172-74 (designating that all death penalty sentencing schemes must “(1) rationally narrow the class of death-eligible defendants; and (2) permit a jury to render a reasoned, individualized sentencing determination based on a death-eligible defendant’s record, personal characteristics, and the circumstances of his crime”).

\textsuperscript{72} For an example of how such a story can be told in the death penalty context, see \textit{Who is Andrea Yates? A Short Story About Insanity}, 10 DUKE J. GENDER L. & POL’Y 1 (2003).

\textsuperscript{73} Blume & Paavola, \textit{supra} note 55.
clude “empathy-evoking evidence” in an effort “to humanize the accused killer” and “enable jurors to feel human kinship with someone whom they have just convicted of an often monstrous crime.” Mitigation also “provides the biography of [a defendant’s] mental disability” by examining “the years, days, hours, minutes, and seconds leading up to the capital crime, and how information was processed in a damaged brain.” The purpose of expert testimony, if it is offered, “may simply be to help jurors appreciate the world as the client experiences it.” In essence, mitigation is “credibly telling the defendant’s story [in a way that] can make the difference between life and death.” For example, the trial judge in Jeffrey Landrigan’s sentencing hearing concluded that one of the two non-statutory mitigating circumstances operating on Landrigan’s behalf was “that Landrigan’s family loved him,” evidence that would be irrelevant for Landrigan as a defense against a murder conviction.

Given the relative temporal differences in comparing aggravating circumstances and mitigating circumstances, it can perhaps be more readily understood why behavioral genetics evidence may be at a disadvantage. Most aggravating evidence concerns the crime itself and the extent of the harm the defendant inflicted. The most removed in time an aggravating factor may go would be to provide insights on the extent of a defendant’s criminal record. Statutory and non-statutory mitigating factors can also pertain to what happened at the scene of the crime, for example, if “the defendant was under unusual or substantial duress.” At the same time, the Court’s “any aspect of the defendant’s character or record” standard is markedly flexible, and it enables defendants to bring in evidence that can go back generations. Attempts to weigh this evidence with events more immediately surrounding a crime, however, can seemingly pose a larger challenge on a range of levels.

Indeed, over the years some courts have viewed behavioral genetics evidence skeptically, even when presented as mitigation in a death penalty context. One classic example of this attitude is exemplified in the 1994 appeal of Stephen Mobley, a watershed moment in the modern use of behavioral genetics evidence in criminal cases and a comparison case for this Article’s study. Mobley marks the start of this Author’s seventeen-year analy-
sis of the use of such evidence in criminal cases because the case seemed to strike a modern nerve, both socially and legally, in terms of the key concerns identified with behavioral genetics evidence. And Mobley’s mitigation story is complex.

1. The Stephen Mobley Story

Mobley’s 1991 crime—the attempted robbery of a Domino’s Pizza store that ended with the needless murder of the store’s manager—prompted particular challenges for his court-appointed attorneys. Mobley’s “numerous” confessions and the dearth of “‘traditional mitigation evidence’” did not make for a sympathetic story. As a white adult of twenty-five years, Mobley was economically privileged, had no history of physical or sexual abuse, and also demonstrated an early and continuous history of severe personal and behavioral disorders that were pronounced even when he was awaiting trial. Prospects for any defense appeared slight. Yet, in the course of analyzing Mobley’s family, a relative testified that four generations of Mobleys—including Mobley’s uncles, aunts, and a grandfather—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.

In order to further probe this lead, Mobley’s attorneys made two moves. First, they requested experts and financial support so that scientific tests could be conducted to determine if Mobley showed any kind of genetic


82. Turpin, 502 S.E.2d at 463; Behavioral Genetics Evidence, supra note 19, at 325-26.

83. Turpin, 502 S.E.2d at 463-64; Daniel A. David, 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); see also Turpin, 502 S.E.2d at 463-66 (recognizing the lack of available mitigating evidence in Mobley’s background).

84. Turpin, 502 S.E.2d at 463-64.

85. Id. at 463.

86. These behaviors ranged from lying and theft as a youth to more serious offenses in adolescence, resulting in prison sentences for forgery and culminating in numerous armed robberies during Mobley’s mid-twenties and up to the point of his Domino’s Pizza murder. Summer, supra note 83. While awaiting trial for that murder, 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. Id. Turpin, 502 S.E.2d at 463-64; Legal Implications, supra note 28, at 251-52.

87. Turpin, 502 S.E.2d at 465.

88. Id.; Legal Implications, supra note 28, at 251 & fig.1.
or neurochemical imbalance. Second, they introduced into evidence a then-recent article published in the prestigious journal *Science*, reporting the results of genetics testing of a Dutch kindred of four generations. The kindred comprised a number of males affected by a syndrome characterized by borderline mental retardation and serious behavioral dysfunction such as impulsivity, verbal and physical aggression, and violence. The acts of violence included rape, sexual abuse, attempted murder, and arson. Tests on these males showed a defect of the X chromosome, known as monoamine oxidase A (MAOA) deficiency, which was passed from mother to son and linked to regulating aggression.

Mobley’s attorneys wanted to investigate whether Mobley was also afflicted by the MAOA deficiency or by a comparable kind of disability because it was likely that Mobley had inherited a propensity for criminality. In their mind, the trial court should have enabled Mobley to be so tested. Certainly such testing was not an issue in the Bradley Waldroup case that would arise over a decade later. Yet, the Georgia Supreme Court rejected that reasoning and affirmed the trial court’s holding, relying on the lack of a showing of any causal link between Mobley’s genetics and his violence. Further, as the court explained, the genetics 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.”

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89. Legal Implications, supra note 28, at 252; Summer, supra note 83, at 189.
91. Brunner, MAOA Deficiency, supra note 90, at 156.
92. Id.
93. Brunner et al., X-Linked, supra note 90, at 1035.
94. Brunner et al., Abnormal Behavior, supra note 90, at 578-79.
95. See generally Legal Implications, supra note 28 (discussing the Mobley case in light of historical and contemporary arguments concerning the use of genetics evidence in criminal law cases); Revisiting the Legal Link, supra note 28, at 212; Behavioral Genetics Evidence, supra note 19.
96. See supra notes 26-30.
98. Id.
After further legal wrangling over such “an unorthodox mitigating defense that attempted to show a possible genetic basis for Mobley’s conduct,” the Georgia Supreme Court again denied genetics testing for Mobley, 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. Further, even if the court had allowed genetics testing, “there ha[d] been no showing that a geneticist would have offered additional significant evidence.” Ultimately, however, family history evidence alone failed to mitigate in Mobley’s case. In 2005, after additional appeals, he was executed.

Mobley’s request for genetics testing—in addition to other events at the time—invited wide-ranging national and international debate on the political and scientific acceptability of behavioral genetics evidence of criminality. The debate invoked earlier controversies, ranging from the historical association of genetics evidence with the Holocaust, the chilling of free will, the stigmatization of disordered populations, the absolution from social responsibility, and the fear that juries would be unduly swayed by the seemingly more objective and precise nature of genetic studies. These concerns also played into the 1992 conference at the University of Maryland regarding the potential racial bias of such evidence.
After Mobley, predictions were also made that attorneys would increasingly attempt to introduce behavioral genetics evidence in criminal cases during the guilt-or-innocence phase or as mitigation during the penalty phase. While such predictions are difficult to measure, this Author’s study of cases from 1994-2007 suggested that the strategy grew in use, especially for the defense. Not only were behavioral genetics studies becoming more sophisticated, but so were defense attorneys, especially in their willingness to rely on interdisciplinary research. Likewise, the particularly strong reaction against Mobley’s case seems, in retrospect, an outlier because other cases at the time were also introducing behavioral genetics evidence, albeit under the radar. The highly publicized case of Susan Smith, for example, was far quieter in its use of genetics evidence, but the evidence also appeared far more successful for the defense.

2. The Susan Smith Story

Susan Smith’s 1995 trial took place one year after Mobley’s controversial appeal. Smith was convicted of murdering her two young sons by causing her car to roll into a lake with her sons strapped inside. She ultimately avoided a death sentence seemingly in part because her defense team introduced mitigating evidence that depicted her as having suffered from...
depression since childhood. According to her defense, she was on the verge of committing suicide and taking her two children with her when she changed her mind at the last minute and leaped from the car, all the while watching while the car submerged. Testimony indicated that her state of mind was so distressed at the time that she was not able to think about her drowning children.

In an effort to support its case, the defense presented expert witness testimony of Smith’s family history and upbringing. According to defense witness and psychiatrist Seymour Halleck, M.D., there was a high incidence of depression and mental illness in Susan Smith’s family. Her older brother Michael, her grandmother, and her aunt had all attempted suicide, which meant that it was likely that Smith herself was genetically predisposed to depression (such high levels of mental illness in the family “increases your chances threefold” for depression). Defense witness and social worker Dr. Arlene Andrews created a “genogram,” shown in Figure 1, which illustrated the family’s history of behavioral disorder across


112. Transcript, Closing Arguments, supra note 111, at *22 (testimony of Seymour Halleck, M.D.) (“And [defense witness] Dr. Halleck concluded after reviewing the whole history, everything that I have just passed over quickly now, that she was in a depressive crisis, in a depressive episode. And in the irrationality of that moment she made the irrational choice of suicide.”).

113. Id. at *23.

114. See discussion infra Subsection I.A.2.

115. See discussion infra Subsection I.A.2.


Well, there is a very high incidence of mental illness in the blood members of her family. We call this heavy genetic loading, which really means that there is a very, very high chance that a person with this kind of frequency of illness in the family would get depressed. . . . I think the bottom line in this is that we know that having this kind of family tree increases your chances threefold that she will get depressed.

Id.

117. Infra Figure 1. The original genogram presented in court is color-coded to indicate particular disorders. Because Figure 1 in this Article cannot be in color, disorders are indicated by initials, as shown.

118. The genogram was Defense Exhibit No. 4 prepared by defense witness Dr. Arlene Andrews. A photo of the genogram was taken and sent to the Author by William F.
three generations. The genogram contains details of each relative who had experienced either depression, a suicide attempt or suicide success (Smith’s father), alcohol abuse, mental retardation, or other disability. In addition to the genetics evidence, testimony revealed that Smith’s early childhood upbringing was characterized by family tension and instability due to her parents’ separation, followed by her father’s suicide when Smith was six years old. Dr. Andrews testified that these events led to the development of dependent depressive disorder in Smith, in which she constantly needed love and attention from those around her and was frequently distraught over losing this love and attention.

Drawing on this history, the defense brought up Smith’s first suicide attempt at the age of thirteen to demonstrate how her upbringing had affected her mental health. During her later teenage years, Smith suffered from sexual abuse at the hands of her stepfather. Dr. Andrews testified that this further exacerbated Smith’s depression, as she was afraid to lose her stepfather, but at the same time felt that she was violating her own moral code. Smith’s second suicide attempt came at the age of eighteen, Dr. Andrews testified, most likely because she was afraid of losing the relationships with her forty-year-old supervisor and thirty-year-old co-worker, both of whom she had been involved with sexually.

Smith’s marriage to David Smith, the father of their two children, was rocky and characterized by repeated intervals of separation and reconciliation.
tion. During one of these separation periods, Smith became involved with Tom Findlay as well as Findlay’s father, Cary, who owned Conso Products, where Smith was employed. David Smith found a letter Smith had written to Tom Findlay and coerced Smith into giving him the details of the affair, including the involvement with Cary Findlay. The prosecution argued that Smith killed her children because Tom Findlay did not want to be involved with someone who had a “readymade” family. The defense, on the other hand, argued that Smith was driven to commit suicide because her husband’s threat to disclose her affairs would lead her to lose her job and would disgrace her and leave her all alone.

These fears, in the past, had exacerbated her depressive disorder and had led to suicidal attempts. The situation was no different here. However, the defense argued, at the last minute, Smith, perhaps in a moment of unconscious self-preservation, jumped out of the car without thinking and did not realize that she had left her two children in the car to die. Since her depression prevented her from possessing the necessary mental state for premeditated murder, the defense argued, Smith should not be given a death penalty.  

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126. *Id.* at *56-60.
127. *Id.* at *59-61.
128. *Id.*
129. See *George Rekers, Susan Smith: Victim or Murderer* 141 (1996). Tom Findlay had written a letter to Susan explaining his feelings about the children as well as other differences between the two of them. Transcript of Testimony at *7-8, South Carolina v. Smith, 1995 WL 465719 (S.C. Gen. Sess. July 19, 1995) (Nos. 94-GS-44-906, 94-GS-44-907) (relying on the testimony and letter of Tom Findlay). An excerpt of the letter concerning the children is as follows:

Susan, I can really fall for you. You have so many endearing qualities about you, and I think that you are a terrific person. But like I have told you before, there are some things about you that aren’t suited for me, and yes, I am speaking about your children. I’m sure that your kids are good kids, but it really wouldn’t matter how good they may be. The fact is, I just don’t want children. These feelings may change one day, but I doubt it. With all of the crazy, mixed-up things that take place in this world today, I just don’t have the desire to bring another life into it. And I don’t want to be responsible for anyone else’s children, either. But I am very thankful that there are people like you who are not so selfish as I am, and you don’t mind bearing the responsibility of children. If everyone thought the way I do, our species would eventually become extinct.

*Id.*
130. *Id.* at *60-61.
131. See *id.*
132. Transcript of Closing Arguments at *22, South Carolina v. Smith, 1995 WL 789245 (S.C. Gen. Sess. July 28, 1995) (Nos. 94-GS-44-906, 94-GS-44-907) (“And [defense witness] Dr. Halleck concluded after reviewing the whole history, everything that I have just passed over quickly now, that she was in a depressive crisis, in a depressive episode. And in the irrationality of that moment she made the irrational choice of suicide.”); *Id.* at *20-23 (relying on the testimony of defense witness Dr. Seymour Halleck).
sentence.133 Closing arguments reiterated why the defense “presented the evidence about Susan Smith’s entire life, going all the way back generations to show . . . her bloodline and her genetic inheritance and her susceptibility to pressure, and coming all the way forward.”134

Interviews with some of the members of Smith’s jury indicated that such evidence appeared to be persuasive in their decision to reject the death penalty.135 Smith received a life term with the opportunity to be paroled in 2024.136 According to some of the jurors, particular aspects of Smith’s life circumstances appeared to explain the reasons for her behavior—the suicide of her biological father followed by molestation and sexual abuse by her stepfather, as well as Smith’s own suicide attempts at ages thirteen and eighteen and her troubling sexual relationships while she was an adult.137 In the eyes of one juror, for example, such family tragedies were “not dealt with properly, and that led up to what [Smith] did”138 and “the irrational decisions that she made.”139 In the eyes of another juror, the actions of Smith’s stepfather were partly responsible, and he “should be locked up with her.”140 Yet another juror expressed concern over Smith’s mental illness and the hope that Smith would get the appropriate help for it in pris-

133. Transcript, Closing Arguments, supra note 111, at *17.
134. Id.
135. See Paula Zahn, Anchor, CBS This Morning, Interview with Smith Trial Juror Michael Roberts (CBS News Transcripts) (July 31, 1995); Mike Dorning, Jurors Hope Susan Smith Gets Psychiatric Help, AUSTIN AM., July 30, 1995, at A2 (interviews with Smith trial jurors Robbie Christian, Deborah Benvenuti, Roy Palmer, and John Dunn); Jeanne Meserve, Anchor, CNN News, Smith Juror Discusses Susan Smith Verdict (CNN News Transcript # 1156-3) (July 29, 1995) (interview with Smith trial juror Michael Roberts) [hereinafter CNN News Transcript]; see also South Carolina Mother Sentenced to Life in Sons’ Drownings; Smith Avoids Death Penalty; Other Developments, FACTS ON FILE WORLD NEWS DIG., Aug. 3, 1995, at A1 (discussing some of the key testimony in the case that influenced jurors).
136. During the guilt-or-innocence phase, the jury of nine men and three women convicted Smith on two counts of murder after deliberating for less than three hours. See Tom Morgenthau, Will They Kill Susan Smith?, NEWSWEEK, July 31, 1995, at 65. During the penalty phase, the same jury again deliberated less than three hours and sentenced Smith to life in prison. See Transcript, Closing Arguments, supra note 111, at *51 (quoting Albert Epps, Jury Foreman). Information provided by the South Carolina Department of Corrections indicates that Susan Smith will be eligible for parole on November 4, 2024, after serving a minimum of thirty years. Presently, she is incarcerated at Leath Correctional Institution in Greenwood County, South Carolina. See Incarcerated Inmate Search, SOUTH CAROLINA DEPARTMENT OF CORRECTIONS, https://sword.doc.state.sc.us/sedc-public/?id=00221487 &youth=N&type=F; http://www.webcitation.org/5s3Pjuosa.
137. Zahn, supra note 135; Dorning, supra note 135, at A2 (interviews with Smith trial jurors Robbie Christian, Deborah Benvenuti, Roy Palmer, and John Dunn); CNN News Transcript, supra note 135 (interview with Smith trial juror Michael Roberts).
139. Meserve, supra note 137.
140. Dorning, supra note 135, at A2 (interviews with Smith trial jurors Robbie Christian, Deborah Benvenuti, Roy Palmer, and John Dunn).
on. At the same time, Smith’s jury still found her guilty of murder because they were convinced that she had understood the difference between right and wrong, she made a conscious decision to drown her sons, and she could have decided otherwise. Compared to the Stephen Mobley case, however, there was no evidence of a strong legal or public outcry against the use of behavioral genetics evidence in Smith’s case. Nor do news stories about the Smith case generally appear to associate Susan Smith with a kind of behavioral genetics defense.

C. “Exotic” Mitigation Stories

There is no mystery regarding why Susan Smith avoided a death sentence. Reasons include Smith’s lack of past violent conduct, her history of family abuse, her depression and mental health challenges, her remorse, as well as her attorneys’ efforts to offer uncontroversial genetics evidence. However, this Article’s message is not based on an attempt to compare Smith’s case with that of Stephen Mobley. Instead, what Smith’s case shows is the importance of behavioral genetics evidence to telling a defendant’s story, whether or not that evidence successfully outweighs the aggravating factors in that story or is even particularly compelling. In Smith’s case it appeared compelling, perhaps in part because behavioral genetics evidence also reveals as much about environmental influences on a defendant as it does about a defendant’s heritable traits.

Indeed, modern research continues to emphasize the importance of environmental effects on behavior, thereby dashing the common myth that an individual’s genetic structure is static. During the past decade in particular, 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. Recent federally-funded meetings emphasize this very aspect,

141. Id.
142. Zahn, supra note 135.
143. See supra notes 7-8 and accompanying text.
144. See supra notes 17-19 and accompanying text.
145. For examinations of the relationship among these variables, see Carey, supra note 23; Owen D. Jones & Timothy H. Goldsmith, Law and Behavioral Biology, 105 Colum. L. Rev. 405, 487 (2005); Moffitt, supra note 35; see also supra notes 17-22 and accompanying text.
and the meetings have ceased to draw the negative publicity that they have in the past.\footnote{Patricia Cohen, \textit{Genetic Basis for Crime: A New Look}, N.Y. TIMES, June 20, 2011, at C1.}

Irrespective of how researchers are handling this evidence, different courts can still have different perspectives. The \textit{Mobley} court, for example, viewed the theory of a link between genetics and violence as “unorthodox,”\footnote{Turpin v. Mobley, 502 S.E.2d 458, 463 (Ga. 1998).} and in 2001, a Ninth Circuit Court of Appeals panel in \textit{Landrigan v. Stewart}\footnote{272 F.3d 1221 (9th Cir. 2001).} still considered it “exotic” and ineffectual as mitigation.\footnote{Id. at 1228.} As recently as 2007, in \textit{Schriro v. Landrigan},\footnote{550 U.S. 465 (2007).} the United States Supreme Court validated the Ninth Circuit panel’s assessment by directly quoting part of its conclusion\footnote{Id. at 481.} that, for Landrigan, the genetics evidence “‘could not have been very helpful.’”\footnote{Schriro v. Landrigan, 550 U.S. 465, 481 (2007) (citing Landrigan v. Stewart, 272 F.3d 1221, 1229 (9th Cir. 2001)).}

At the same time, a fuller account of the \textit{Landrigan} case shows twists and turns in how the evidence was treated because the appellate court was more accepting of it. Jeffrey Landrigan was convicted of murder and sentenced to death in 1993,\footnote{State v. Landrigan, 859 P.2d 111, 114 (Ariz. 1993).} one year before Stephen Mobley.\footnote{See Turpin, 502 S.E.2d at 460.} After the Arizona Supreme Court affirmed Landrigan’s conviction and sentence\footnote{Landrigan, 859 P.2d at 118.} and the district court rejected Landrigan’s petition for habeas corpus relief, Landrigan appealed to the Ninth Circuit Court of Appeals.\footnote{Landrigan, 272 F.3d at 1223.} Landrigan’s numerous post conviction appeals and petitions were based in part on a claim of ineffective assistance of counsel, arguing that counsel did not investigate and introduce a sufficient amount of acceptable mitigating evidence.\footnote{Id. at 1224.} The three-judge appellate panel denied Landrigan’s ineffective assistance of counsel claim and affirmed the district court’s decision.\footnote{Id. at 1229.} Citing \textit{Mobley v. Head}\footnote{267 F.3d 1312 (11th Cir. 2001).} and \textit{Turpin v. Mobley},\footnote{502 S.E.2d 458 (Ga. 1998).} 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{161} 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 anticipate that he would continue to be violent.”\textsuperscript{162} 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.”\textsuperscript{163}

After further petitions,\textsuperscript{164} in 2005, the Ninth Circuit Court of Appeals ordered that Landrigan’s case be reheard en banc.\textsuperscript{165} On rehearing, the Court of Appeals affirmed in part, reversed in part, and remanded the case.\textsuperscript{166} In so doing, the Ninth Circuit’s opinion indicated a considerable amount of openness and receptivity concerning Landrigan’s efforts to introduce mitigating genetic and family history evidence.\textsuperscript{167}

Such receptivity was short lived, however. In 2007, on grant of certiorari, the Supreme Court reversed and remanded, forcefully supporting a number of the concerns about Landrigan’s dangerousness that were articulated by the Ninth Circuit’s initial decision.\textsuperscript{168} Addressing Landrigan’s alleged genetic predisposition to violence, for example, the Court found it “difficult to improve upon the initial Court of Appeals panel’s conclusion” that Landrigan “‘not only failed to show remorse or offer mitigating evidence, but he flaunted his menacing behavior’”; therefore, “‘assuring the court that genetics made him the way he is could not have been very help-

\textsuperscript{161} 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 \textit{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 1-6.

\textsuperscript{162} Landrigan, 272 F.3d at 1229.

\textsuperscript{163} \textit{Id.}


\textsuperscript{165} Landrigan \textit{v.} Stewart, 397 F.3d 1235, 1235 (9th Cir. 2005).

\textsuperscript{166} Landrigan \textit{v.} Schriro, 441 F.3d 638 (9th Cir. 2006).

\textsuperscript{167} \textit{Id.}

\textsuperscript{168} Schriro \textit{v.} Landrigan, 550 U.S. 465, 481 (2007). The Supreme Court also disagreed with the en banc court’s opinion regarding Landrigan’s refusal to permit the introduction of mitigating evidence, finding that Landrigan “plainly . . . informed his counsel not to present any mitigating evidence.” \textit{Id.} at 476. Given that much of the testimony of the proffered witnesses would have “overlap[ped] with the evidence Landrigan now wants to present,” the Supreme Court held it to be clearly established “that Landrigan would have undermined the presentation of any mitigating evidence that his attorney might have uncovered.” \textit{Id.} at 476, 477. With regard to the question of whether “Landrigan’s decision not to present mitigating evidence was ‘informed and knowing,’” \textit{Id.} at 478, the Supreme Court noted first that “[w]e have never imposed [such a] requirement upon a defendant’s decision not to introduce evidence,” \textit{Id.} at 479, and then proceeded to outline several additional reasons that the claim was without merit. \textit{Id.} at 479-80 (citations omitted).
Describing Landrigan’s mitigation evidence as “weak,” and noting that “the postconviction court was well acquainted with Landrigan’s exceedingly violent past and had seen first hand his belligerent behavior,” the Court concluded that the district court did not abuse “its discretion in declining to grant Landrigan an evidentiary hearing.”

Presumably, Landrigan, like Mobley, would have implications for other kinds of behavioral genetics evidence cases, irrespective of the types of factors they may try to introduce. Both cases questioned the value, relevance, and significance of such evidence in the context of a defendant’s appeal for mitigation. At the same time, the Supreme Court has in no way dismissed the potential applicability of behavioral genetics evidence in cases where the Court may perceive the evidence as more acceptable and the defendant as more remorseful. While the Court did not provide a test or standard suggesting how it may weigh such information in the future, the Court did suggest that there are particular aspects of Landrigan’s history and demeanor that may have prompted the Court’s final determination that other defendants may avoid.

This Author’s study of behavioral genetics evidence in criminal court cases is an effort to determine how courts have treated such evidence following the Landrigan Court’s conclusions. As Part II shows, there is no court that has been so dismissive of the evidence, quite the contrary. For the most part, courts seem to take the evidence in stride with what a defendant has to offer, whether or not that helps the outcome of the defendant’s case.

II. BEHAVIORAL GENETICS EVIDENCE CASES: 2007-2011

This Part analyzes thirty-three criminal cases, all appellate court decisions, that have referred to behavioral genetics evidence over the past four years, that is, since June 1, 2007, when this Author’s last study of behavioral genetics evidence ended, to July 1, 2011. These thirty-three cases, which are summarized in this Article’s Appendix and in Charts 1-5.

169. Id. at 481 (citations omitted).

170. Id.

171. Revisiting the Legal Link, supra note 28, at 228-29.

172. Id. at 229 (referring to Landrigan, 550 U.S. 465).

173. See Landrigan, 550 U.S. at 481. Given the Court’s emphasis on Landrigan’s “exceedingly violent past” and lack of remorse, as well as the weakness of the evidence, id. at 481, a defendant who lacked one or more of these drawbacks would have a stronger case.

174. See Behavioral Genetics Evidence, supra note 19.

175. See infra Appendix; Charts 1-5. The thirty-three cases that were found with this search break down in terms of publication source as follows. Seventeen cases are published in official reporters. See Cullen v. Pinholster, 131 S. Ct. 1388 (2011); Worthington v. Roper, 631 F.3d 487 (8th Cir. 2011); Rhoades v. Henry, 638 F.3d 1027 (9th Cir. 2011); Detrich v. Ryan, 619 F.3d 1038 (9th Cir. 2010); Mickey v. Ayers, 606 F.3d 1223 (9th Cir. 2010); Hamilton v. Ayers, 583 F.3d 1100 (9th Cir. 2009); Jones v. Ryan, 583 F.3d 626 (9th Cir. 2009);
were compiled using legal research databases only.\textsuperscript{177} Other cases may exist in which behavioral genetics evidence was at issue or potentially could have

\textsuperscript{177} See infra Charts 1-5. The case selection techniques were comparable to those used in the Author’s prior studies of behavioral genetics evidence in criminal cases. See Behavioral Genetics Evidence, supra note 19; see also Revisiting the Legal Link, supra note 28. Relevant searches for decisions were conducted using LexisNexis and Westlaw, the two major legal research databases. Over the years, these legal databases have expanded the content available online to include cases that are not published and therefore not found in official legal reporters. Therefore, the parameters of this Article’s search included the following: published opinions, unpublished opinions, opinions that are slated to be published, and opinions in which the state of publication is, at the time of this Article’s writing, unclear. Both LexisNexis and Westlaw clarify an opinion’s publication status when they are provided the relevant information to do so. In order to make the content of this Article’s search consistent across all cases, the search looked only at opinions and not at the briefs for those opinions because case briefs are not available for all cases on LexisNexis and Westlaw. As mentioned, the search was limited to judicial decisions released between June 1, 2007, and July 1, 2011. In order to collect the relevant opinions and make the search consistent with the Author’s past studies, the search was limited to decisions in which courts made reference to permutations of the following terms: genetics, family history, family background, propensity, and predisposition. Some of the searches also contained the terms “mitigating” and “aggravating.” An additional search was conducted in light of the recent United States Supreme Court decision in \textit{Cullen v. Pinholster}, 131 S. Ct. 1388 (2011), by focusing on cases citing Pinholster that made reference to behavioral genetics evidence. For a discussion of Pinholster and why the case warranted this research, see infra Section III.D. To be
been at issue; however, such cases were either not published in legal databases or were not made known publicly in a way that made them readily verifiable (for example, there were only news articles written about them). This selection strategy promotes consistency across cases and accountability across time periods, not only within this particular study, but also with the Author’s earlier study of forty-eight behavioral genetics evidence cases (1994-2007).

Of course, there are vastly different types of behavioral genetics evidence, as this Article discusses. It is somewhat artificial to aggregate all the research under one heading. This type of lumping can also potentially confuse debates about when and where such evidence should be appropriately applied. The umbrella heading of “behavioral genetics evidence” is used here, however, to make general points, while recognizing that the conclusions could differ in their accuracy and relevancy depending on the type and quality of evidence at issue (for example, MAOA deficiency compared to a family history). The next Section examines the behavioral genetics evidence uncovered in this Study by answering a series of questions about when and how courts apply it.

A. When and How Evidence Is Introduced

As Chart 1 shows, all but one of the thirty-three cases began as a capital case in which the defendant was initially sentenced to death by a judge or jury. The single exception is Morris v. Malfi, which started as a life-case included in this Article’s study, an appellate court must have announced a disposition in a case where a party either introduced or sought to introduce behavioral genetics evidence at any point in the proceeding (e.g., guilt phase, penalty phase, post-conviction hearing, evidentiary hearing, etc.). If behavioral genetics evidence was admitted at trial, this was also sufficient to be included. For cases in which behavioral genetics evidence was introduced post-trial, the Author included them in the study only if the court took action on the basis of behavioral genetics evidence. Such action could consist of granting an evidentiary hearing on its basis, finding ineffective assistance of counsel for failure to pursue, or finding prior court error for failure to admit the evidence. The Author also required that the court have discussed the behavioral genetics evidence as part of its rationale for a particular holding. Among cases that could not be included in the study are cases that were not appealed on the issue of behavioral genetics evidence, cases where a defendant was acquitted, and cases in which a defendant was sentenced to life. Among cases that could not be included in the survey are cases that were not appealed on the issue of genetic evidence, cases where a defendant was acquitted, and cases in which a defendant was sentenced to life.

178. A general Internet search turned up references to cases in which behavioral genetics evidence was relevant; in most instances, however, efforts to locate such cases on Westlaw or LexisNexis were unsuccessful. Thus, for example, this Study does not include the Bradley Waldroup case, nor the Susan Smith case because neither case included mention of behavioral genetics evidence in a court opinion that could be accessed on a legal database.

179. See infra Chart 4.

180. See infra Chart 1.
in-prison case in which the defendant challenged his sentence claiming he was tried and adjudicated while incompetent.\footnote{182} It is striking, then, that behavioral genetics evidence is of significance nearly exclusively in death penalty cases, and it is applied in no case involving less than a life sentence. Thus, discussions of the effects of such evidence on criminal responsibility, while conceptually important,\footnote{183} are not directly relevant to situations where genetics factors are instead used as mitigation evidence in the penalty phase of a capital trial.

Attempts to exclude such evidence therefore affect most strongly a pocket of individuals facing the possibility of execution. The implications can be powerful for those defendants’ fates. In ten of this Study’s thirty-three cases, defendants originally sentenced to death had their death sentence vacated on appeal.\footnote{184} In seven of those ten cases, a counsel’s failure to adequately investigate or present behavioral genetics evidence (mostly along with other factors) was grounds for vacating a death sentence and remanding for imposition of a sentence of life in prison.\footnote{185} In yet another

\begin{itemize}
\item \footnote{181} Morris v. Malfi, No. C 06-7409, 2010 WL 2629738 (N.D. Cal. June 29, 2010).
\item \footnote{182} Id. at *11, *16 (denying writ of habeas corpus on the basis that the new evidence did not raise real questions of Morris’s incompetence at the time of the crime, but issued a certificate of appealability).
\item \footnote{184} See Ex parte Smith, No. 1080973, 2010 WL 4148528, at *13 (Ala. Oct. 22, 2010) (remanding the case for another penalty-phase hearing); Allison v. Cullen, 725 F. Supp. 2d 924, 925 (C.D. Cal. 2010) (vacating the death sentence and granting relief on the defendant’s ineffective assistance of counsel claim); Detrich v. Ryan, 619 F.3d 1038, 1069 (9th Cir. 2010) (vacating Detrich’s death sentence and remanding the case to the district court); Commonwealth v. Williams, No. 200001876, 2010 Pa. Dist. & Cnty. Dec. LEXIS 193, at *15 (Pa. Cnty. Ct. May 13, 2010) (vacating death sentence and sentencing the defendant to life in prison); Woodall v. Simpson, No. 5:06CV-P216-R, 2009 WL 464939, at *55 (W.D. Ky. Feb. 24, 2009) (vacating death sentence and remanding the case to state trial court); Hamilton v. Ayers, 583 F.3d 1100, 1136 (9th Cir. 2009) (remanding the case to Tulane County Superior Court with instructions to reduce defendant’s sentence to life imprisonment without parole); Jones v. Ryan, 583 F.3d 626, 647 (9th Cir. 2009) (reversing and remanding the case with instructions to issue a writ of habeas corpus); Hall v. McPherson, 663 S.E.2d 659, 670 (Ga. 2008) (upholding the habeas court’s vacation of the defendant’s death sentence); Malone v. State, 168 P.3d 185, 215, 230 (Okla. Crim. App. 2007) (reversing the defendant’s death sentence); Morales v. Mitchell, 507 F.3d 916, 942 (6th Cir. 2007) (finding that the defendant was entitled to a writ of habeas corpus and vacating his death sentence).
\item \footnote{185} See Allison v. Cullen, 725 F. Supp. 2d 924, 925 (C.D. Cal. 2010) (granting relief on Allison’s ineffective assistance of counsel for failure to present mitigating evidence claim,
case, the court granted an evidentiary hearing where the petitioner claimed that counsel’s failure to find witnesses and records on his background constituted ineffective assistance.\textsuperscript{186} According to the petitioner, an adequate investigation would have revealed a range of disorders: a genetic predisposition to alcoholism and mental illness; a childhood filled with “physical abuse, neglect, abandonment, and poverty;” as well as mental illnesses that were never treated, “including depression, post-traumatic stress disorder (‘PTSD’), attention deficit-hyperactivity disorder, and polysubstance abuse.”\textsuperscript{187} Because alcoholism and violence were prevalent in the petitioner’s family, the mitigating evidence that counsel ignored “would have shown that petitioner was born ‘into a family marked by extreme pathology and dysfunction over multiple generations.’”\textsuperscript{188}

This Author’s prior analysis of forty-eight behavioral genetics evidence cases (from 1994-2007) showed that attorneys used three basic rationales for presenting this evidence: (1) to support a claim of ineffective assistance of counsel; (2) to provide proof and diagnosis of a defendant’s mitigating condition; and (3) to indicate some likelihood of the defendant’s future dangerousness. As Chart 2 shows, however, in this Article’s analysis of thirty-three cases during the last four years, attorneys used only the first two of these three rationales (thereby eliminating the rationale of future dangerousness).\textsuperscript{189} The great majority of cases (twenty-six cases or seventy-eight percent) involved petitions and appeals by defendants based on claims of ineffective assistance of counsel due to the failure to present behavioral


\textsuperscript{187} Id. at 89.

\textsuperscript{188} Id. (citations omitted).

\textsuperscript{189} See infra Chart 2.
In addition to using behavioral genetics evidence to prove ineffective assistance of counsel, some defendants also used the evidence to prove the existence of a mitigating factor. Indeed, nearly half of the cases (fifteen cases or forty-five percent) used behavioral genetics evidence to prove or support a diagnosis of a defendant’s mitigating condition. Of course, some of the thirty-three cases used both rationales (ineffective assistance and proof of diagnosis), thereby creating an overlap between the categories. Strikingly, no case employed behavioral genetics evidence to indicate the likelihood of a defendant’s future dangerousness (only several of the forty-eight cases in this Author’s prior study employed genetics evidence in this way). This finding is significant in light of prior concerns (expressed by the Landrigan courts, for example) that such evidence would be used to predict defendants’ future dangerousness (or some variant of that theme). In fact, there is little-to-no indication that such an application would pose a real legal threat.
Chart 3 considers the purpose that attorneys have for relying on behavioral genetics evidence in the death penalty context.\textsuperscript{195} Notably, in all but four of the thirty-three cases, the evidence is used to mitigate a death sentence. In an additional three cases,\textsuperscript{196} behavioral genetics evidence was raised to support a claim under \textit{Atkins v. Virginia}.\textsuperscript{197} In \textit{Atkins}, the United States Supreme Court held that executing mentally retarded individuals violates the Eighth Amendment’s ban on cruel and unusual punishment.\textsuperscript{198} Of course, until 2002, \textit{Atkins} was not an available vehicle in which to use behavioral genetics evidence although it is a particularly apt place for it now. Lastly, in \textit{Morris v. Malfi},\textsuperscript{199} as mentioned, the only non-death penalty case, the evidence was interjected to support arguments that the defendant was not competent to stand trial, the only case in this survey which raised a competency argument.\textsuperscript{200}

\[\text{Although Landrigan’s new evidence can be called mitigating in some slight sense, it would also have shown the court that it could anticipate that he would continue to be violent. He had already done that to a fare-thee-well. The prospect was chilling; before he was 30 years of age, Landrigan had murdered one man, repeatedly stabbed another one, escaped from prison, and within two months murdered still another man. . . . On this record, assuring the court that genetics made him the way he is could not have been very helpful.}\]

\textit{Id.}

The Supreme Court in \textit{Landrigan} quoted the Ninth Circuit’s latter phrases, explaining that it could not explain the reasoning any better. See \textit{Schriro v. Landrigan}, 550 U.S. 465, 481 (2007).

“The prospect was chilling; before he was 30 years of age, Landrigan had murdered one man, repeatedly stabbed another one, escaped from prison, and within two months murdered still another man. . . . On this record, assuring the court that genetics made him the way he is could not have been very helpful.”

\textit{Id.}

194. \textit{Behavioral Genetics Evidence, supra} note 19, at 345-49.
195. See infra Chart 3.
196. In three of the thirty-three cases in this survey, defendants attempted to admit evidence of a genetic predisposition to mental retardation to prove they were ineligible for the death penalty. See \textit{Ex parte Smith}, 2010 WL 4148528, at *2 (affirming trial court’s determination that defendant was not mentally retarded after defendant presented evidence that he was born with a genetic predisposition to mental retardation and that five members of his immediate family suffer from the same mental infirmity); \textit{Williams}, 2010 Pa. Dist. & Ctyn. Dec. LEXIS 193, at *6 (finding that defendant was mentally retarded and therefore ineligible for the death penalty after evaluating expert opinions, including testimony that defendant was born with “some genetic predisposition to mental retardation”); \textit{Hall}, 2009 WL 612559, at *18 (upholding trial court’s imposition of the death penalty after reviewing evidence that defendant exhibited characteristics consistent with genetic disorders such as XXY, Kleinfelter Syndrome, YYY, Extra Y Chromosome, or Fragile X Syndrome, all of which would be present from birth and would be consistent with mental retardation).
198. Id. at 320-21.
200. Id. at *11.
Most surprisingly, in no case in this Study was behavioral genetics evidence introduced by the State as an aggravating factor. This Author’s pre-2007 study did find at least one case in which behavioral genetics evidence appeared to be used as an aggravating factor. Yet, such a rare occurrence within a pool of eighty-one cases examined during a seventeen-year period stunts prior expectations that such evidence would be manipulated to justify the death penalty. This outcome may also be explained in part by the increasing quality of the admitted experts and evidence, both of which could prevent extreme characterizations or conclusions that a defendant may be “hard-wired” into dangerousness.

B. The Types of Evidence Introduced

Chart 4 shows the nature of the genetics evidence sought to be admitted in these cases. This evidence breaks down into four overlapping categories (signifying that some cases have multiple types of evidence): (1) expert testimony, (2) family history, (3) behavioral history, and (4)

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202. See infra Chart 4.


Behavioral histories could consist of school records or other testimony regarding childhood behavior relevant to genetic disorder diagnoses. Medical records could consist of any documented medical history be it physical or psychological.

As would be expected, most of the information in Chart 4 derives from some kind of expert evaluation or family history (twenty-four and eighteen cases, respectively), rather than a behavioral or medical history (four and three cases, respectively). However, there is overlap between these two categories given that in several of the cases, experts testified to some extent about the defendants’ family histories. In general, all four groups are directed toward similar types of information even if its source varies or it is characterized in different ways.

Family history evidence is especially varied and has been used to show genetic predispositions towards many different conditions. It is


206. See Worthington v. Roper, 619 F. Supp. 2d 661, 682-83 (E.D. Miss. 2009); Detrich, 619 F.3d at 1063; Jones, 583 F.3d at 631.

207. See infra Chart 4.

208. See infra Chart 4.

209. See Hall v. McPherson, 663 S.E.2d 659, 667 (Ga. 2008) (presenting expert testimony from a psychiatrist about defendant’s family tree showing a genetic predisposition to substance dependence disorder); Brant v. State, 21 So. 3d 1276, 1282 (Fla. 2009) (presenting expert testimony from a forensic psychologist that defendant was genetically predisposed to sexual sadism and also presenting defendant’s mother’s testimony about a family history of depression); Worthington, 619 F. Supp. 2d at 682 (presenting evidence of defendant’s medical history, including genetic predisposition to and a family history of depression, bipolar disorder, schizophrenia and inherited brain dysfunction); Hamilton v. Ayers, 583 F.3d 1100, 1127-28 (9th Cir. 2009) (presenting expert witness testimony that defendant had a family history of genetic disorders and a traumatic upbringing); Williams v. Norris, No. 5:07cv00234 SWW, 2008 WL 4820559, at *14 (E.D. Ark. Nov. 4, 2008) (presenting defendant’s social, physical, educational, and family history); Allison v. Cullen, No. CV 92-06404 CAS, 2010 U.S. Dist. LEXIS 82957, at *135-36 (C.D. Cal. July 22, 2010) (presenting family history of alcoholism and depression); Detrich v. Ryan, 619 F.3d 1038, 1049 (9th Cir. 2010) (presenting evidence of head injuries and presenting expert testimony that the defendant had neuropsychological deficits (some of which may have been inherited) that prevented him from controlling his impulses).

210. See Hawkins v. Wong, No. Civ. S-96-1155 MCE EFB DP, 2010 WL 3516399, at *91 (E.D. Cal. Sept. 2, 2010) (defendant sought a social historian who could have testified to his family tree, which “included many alcoholics, indicating a family genetic predisposition to alcoholism . . . [and which also] included many violent, abusive, and mentally ill or handicapped persons.”); Worthington, 619 F. Supp. 2d at 672, 682-83 (family history of depression, bipolar disorder, schizophrenia, and inherited brain dysfunction); Allison, 2010 U.S. Dist. LEXIS 82957, at *169 (family history of alcoholism and depression); Ex parte
often introduced through the testimony of the defendant’s relatives and also through expert testimony. While in some cases, the behavioral genetics evidence presented consisted almost wholly of the defendant’s family history in other cases, defendants had requested experts to assess the mitigation value of establishing a genetic predisposition towards a condition or behavior. For instance, in *Rhoades v. Henry*, the defendant submitted a 1000-page proffer on appeal, which contained declarations from a variety of sources: a neuropsychologist, an expert who was both a psychiatrist and neurologist; police officers; defendant’s family and friends; both medical and criminal records for defendant and his family members; defendant’s elementary school transcript; as well as “a family tree depicting drug and alcohol abuse, suicide, intelligence, mental health, and criminal convic-


213. *Hawkins*, 2010 WL 3516399, at *91 (defendant sought a social historian who could have testified to his family tree, which included many alcoholics, indicating a family genetic predisposition to alcoholism, and which also “included many violent, abusive, and mentally ill or handicapped persons”); *Allison*, 2010 U.S. Dist. LEXIS 82957, at *169 (an expert witness suggested that defendant’s family history showed that he might have a genetic predisposition to alcoholism, substance abuse, and mental illness); Keough v. State, No. W2008-01916-CCA-R3-PD, 2010 WL 2612937, at *13 (Tenn. Crim. App. June 30, 2010) (a specialist in addiction medicine testified that alcoholism is genetic and that defendant had a family history of alcoholism); Henry v. Ryan, No. CV 02-656-PHX-SRB, 2009 WL 692356, at *74 (D. Ariz. Mar. 17, 2009) (defendant had a family history of schizophrenia and exhibited symptoms as a child); *Gibson*, 19 A.3d at 519 (family history of alcohol abuse used to support the concept that defendant might have a genetic predisposition to substance abuse); Turner v. Epps, No. 4:07CV77-WAP, 2010 WL 653880, at *13 (N.D. Miss. Feb. 19, 2010) (family history of mental illness, including a grandmother who had been diagnosed with schizophrenia; genetic predisposition to mental illness); *Worthington*, 619 F. Supp. 2d at 682 (genetic predisposition to and family history of depression, bipolar disorder, and schizophrenia, and inherited brain dysfunction); Williams v. Norris, No. 5:07cv00234 SWW, 2008 WL 4820559, at *12 (E.D. Ark. Nov. 4, 2008) (defendant “experienced family dysfunction which extended from ‘generation to generation’”) (internal cross references omitted); Wood v. Schriro, No. CV-98-053-TUC-JMR, 2007 WL 3124451, at *31 (D. Ariz. Oct. 24, 2007) (family history of alcoholism).

214. 638 F.3d 1027 (9th Cir. 2011).
According to the neuropsychologist, "[t]he alcoholism and suicides seen in past generations of [defendant’s] family very likely played a genetic role in the mental and emotional health of [defendant] and his siblings." Nonetheless, it was the family context of physical and sexual abuse, as well as medical problems and defendant’s chronic use of methamphetamine, that “may well have damaged his brain in areas critical to impulse control and the ability to think clearly in high pressured situations.”

Even so, the court found that the aggravating factors outweighed the mitigating factors, and defendant’s sentence and convictions were affirmed.

The defendant in *Hawkins v. Wong* had a more favorable outcome. He claimed that counsel was ineffective for, among other things, failing to hire a social historian who could have explained how his background influenced his behavior. The Ninth Circuit Court of Appeals agreed with the defendant that his counsel was ineffective. The mitigating evidence would have shown that Hawkins was genetically predisposed to alcoholism and mental illness. A social historian could have also testified about Hawkins’s family tree, which included many alcoholics and indicated a family genetic predisposition to alcoholism, as well as included a range of violent, abusive, and mentally ill or handicapped persons. The court allowed an evidentiary hearing on the ineffective assistance of counsel claim.

As with other kinds of evidence, courts vary on whether behavioral genetics evidence need be presented by experts. Some courts have said that there is no need to present an expert to testify on genetics evidence because the court or the jury is capable of inferring that a defendant’s disposition is genetically inherited. For example, in *Hodges v. Bell*, the defendant wanted a mitigation expert to testify about the genetic transmission of drug and alcohol dependency. The trial court’s decision to deny expert services was upheld because counsel was deemed capable of presenting to the court information about the defendant’s substance addictions and the court was able to process that information without the need for an expert.

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215. *Id.* at 1048.
216. *Id.*
217. *Id.*
218. *Id.* at 1052, 1055.
220. *Id.* at *1.
221. *Id.* at *91.
222. *Id.*
223. *Id.*
224. *Id.* at *92.
226. *Id.* at 546.
227. *Id.* at 547.
Woodall v. Simpson,228 the failure to present a genetics defect defense was also not ineffective assistance of counsel because the court found that the jury could have inferred that, genetically, the defendant’s family had a history of mental problems.229 In Darling v. Secretary,230 the court found that since there was contradictory evidence as to whether the defendant actually suffered from frontal lobe brain damage, counsel was not ineffective in failing to obtain an evaluation and relying instead on a defense witness’ testimony.231 Likewise, the court in Wood v. Schriro232 denied defense counsel’s request for a neurometric brainmapping technician for the purpose of diagnosing organic brain damage and/or psychopathology in the defendant, finding that “there appear[ed] to be no support for this type of examination.”233

Despite the lack of complete deference to mental health experts, at least one court has acknowledged the tension between the legal field and medical field. In Jones v. Ryan,234 the district court dismissed each ineffective assistance of counsel claim on finding that failure to hire a mental health expert (among other claims) was not prejudicial to the defendant because there was not enough evidence presented to show that the defendant suffered from neurological damage caused by head trauma or other factors.235 The Ninth Circuit Court of Appeals, however, agreed with defendant that his counsel was ineffective.236 By allowing a court-appointed expert to testify about the defendant’s mental health at sentencing, instead of hiring a mitigation expert or psychiatrist, defense counsel violated the American Bar Association guidelines, Supreme Court precedent, and Ninth Circuit law.237 The court found that the district court acted improperly in weighing the testimony of the experts in order to determine who was the most credible and whether the defendant had presented evidence confirming that he had neurological damage.238 In essence, it was not the proper role of the district court to find a “definitive diagnosis” or evaluate the credibility of the experts.239

For any one of a number of reasons, other courts seem to be more comfortable drawing conclusions on genetics evidence presented by experts.

229. Id. at *48.
231. Id. at *28.
233. Id. at *30.
234. 583 F.3d 626 (9th Cir. 2009).
235. Id. at 635-36.
236. Id. at 640.
237. Id. at 638.
238. Id. at 641.
239. Id. at 641.
In *Hall v. Quarterman*,240 for example, the district court noted testimony presented by and against the defendant on the issue of mental retardation and stated some of the genetic conditions the defendant might have.241 Rather than frame mental health findings strictly in terms of the expert’s direct testimony, the district court took the expert’s findings and drew its own conclusions as to the possibilities. According to the court:

In addition to [the expert, Dr. Sally Church’s] diagnosis that Applicant is mentally retarded, Dr. Church noted that Applicant’s physical appearance is typical of a person who suffers from Fetal Alcohol Syndrome or Fetal Alcohol Effect. It is entirely possible that Applicant suffers from one of these conditions as there is evidence that Applicant’s mother was an alcoholic. Either of these conditions would be a correlate of Applicant’s mental retardation.

Also, Applicant exhibits characteristics consistent with genetic disorders such as XXY, Kleinfelter Syndrome, YYX, Extra Y Chromosome, or Fragile X Syndrome. All of these disorders are usually related to mental retardation and are present at the time of birth.242

C. The Reasons Why Evidence is Introduced

Regardless of how behavioral genetics evidence is presented, Chart 5 indicates that most of the evidence is applied to validate the existence of a serious condition, typically a mental illness or addiction. This is evidence a defendant could introduce as mitigating during the penalty phase or at trial during the guilt-or-innocence phase, irrespective of whether that evidence was accompanied by genetic associations.243 In other words, most of the factors listed in Chart 5 constitute traditional kinds of defenses and mitigating evidence that courts have long admitted into court for a wide range of reasons.

Chart 5 also depicts the different reasons defendants have offered behavioral genetics evidence and how receptive courts have been to it.244 The label in Chart 5, *Genetics Evidence Offered by Defendant*, refers to instances where defendants presented evidence to show they were genetically predisposed toward a particular condition or behavioral pattern. In comparison, the label *Genetics Evidence Rejected by Court*, refers to the few instances where courts refused to admit behavioral genetics evidence either at trial or in post-trial proceedings or they were simply silent on the issue.

241. *Id.* at *18.
242. *Id.*
243. *See infra* Chart 5. The total number of cases will be more than the number of examined cases (thirty-three), because in some cases the evidence was applied to validate more than one condition.
244. *See infra* Chart 5.
Overall, Chart 5’s statistics indicate that in almost all cases where a defendant presented behavioral genetics evidence, the court admitted the evidence at trial or analyzed the evidence in post-trial proceedings. This response was consistent among all of Chart 5’s eleven categories: substance dependency, alcohol dependency, mental illness, depression, mental retardation, bipolar disorder, schizophrenia, predisposition to...
ward violence, propensity toward criminal behavior, sexual sadism, and family dysfunction. It is striking that behavioral genetics evidence is primarily used to validate the existence of a substance or alcohol dependency, followed by either unspecified or specified (e.g., depression) mental illness, then some kind of propensity for criminality or violence, and lastly, family dysfunction. Relative to these other conditions, however, the substance/alcohol dependency association is especially pronounced. In twenty of the thirty-three cases examined—or well over half (sixty-one percent)—of all the cases, courts found a link between alcohol and/or substance abuse and behavioral genetics evidence. In sharp contrast, courts linked behavioral genetics evidence solely to other conditions in only thirteen cases.

LEXIS 193, at *6 (Pa. Cnty. Ct. May 13, 2010). This evidence was rejected in Ex parte Smith, 2010 WL 4148528, at *7, *13. See infra Chart 5, BIPOLAR DISORDER. For cases where evidence was offered to the court see Worthington, 619 F. Supp. 2d at 681-82.


See infra Chart 5, PREDISPOSITION TOWARD VIOLENCE. For cases where evidence was offered to the court see Cullen v. Pinholster, 131 S. Ct. 1388, 1404 (2011); Rienhardt v. Ryan, 669 F. Supp. 2d 1038, 1052 (D. Ariz. 2009).

See infra Chart 5, SEXUAL SADISM. For a case where evidence was offered to the court see Brant v. State, 21 So. 3d 1276, 1281 (Fla. 2009).


See infra Chart 5, PROPENSITY TOWARD CRIMINAL BEHAVIOR. For cases where evidence was offered to the court see Cullen v. Pinholster, 131 S. Ct. 1388, 1404 (2011); Rienhardt v. Ryan, 669 F. Supp. 2d 1038, 1052 (D. Ariz. 2009).

See infra Chart 5, PREDISPOSITION TOWARD VIOLENCE. For cases where evidence was offered to the court see Cullen v. Pinholster, 131 S. Ct. 1388, 1404 (2011); Rienhardt v. Ryan, 669 F. Supp. 2d 1038, 1052 (D. Ariz. 2009).

See infra Chart 5, SEXUAL SADISM. For a case where evidence was offered to the court see Brant v. State, 21 So. 3d 1276, 1281 (Fla. 2009).
presented evidence of a genetic predisposition to alcohol or substance dependency, that defendant also presented evidence of genetic predisposition to other conditions. Regardless, the alcohol/substance abuse claim is pervasive and far more substantial when compared to this Author’s study of pre-2007 cases.\textsuperscript{259} It appears attorneys are more willing to submit such evidence, perhaps because the science of addiction has progressed so rapidly.

Irrespective of the particular type of behavioral genetics evidence, however, there are varying ways defendants offer such evidence and courts either accept or reject it. For example, \textit{Schurz v. Schriro}\textsuperscript{260} concerned evidence involving three of Chart 5’s categories: substance dependency, alcohol dependency, and family dysfunction.\textsuperscript{261} In \textit{Schurz}, the defendant offered evidence that his counsel should have investigated and presented the following areas of mitigation: a genetic predisposition toward addiction and mental illness; possible fetal alcohol syndrome; a history of alcoholism among family members, including his mother, father, grandfather, grandmother, and aunts and uncles; serious and ongoing parental neglect, chronic alcohol and substance abuse, and physical neglect.\textsuperscript{262} In its evaluation of the merits of the defendant’s claim, the court conceded to the dysfunctionality of the defendant’s “home environment,” noting that as a youth the defendant was forced to experience “his family’s alcoholism, verbal and physical abuse, which was at times severe, lack of nurturing from his parents, and family fights and violence.”\textsuperscript{263} Yet the district court still denied habeas relief, predicting that “the sentencing court would have assigned minimal significance to the new declarations providing additional detail about Petitioner’s dysfunctional family history.”\textsuperscript{264} In addition, as mentioned in the analysis of Chart 3, in three cases defendants introduced genetics evidence for the purpose of contending that the defendant was mentally retarded and therefore

\begin{footnotesize}
\begin{itemize}
\item 259. \textit{See Behavioral Genetics Evidence, supra note 19, at 321, 465-98.}
\item 261. \textit{See infra Chart 5.}
\item 262. \textit{Id. at *41.}
\item 263. \textit{Id. at *48.}
\item 264. \textit{Id. at *49.}
\end{itemize}
\end{footnotesize}
ineligible for the death penalty under Atkins.265 Yet only one of the three courts accepted that argument.266

At the same time, most courts accepted the evidence that defendants offered, even when that evidence could be viewed as controversial or potentially stigmatizing. In Morales v. Mitchell,267 for example, the Sixth Circuit affirmed the district court’s finding that defendant’s counsel was ineffective because counsel had failed to conduct an adequate investigation of potentially mitigating evidence.268 That search would have revealed defendant’s extensive family history of alcoholism, his own alcoholism and how it affected him (such as being prone to blackouts), his upbringing (alcoholic and absent parents, and a mentally retarded brother), as well as “[t]he role of alcohol in the Native American Indian culture in which he was raised.”269 Defendant’s parents, grandparents, uncle, and aunts were alcoholics, and several relatives who died from cirrhosis of the liver.270 All of this information was positively influential in terms of mitigation. Defendant was entitled to a writ of habeas corpus, and his death sentence was vacated.271

Indeed, Chart 5 also lists categories that could potentially be viewed as aggravating at first glance, but within a proper context, serve as mitigation.272 In Creech v. Hardison,273 for example, the defendant, Creech, claimed ineffective assistance of counsel at his resentencing hearing due to his counsel’s inadequate research on mitigation evidence.274 According to a psychologist who testified at Creech’s resentencing hearing, Creech “probably had a genetic or biological predisposition for violence” based on the

265. See infra Chart 3. In three of the cases in this survey, genetics evidence was used to support defendants’ claims of mental retardation. See Ex parte Smith, No. 1080973, 2010 WL 4148528, at *13 (Ala. Oct. 22, 2010) (upholding trial court’s determination that Smith was not mentally retarded and that, therefore, his conviction did not violate Atkins despite the defendant’s introduction of evidence that he had a genetic predisposition to mental retardation and that several members of his family were mentally retarded); Commonwealth v. Williams, No. 200001876, 2010 Pa. Dist. & Cnty. Dec. LEXIS 193, at *15 (Pa. Cnty. Ct. May 13, 2010) (finding that the defendant was mentally retarded while relying on a genetic predisposition to mental retardation as one form of evidence to support this finding); Hall v. Quarterman, No. 4:06-CV-436-A, 2009 WL 612559, at *44-46 (N.D. Tex. Mar. 9, 2009) (denying habeas relief after finding that the defendant did not persuasively demonstrate evidence of mental retardation consistent with the Atkins standard despite the presentation of evidence from one psychologist that the defendant exhibited characteristics consistent with several forms of genetic disorders that would also be consistent with mental retardation).

267. 507 F.3d 916 (6th Cir. 2007).
268. Id. at 928-31.
269. Id. at 931.
270. Id. at 932.
271. Id. at 942.
272. See infra Chart 5.
274. Id. at *10.
psychologist’s examination of records, mental health reports, an interview with Creech, and the results of various psychological tests. The psychologist also concluded “that Creech had an antisocial personality and scored in the 96th percentile of the prison population for psychopathy.” On appeal, Creech also introduced new evidence from a 2005 neurological examination, showing that he had “bilateral brain damage that affected [his] insight, judgment and capacity to exercise social inhibitions.” After reviewing the record, however, the court found that “the state district court expressly considered the various mitigating circumstances.” While “[a] neurologist’s opinion that Creech has brain damage may be more specific than [the psychologist’s] testimony,” it offered “only a modest counterweight” to the aggravating factors involved in Creech’s case, including his long criminal record as well as the “brutal manner” in which he killed a more vulnerable fellow inmate “over a petty dispute.”

*Brant v. State* is notable both because it is the only case that concerned sexual sadism and because behavioral genetics evidence was mentioned in passing during the trial. According to a forensic psychiatrist for the defense, Brant suffered from sexual sadism which “in most cases . . . arises out of a genetic predisposition and unhealthy childhood environment.” Concerning the sexual battery involved in the case, the psychiatrist stated that Brant possessed “a substantial impairment in his ability to conform his conduct with the requirements of the law” because of both his sexual sadism and the effects of methamphetamine. The underlying sexual disorder which hindered Brant’s ability to control his sexual impulses was exacerbated when he ingested drugs. In addition, a PET scan of Brant’s brain indicated “underactivity” in the areas associated with impulse control and good judgment. Nevertheless, the Florida Supreme Court affirmed Brant’s death sentence—unconvinced that the mitigating evidence outweighed the aggravating evidence. At the same time, the court did not
throw doubt on the validity of the evidence, nor turn it into a vehicle for aggravation.

**III. The State of Behavioral Genetics Evidence Now**

This Part has two goals: it discusses this Author’s study of thirty-three behavioral genetics evidence cases in more depth and it compares the study to the results of this Author’s prior research on forty-eight behavioral genetics evidence cases decided between 1994-2007. This comparison is made by way of addressing a series of questions about the findings and then the overall impact of behavioral genetics evidence.

A. Are Courts Still Skeptical?


   In 1994, defense preparations for *Mobley v. State* drew world-wide publicity because of counsel’s unprecedented efforts to gather mitigating behavioral genetics evidence to prevent Stephen Mobley’s execution. According to some commentators at the time, the availability of such testing would prompt political and moral abuses of highly controversial information. Yet this Author’s earlier survey of the forty-eight cases that had used behavioral genetics evidence during the thirteen years following *Mobley* (1994-2007) showed no apparent basis for these concerns. There were no political and moral abuses of the ilk that had been predicted and most courts still questioned the relevance of such evidence when attorneys attempted to introduce it at the penalty phase, a tact consistent with the Supreme Court’s 2007 conclusions in *Landrigan*.

   In essence, during the seventeen years between *Mobley* and *Landrigan*, there had been seemingly few changes in social and legal attitudes toward behavioral genetics. The topic remained controversial for many of the same reasons espoused at the 1992 University of Maryland conference. Moreover, the applicability of behavioral genetics evidence

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289. 455 S.E.2d 61 (Ga. 1995).
290. See Behavioral Genetics Evidence, supra note 19, at 319.
291. Id. at 349 (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).
292. Id. at 321.
293. Id. at 350 (citing Schriro v. Landrigan, 550 U.S. 465, 480-81 (2007)).
294. Id. at 324.
295. Id. at 350 & n.219.
as mitigation in death penalty cases still seemed to baffle the press and public, thereby accentuating the controversy.  

There were exceptions, of course, as the Susan Smith case illustrated. In Von Dohlen v. State, for example, the court remanded the defendant’s case for resentencing in light of the mitigating evidence that attorneys presented, which had included behavioral genetics factors. Notably, such evidence was sufficiently compelling even without a testifying expert documenting the defendant’s genetic proclivity for mental disorder or other troublesome conditions. The passage of time may have influenced Von Dohlen’s outcome because it was decided a decade after Mobley. Regardless, the case remains unusual when compared to a larger group of opinions that have viewed behavioral genetics evidence either as inconsequential or potentially predictive of a defendant’s future violent tendencies.  

Consistent with Mobley and Landrigan, this Author’s earlier study showed that courts articulated five major reasons for rejecting a defendant’s submission of behavioral genetics evidence: (1) The mitigation evidence the defense had already submitted was sufficient and further information concerning the defendant’s genetic attributes would most likely not have influenced the defendant’s sentence; (2) behavioral genetics evidence is not as valid and reliable relative to other evidence introduced at trial, especially when there is conflicting testimony among the experts; (3) the proposition that a defendant’s criminal behavior may be associated with that defendant’s behavioral genetics is “unorthodox” or “exotic”; (4) even if behavioral genetics evidence is accepted at trial, it can be detrimental to a defendant’s case because it indicates that the defendant will commit further acts of violence and be a danger to the society; and (5) genetics evidence collides with some courts’ views of criminal responsibility, which may favor safeguarding the community rather than rehabilitation.

This Author’s studies provide little support for any of these five rationales. First, both studies have shown that behavioral genetics evidence

296. Id. at 350. This confusion is particularly well illustrated at the time of the Stephen Mobley case. Id. at 350 n.220. Some news media referred to the genetics evidence as a culpability defense, not as a basis for mitigation even though attorneys only applied it in mitigation. Id.

297. Id. at 351 (citing 602 S.E.2d 738, 743 (S.C. 2004)).

298. Id.

299. Id. at 351 n.22; see also Mickey v. Ayers, 606 F.3d 1223 (9th Cir. 2010); Loving v. United States, 64 M.J. 132 (C.A.A.F. 2006); Head v. Thomason, 578 S.E.2d 426 (Ga. 2003).

300. Behavioral Genetics Evidence, supra note 19, at 351.


304. Id. at 351-52.
can have a beneficial impact for some defendants in some cases, particularly when it bolsters or interacts with other kinds of mitigating evidence. For example, there are compelling arguments that behavioral genetics evidence is relevant and useful if applied in a limited way, such as to buttress other mitigating conditions, or to verify the existence of a condition that is questioned. Likewise, courts’ rendering of genetic factors as “unorthodox” or “exotic” ignores the reality that genetics evidence has a long history in legal cases, even if that past was controversial or seemingly forgotten by more recent decisions, such as *Mobley v. State* and *Landrigan v. Schriro*. For example, this Author’s past and present surveys have uncovered eighty-one such cases over the past seventeen years.

The remaining rationales also lack support. While courts and commentators have long-stressed the double-edged-sword aspect of behavioral genetics evidence, this characteristic is inherent to many other mitigating factors. A prime example is the kinds of factors the Supreme Court found applicable to juveniles in *Roper v. Simmons*. In *Roper*, 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. The very factors that argued against juveniles’ eligibility for the death penalty also made them more prone to misconduct—truly a

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305. *Id.* at 352 (discussing the five stated problems concerning the use of genetics evidence in criminal cases). Indeed, similar to brain imaging technologies, behavioral genetics evidence may be more scientifically reliable than other kinds of evidence admitted into trial. See Adam Teitcher, *Weaving Functional Brain Imaging into the Tapestry of Evidence: A Case for Functional Neuroimaging in Federal Criminal Courts*, 80 FORDHAM L. REV. 355 (2011).

306. See *Behavioral Genetics Evidence*, supra note 19, at 333 (listing the ways that genetics evidence validates the existence of a serious condition).


308. See *Behavioral Genetics Evidence*, supra note 19, at 352.


312. *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.”); see also *Graham v. Florida*, 130 S. Ct. at 2011 (2010) (holding that “the Constitution prohibits the imposition of a life without parole sentence on a juvenile offender who did not commit homicide”).

313. 543 U.S. at 569-70.

314. *Id.* at 570-71.
double-edged sword. Likewise, the argument that behavioral genetics evidence conflicts with some courts’ theories of criminal responsibility again reveals the confusion concerning the disparate standards relevant for the guilt-or-innocence phase of a trial as opposed to the penalty phase of a trial. The standard for mitigation evidence is far broader given the purpose that it serves.\footnote{315}{See Behavioral Genetics Evidence, supra note 19, at 353.}

The earlier cases in which behavioral genetics evidence was more easily dismissed also revealed courts’ general ignorance about interdisciplinary research and interactions among social, biological, and genetic variables. As this Article has shown, however, such variables are so intertwined it would be an artificial and misleading process to attempt to separate them for purposes of sentencing.\footnote{316}{Id.}

The latest discoveries in behavioral genetics, however, have not fallen on courts’ deaf ears in more recent times. Indeed, the next Section’s discussion of cases using behavioral genetics evidence during the last four years suggests that much of this judicial skepticism has ebbed if not disappeared entirely.\footnote{317}{See infra Section III.B.}

\section{2. The Second Study: 2007-2011}

Unlike appellate decisions prior to 2007, courts during the last four years seem to have shifted their analysis of behavioral genetics evidence from whether it should be admitted at all. Rather, the question now is whether sufficient evidence has been presented and, if so, how much weight it should be given. In all thirty-three of the appellate decisions this Author examined, the courts appear to at least consider behavioral genetics evidence in their analysis of mitigating factors and whether an attorney has rendered ineffective assistance. Likewise, none of the courts has squarely rejected the introduction of behavioral genetics evidence nor referred to it as “exotic” or “unorthodox.”

Courts’ consideration of the weight such evidence should be given takes a variety of forms and, unsurprisingly, relies on case specific facts. Even where courts did not find that genetics evidence was likely to affect the outcome of the case or was outweighed by aggravating factors, they still addressed and acknowledged family history. Particularly striking over the last four years were arguments concerning defendants’ genetic proclivities to alcohol and substance abuse—a far larger percentage than had previously been found in the past.\footnote{318}{See infra Chart 5.} Again, regardless of whether such evidence affected the outcome of the defendant’s sentence positively, courts did take it

\begin{footnotesize}
\begin{enumerate}
\item \footnote{315}{See Behavioral Genetics Evidence, supra note 19, at 353.}
\item \footnote{316}{Id.}
\item \footnote{317}{See infra Section III.B.}
\item \footnote{318}{See infra Chart 5.}
\end{enumerate}
\end{footnotesize}
into account in the same way they would other kinds of mitigating evidence. According to the court in *Rhoades v. Henry*, for example, the evaluations of two experts indicating that Rhoades likely has a genetic predisposition were not sufficiently strong to shed light on Rhoades’s mental and emotional states of mind at the time he committed the murders. One expert stated, for example, that alcoholism and suicides in Rhoades’s family “very likely” indicated a genetic factor in his mental health. Another expert concluded that Rhoades “inherited the diseases of alcoholism and drug abuse” and that he was “born into a family that suffered from major mental illness and neuropsychological impairment.” Yet the court viewed the reports of both experts to be “speculative” and “indeterminate,” concluding that the aggravating factors in Rhoades’s case outweighed the mitigating factors. The district court and the Ninth Circuit also considered the reports of both experts in their analysis of Rhoades’s claim.

These kinds of balances are perhaps most intricately assessed in cases (previously discussed) where defendants have a proclivity for criminal conduct in unsympathetic circumstances. In *Creech v. Hardison*, for example, the defendant, while serving a life sentence for murder, murdered another prisoner by hitting him with a battery-filled sock and stomping on his head and neck. The state court considered both aggravating and mitigating factors, such as defendant’s young age (mitigating), genetic or biological predisposition for violence (mitigating), and the nature of the crime (highly aggravating)—holding that the aggravating factors outweighed the mitigating factors, a conclusion the district court endorsed. The court found that the sentence would have been the same even with (among other factors) the “possibility of a biological predisposition . . . listed as a mitigating factor.” Likewise, in *Schurz v. Schriro*, the defendant—facing the death sentence for murder after splashing the victim with gasoline and setting him on fire—claimed on appeal that several mitigation factors should have been presented at his sentencing hearing. These factors included a genetic predisposition toward addiction and mental illness, exposure to neu-

319. 638 F.3d 1027 (9th Cir. 2011).
320. *Id.* at 1050, 1052.
321. *Id.* at 1048.
322. *Id.*
323. *Id.* at 1050-51.
324. *Id.* at 1050.
326. *Id.* at *1.
327. *Id.* at *3.
328. *Id.* at *10.
329. *Id.* at *11.
331. *Id.* at *1-2.
rotoxins, as well as a family life of violence and crime. While the Schurz court acknowledged all these factors, it concluded, like the court in Creech, that the defendant did not show these factors affected his ability to control, comprehend, or perceive his actions at the time of the murder and that the outcome in the sentencing court would have been the same. The court in Brant v. State similarly affirmed the defendant’s death sentence, unconvinced that the mitigating evidence (genetic predisposition to sexual sadism, unhealthy childhood environment, family history of depression, and drug use) outweighed the aggravating evidence (premeditation and attempts to cover up the crime, and calm demeanor after the crime). Brant’s impairment due to abnormal brain functioning and drug use, while mitigating, was “not so mitigating as to make his death sentence disproportionate.”

Even in cases where defendants’ propensities for violence are not as marked, many courts remain unswayed by genetic evidence of substance abuse. Yet again, the important point here is that they accept the validity of the evidence irrespective of whether it affects their decision about the sentence. In Keough v. State, for example, the defendant introduced evidence at his post-conviction hearing regarding a family history of alcoholism. However, his convictions and death sentence were affirmed by the Court of Criminal Appeals on the basis that further investigation into his chronic alcoholism would have done little to change the outcome of the case, as the jury had already heard testimony about his alcohol use on the night of the murder and had already rejected a defense theory of voluntary intoxication. In Commonwealth v. Gibson the court similarly concluded that the new mitigation evidence presented by the defendant, which included a family history of alcohol abuse spanning at least three generations, was not reasonably likely to have swayed a juror to alter his or her vote. Thus, the court denied defendant’s petition for post-conviction relief.

Other courts in the last four years have tended to give behavioral genetics evidence (including alcohol or substance abuse) more weight—some to the point of considering it an error not to have a pretrial hearing on a defendant’s genetic predisposition; others have made it grounds for vacating a
death sentence. In *Hawkins v. Wong*, for instance, the court allowed an evidentiary hearing on the defendant’s ineffective assistance of counsel claim, part of which concerned the failure to investigate and present mitigating evidence, including the defendant’s genetic predisposition to alcoholism and mental illness. According to the defendant, the mitigating evidence omitted by counsel would have shown that defendant was born “into a family marked by extreme pathology and dysfunction over multiple generations.” In *Morales v. Mitchell*, the court conclusively held that defense counsel rendered ineffective assistance for failing to conduct an investigation into mitigating evidence—information that primarily consisted of alcoholism in Morales’s family, Morales’s own alcoholism and its effects on him, as well as his family upbringing. The district court in *Allison v. Culler* also vacated the defendant’s death sentence and granted relief on his claim of ineffective assistance of counsel for failure to present mitigating evidence. This evidence included expert statements that defendant might have a genetic predisposition to alcoholism, substance abuse, and mental illness. Lastly, in *Hall v. McPherson*, the Supreme Court of Georgia upheld the habeas court’s vacation of McPherson’s death sentence, stating that his trial counsel should have investigated further into McPherson’s background, which included a family tree that showed a genetic predisposition to substance abuse disorder, and that failure to do so was due to inattention, rather than to a strategic decision.

**B. Is Behavioral Genetics Evidence Effective?**

It is somewhat unclear whether the failure to present behavioral genetics evidence is a stronger ground for granting a claim of ineffective assistance of counsel now than it was at the end of the 2007 study. However, in most of the thirty-three cases in this Study, at least one of the defendants’ claims alleged ineffective assistance of counsel for failure to adequately investigate or present mitigating evidence of genetic factors. One case

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344. *Id.* at *86, *92.
345. *Id.* at *89.
346. *Id.*
347. 507 F.3d 916 (6th Cir. 2007).
348. *Id.* at 931, 936.
350. *Id.* at *120-21, *177.
351. *Id.* at *133, *169.
352. 663 S.E.2d 659 (Ga. 2008).
353. *Id.* at 662, 667, 670.
354. See Morales v. Mitchell, 507 F.3d 917, 931 (6th Cir. 2007) (defense counsel was ineffective for failing to adequately investigate defendant’s cultural background, which was
where failure to present this evidence was on strong ground is *Morales v. Mitchell.*\(^ {355}\) Morales was a Native American man with a family history of alcoholism.\(^ {356}\) During the penalty phase of his case, the only evidence presented was the defendant’s unsworn statement. On appeal, the Sixth Circuit found that this failure to present any mitigation evidence constituted deficient performance.\(^ {357}\) Among the points that the court agreed should have been raised by trial counsel during the penalty phase were the defendant’s “chaotic and dysfunctional family environment” and “[t]he role of alcohol in the Native American Indian culture” in which defendant lived.\(^ {358}\) The court found that in light of the “volume and compelling nature” of the evidence of Morales’s “tumultuous life, continued and uncontrolled alcohol and drug abuse, dysfunctional family history, potential mental health problems, and detailed cultural background,” there was a “reasonable probability that effective counsel could have achieved a different outcome.”\(^ {359}\)

In *Hamilton v. Ayers,*\(^ {360}\) the Ninth Circuit also seemed to suggest that the failure to include behavioral genetics evidence was a strong ground for claiming ineffective assistance.\(^ {361}\) Hamilton was facing the death penalty and petitioned for a writ of habeas corpus based on his claim that he was incompetent to stand trial and that his counsel had not thoroughly investigated his mental state.\(^ {362}\) The district court rejected Hamilton’s petition despite expert testimony that he had a family history of genetic disorders and a traumatic upbringing.\(^ {363}\) In a 2009 appeal to the Ninth Circuit, the court remanded the case, with instructions to reduce Hamilton’s death sentence to

Native American Indian, and its effect on him, and to adequately investigate the cause of his mental and emotional deficiencies during his lifelong alcohol consumption; Hawkins v. Wong, No. CIV S-96-1155 MCE EFB DP, 2010 WL 3516399, at *86, *89 (E.D. Cal. Sept. 2, 2010) (counsel failed to organize the case around themes supported by the mitigating evidence, and failed to investigate and present mitigating evidence that defendant was genetically predisposed to alcoholism and mental illness); Turner v. Epps, No. 4:07CV77-WAP, 2010 WL 653880, at *10-13 (N.D. Miss. Feb. 19, 2010) (defendant claimed that counsel was ineffective for failure to investigate or present evidence of his traumatic childhood upbringing, his depressive disorders, a family history of mental illness, and a genetic predisposition to mental illness); Woodall v. Simpson, No. 5:06CV-P216-R, 2009 WL 464939, at *45, *48-49 (W.D. Ky. Feb. 24, 2009) (defendant claimed that counsel was ineffective for failure to present a genetic defect defense and to obtain additional neurological testing, which included failure to link his mental condition to his genetic history).

355. 507 F.3d 917 (6th Cir. 2007).
356. Id. at 924, 931-33.
357. Id. at 933, 936.
358. Id. at 931.
359. Id. at 935.
360. 583 F.3d 1100 (9th Cir. 2009).
361. Id. at 1126-29.
362. Id. at 1102.
363. Id. at 1105.
life imprisonment without parole.\textsuperscript{364} The court found that Hamilton’s counsel was deficient for failing to investigate and present mitigating evidence, such as evidence of Hamilton’s mental health history.\textsuperscript{365} Among the mitigation evidence that should have been presented was a family history of depression and mental health issues, including evidence that Hamilton’s parents and extended family suffered from depression and suicidal thoughts, and his paternal great-grandmother and cousin committed suicide.\textsuperscript{366} In addition, one expert who testified at Hamilton’s habeas hearing stated that Hamilton “was raised in an environment of intergenerational alcoholism.”\textsuperscript{367} Given the new evidence, the court concluded that Hamilton’s trial counsel’s investigation “fell far below the constitutional floor” and was prejudicial to the defendant.\textsuperscript{368}

Success in this arena depends on a wide range of factors. In other recent appeals, courts have not given behavioral genetics as much weight for one of a variety of reasons. In 2010, the same court of appeals that vacated Hamilton’s death sentence, affirmed a denial of habeas for another defendant’s guilt phase and reversed the district court’s grant of habeas relief as to the penalty phase.\textsuperscript{369} In \textit{Mickey v. Ayers}, the district court agreed that the defendant’s counsel could have made a successful mitigation case with evidence that defendant’s genetic propensities, when combined with his family upbringing and mental illness, caused him to be predisposed to alcohol and drug dependency.\textsuperscript{370} On appeal, the Ninth Circuit found that since the second penalty phase expert’s research into genetic links of certain diseases was in a nascent stage at the time of trial, the defendant’s counsel was not deficient in failing to provide the expert with the defendant’s family history of substance abuse.\textsuperscript{371}

In general, both of this Author’s studies show that, as would be expected, failure to present behavioral genetics evidence alone was not enough to find ineffective assistance of counsel. But, when coupled with a number of other errors committed by trial counsel, courts were less reluctant to grant evidentiary hearings or vacate death sentences altogether for ineffective assistance.

\begin{itemize}
\item \textsuperscript{364} Id. at 1136.
\item \textsuperscript{365} Id. at 1135-36.
\item \textsuperscript{366} Id. at 1127-28.
\item \textsuperscript{367} Id. at 1128.
\item \textsuperscript{368} Id. at 1129-31.
\item \textsuperscript{369} \textit{Mickey v. Ayers}, 606 F.3d 1223, 1249 (9th Cir. 2010).
\item \textsuperscript{370} Id. at 1240.
\item \textsuperscript{371} Id. at 1247.
\end{itemize}
C. Are There New Trends or Arguments?

This Article reports a number of new trends and arguments. In this Author’s original study of forty-eight cases, most cases employed behavior-al genetics evidence in three primary ways: (1) to support a claim of ineffect-ive assistance of counsel, (2) to provide proof and diagnosis of a defendant’s mitigating condition, and/or (3) to indicate some likelihood of the defendant’s future dangerousness.372 This Author’s most recent study of thirty-three cases showed, however, that there was no third category and that no case used behavioral genetics evidence to predict the defendant’s dangerousness.373 Nor was the evidence ever used by the prosecution, much less as an aggravating factor.374 While this Author’s original study did not find many cases in which the evidence was used detrimentally, the discovery that it has never been so used in the last four years is startling. After all, this finding contradicts the Supreme Court’s view in Landrigan that such evidence could be used to enhance the perception of a defendant’s level of dangerousness.375

Second, in light of the Court’s 2002 decision in Atkins v. Virginia,376 behavioral genetics evidence now may play a larger role in defendants claiming a genetic predisposition to mental retardation377 and mental incompetence.378 In Ex Parte Smith, for example, Smith tried to argue that he was mentally retarded and not eligible for the death penalty.379 He stated that he had a genetic predisposition to mental retardation and that five of his family members suffered from the same mental infirmity.380 However, in an Atkins hearing, the court determined that Smith was not mentally retarded because he had failed to demonstrate substantial or significant deficits in adaptive behavior, either at the time of the murders or before the hearing.381 In Commonwealth v. Williams, however, the issue was whether Williams was mentally retarded and therefore ineligible for the death penalty.382 An expert stated that the defendant was born with “some genetic predisposition to mental retardation,” and he had closed-head injuries as a child due to

372. See supra notes 188-90 and accompanying text.
373. See infra Chart 2.
374. See supra notes 200-01 and accompanying text.
380. Id. at *4.
381. Id. at *7.
abuse. The court evaluated the expert opinions and determined that Williams was mentally retarded and therefore ineligible for the death penalty.

In *Morris v. Malfi*, the defendant claimed that his due process rights were violated because he was tried and adjudicated while mentally incompetent. During the penalty phase of his trial, Morris submitted evidence of head injuries, including two in the frontal part of his brain, the area that controls emotions, impulses, and inhibition of behavior. Morris also submitted a 2009 evaluation and report by Dr. Natasha Khazanov, a clinical psychologist, who reviewed and evaluated psychological and medical records pertaining to petitioner’s head traumas, criminal cases, and family medical and psychiatric history, as well as conducted neuropsychological testing on petitioner. In her report, Dr. Khazanov stated, among other things, that Morris had a genetic predisposition to chronic psychopathology, specifically paranoid schizophrenia.

As this Article previously mentioned, the Author’s 2007-2011 study also revealed more cases in which courts were using behavioral genetics evidence to support claims of inheritance of alcohol and drug dependency. Likewise, courts no longer view such evidence as “exotic” in the same way that *Landrigan* did. Nor is there any overt indication that behavioral genetics evidence has reinforced concerns expressed in the context of *Mobley*, most particularly worries that actors in the criminal justice system would increasingly and irresponsibly rely on distorted evidence in their decision making.

Indeed, as this Author previously argued, concerns over behavioral genetics evidence in criminal cases can be a red herring, deflecting attention from the realization that courts can genetically stereotype defendants irrespective of any attempt made by those defendants to submit genetics arguments. While no such case was found in this Author’s most recent study, the Author did find such a case in the prior study. In *State v. Madey*, the defendant, who pled guilty to misdemeanor assault after two police officers

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383. *Id.* at *6.
384. *Id.* at *13-14.
386. *Id.* at *5.
387. *Id.* at *9.
388. *Id.*
389. *Id.*
390. *See supra* p. 2.
392. *See supra* Subsection III.A.2.
tried to take her into protective custody for public intoxication, challenged the court’s probation requirements, one of which mandated that she write an essay on “alcoholism and the American Indians.” The requirements were also made in the context of the court’s numerous and unsubstantiated comments about Madey’s ethnic proclivity for alcoholism. These comments included asking Madey’s mother whether “she knew ‘anything about genetic predisposition to alcoholism?’” or “if she had ‘ever been on an Indian Reservation?’” and if she had ever seen ‘the Scotch or Irish drinking?’” The court even asked the mother whether she “had a concern that her daughter would become ‘a flaming alcoholic’ because, with such an ethnic background, ‘there [was] nothing she can do about it.’” In turn, the court continually speculated about the degree of the defendant’s future dangerousness, even characterizing the defendant’s potential state of being a murder victim as a danger to others: “[I]f you start drinking like this, you’re a danger. You will go out and get yourself attacked, or murdered, or something, and put yourself in these hopeless conditions, which is a bad example, and every time somebody is killed or raped in society, that diminishes the public safety overall.” In vacating the defendant’s sentence and remanding, the appellate court noted that not only were the trial court’s comments completely unrelated “to an interest in doing justice,” but that the defendant did not “attempt[] to use her family background to excuse her behavior.”

In Madey, the genetic stereotyping was in the court’s eyes only, a potential cause for concern in any case, no matter the defense or evidentiary circumstances. Yet some courts have not needed a cultural stereotype to use genetics wrongly. In 2011, for example, a three-judge panel of the United States Court of Appeals for the Second Circuit overturned a federal district court’s decision to sentence a defendant to six-and-a-half years in a child pornography case because the court had made inappropriate conclusions about genetic proclivities. In the district court’s eyes, the defendant would recidivate and continue viewing child pornography “because of an as-of-yet undiscovered gene.” Such a marker is “‘a gene you were born with,’” the court stated to the defendant, “‘[a]nd it’s not a gene you can get

395. Id. at *1.
396. Id. at *2.
397. Id. at *1.
398. Id.
399. Id.
400. Id. at *2.
401. Id. at *4.
402. See U.S. v. Cossey, 632 F.3d 82, 85, 89 (2d Cir. 2011) (“The judgment of the district court hereby is VACATED and REMANDED for resentencing consistent with this opinion, with instructions to assign the case to a different judge.”).
403. Id. at 88.
rid of. Rejecting as "virtually worthless" the two psychological evaluations that demonstrated the defendant was "at a low to moderate risk to re-offend," the court reiterated to the defendant its genetic prediction. "You are what you’re born with. And that’s the only explanation for what I see here." The Second Circuit panel made clear its stance about such an "unsupported theory of genetics," emphasizing the district court’s lack of fairness and integrity and ordering the defendant to be sentenced by a different judge. Such cases emphasize all the more the enhanced need for a scientifically sophisticated judiciary.

D. The Potential Impact of *Cullen v. Pinholster*

After *Landrigan*, *Cullen v. Pinholster* is the only Supreme Court case that has addressed behavioral genetics evidence. Yet, unlike *Landrigan*, *Pinholster* does not focus on the type of evidence at issue, but rather on how and when such evidence can be evaluated. It is seemingly irrelevant that the evidence happened to comprise behavioral genetics factors, as this Section shows.

*Pinholster* is pertinent to this Article’s discussion, however, for two reasons. First, the case’s procedural history is an all-too-classic example of a prisoner’s extraordinary challenges with an ineffective assistance of counsel claim, particularly because of the prisoner’s dense history of genetic and environmental disorders. Second, the *Pinholster* Court’s holding could substantially impact currently-pending behavioral genetics cases (including those examined in this Article), as well as future cases involving behavioral genetics evidence. Before *Pinholster*, for example, federal habeas courts could hold hearings and evaluate new evidence when they reviewed how state courts construed federal law under the Antiterrorism and Effective Death Penalty Act (AEDPA). State prisoners who had been unable to adequately present their claims in state court could seek habeas relief in

404. *Id.* at 87 (citations omitted).
405. *Id.* (citations omitted).
406. *Id.* at 87 (citations omitted)
407. *Id.* at 88.
408. *Id.* at 89.
412. See infra notes X-X and accompanying text.
413. See infra notes X-X and accompanying text.
414. See infra notes X-X and accompanying text.
federal court. 416 As a result of Pinholster, however, such federal review has been severely limited, thus hindering state prisoners’ efforts to garner federal habeas relief. 417 As Professor Samuel Wiseman has shown, Pinholster “significantly alters [the] landscape” in which federal courts can review state records in habeas cases, thereby magnifying the need for prisoners to adequately develop their records and claims in state court. 418

Petitioners have begun to create strategies to circumvent Pinholster; yet it remains unclear how effective these strategies will be. 419 To provide context for such changes, the next part of this Section examines the procedural history and evidence that frames Pinholster before considering how Pinholster may affect currently pending and future behavioral genetics evidence cases.

1. History and Evidence

In 1984, Scott Lee Pinholster was convicted in state court of murder and was sentenced to death; however, he asserted that he received ineffective assistance of counsel in the penalty phase of his trial. 420 After accepting and rejecting several attorneys and even representing himself at one point, he later reconsidered and accepted the two attorneys the court appointed. 421 In a hasty effort to prepare Pinholster’s mitigation case, 422 his counsel consulted with an expert whose conclusions were not in Pinholster’s favor. According to the expert, Pinholster “did not manifest any significant signs or symptoms of mental disorder or defect other than his antisocial personality disorder by history.” 423 In addition, the expert considered Pinholster “cognitively functional, without brain damage.” 424 The defendant’s counsel did not contact the expert again, nor any other expert. 425 Indeed, Pinholster’s attorneys billed a total of 6.5 hours in preparation for the penalty phase. 426 The defendant’s mother was the only defense witness at the proceeding. 427

The jury sentenced Pinholster to death. 428 Pinholster twice sought habeas relief in the California Supreme Court. 429 He alleged that his trial

416. See Wiseman, supra note 410.
417. Id.
418. Id.
419. Id.
420. Cullen, 131 S. Ct. at 1396.
422. Id.
423. Id.
424. Id.
425. Id. at 658.
426. Id.
427. Id.
428. Id. at 659.
counsel had failed to adequately investigate and present mitigating evidence during the penalty phase.\footnote{430} He introduced additional evidence to support his claim: school, medical, and legal records; and declarations from family members, one of his trial attorneys, and a psychiatrist.\footnote{431} In arguing to the state court that his counsel performed deficiently, Pinholster contended that his attorneys should have pursued and presented additional evidence about the following: Pinholster’s family members and their criminal, mental, and substance abuse problems; his schooling; and his medical and mental health history, including his epileptic disorder.\footnote{432} The California Supreme Court summarily denied relief.\footnote{433} Pinholster subsequently filed a habeas petition claiming that had his counsel provided the expert with his family history, particularly as related to mental disorders, Dr. John M. Stalberg “would have made further inquiry ‘before concluding that [Pinholster] had merely a personality disorder.’”\footnote{434} The district court held Pinholster’s petition in abeyance, and the California Supreme Court ultimately denied his second habeas petition “on the substantive ground that it is without merit.”\footnote{435}

After the case was sent back to federal court, Pinholster next requested an evidentiary hearing, which, while denied for the guilt phase, was granted for the penalty phase.\footnote{436} This time, Pinholster had two experts present new mitigation evidence, including testimony that his childhood was much worse than his mother had described.\footnote{437} The revelations about Pinholster’s family were striking: his biological father was a drunk, “had mood swings and fits of anger, and was eventually diagnosed as paranoid with narcissistic personality disorder.”\footnote{438} Pinholster’s older brother Alvin, while charged with the rape and sodomy of a young teen, was found incompetent to stand trial and diagnosed with schizophrenia.\footnote{439} Alvin later committed suicide.\footnote{440} Pinholster’s other siblings were similarly troubled. His younger brother Terry evidenced mild depression and heavily used drugs.\footnote{441} His half-sister Tammy, by age eleven, began abusing alcohol \footnote{442} and, by age seventeen, was arrested with her boyfriend for the sexual assault of a young teenage girl.\footnote{443}
Pinholster’s half-brother Guy evidenced manic depression, and another half-brother, Gary, was characterized as “an alcoholic with severe mood swings.”\textsuperscript{444}

Pinholster’s own disorders fit the family pattern but also indicated that accidents and injuries appeared to be part of the source. According to his experts, for example, Pinholster “had suffered brain damage that explained his aggressive, impulsive, and antisocial behavior.”\textsuperscript{445} One of the experts, a pediatric neurologist, also testified that Pinholster “sustained frontal-lobe injuries” as a result of two car accidents, occurring during childhood. The expert derived this conclusion from two findings: Pinholster’s diagnosis of epilepsy and documentation that, at age nine, he had an abnormal electroencephalogram (EEG).\textsuperscript{446}

According to the Ninth Circuit, all of this evidence demonstrated that Pinholster’s trial counsel were ineffective in conducting their investigation according to the dictates of \textit{Strickland}.\textsuperscript{447} Indeed, the court stressed the paucity of counsel’s billing records, which “confirm counsel’s own admissions that they spent almost no time preparing for the penalty phase hearing that would determine whether Pinholster would live or die.”\textsuperscript{448} Thus, the court set forth two conclusions. First, counsel were “deficit” for neglecting to research Pinholster’s history so that they could provide mitigating evidence during the penalty phase.\textsuperscript{449} Second, such neglect “was prejudicial,” thereby rendering the California Supreme Court’s denial of relief on ineffective assistance as both “contrary to” and “unreasonable” in light of \textit{Strickland}.\textsuperscript{450}

The Supreme Court’s grant of certiorari\textsuperscript{451} would be followed, of course, by an opinion\textsuperscript{452} which, while not directed at Pinholster’s behavioral genetics evidence, surely would have some bearing on how such evidence could be considered for future inmates. Writing for the Court, Justice Clarence Thomas took a different stance, for example, on how to interpret trial counsel’s billing records, stressing that the records showed that Pinholster’s counsel had indeed investigated mitigating evidence.\textsuperscript{453} In reversing the Ninth Circuit, Justice Thomas explained that “[t]here [was] no reasonable probability that that additional evidence presented at Pinholster’s state pro-

\textsuperscript{444} Id.
\textsuperscript{445} Id.
\textsuperscript{446} Id.
\textsuperscript{447} Id. at 671.
\textsuperscript{448} Id.
\textsuperscript{449} Id. at 671.
\textsuperscript{450} Id.
\textsuperscript{451} Cullen v. Pinholster, 130 S. Ct. 3410 (2010).
\textsuperscript{452} CITE NEEDED
\textsuperscript{453} Cullen v. Pinholster, 131 S. Ct. 1388, 1404-05 (2011).
ceedings would have changed the verdict. Not only would the evidence have “largely duplicated the mitigation evidence of [Pinholster’s] mother and brother at trial,” but any new facts or evidence that may have been offered “is of questionable mitigating value.” Although Justice Thomas did not address Pinholster’s genetic evidence specifically, the prior opinion, Pinholster v. Ayers, did discuss evidence Pinholster sought to introduce.

Yet, despite the fact that behavioral genetics evidence was presented as part of the mitigating evidence at issue in the Pinholster Court’s review, the Court’s holdings are not based on the genetic nature of the evidence. Nor do they appear to pertain only or disproportionately to cases involving behavioral genetics evidence. Viewed in another way, Pinholster, then, is certainly no Landrigan with respect to a more direct statement about behavioral genetics evidence. At the same time, Pinholster has already had impact on behavioral genetics evidence cases, and it can be expected to have further impact.

2. Pinholster’s Potential Effect on Behavioral Genetics

Behavioral genetics evidence is often not introduced until post-conviction proceedings, and the cases using it frequently involve ineffective assistance of counsel claims. Therefore, Pinholster could have a considerable impact on currently-pending behavioral genetics cases. With respect to the cases examined in this Article, however, Pinholster’s effect has, so far, not been detrimental.

Two petitioners in this Article’s study have already had their cases remanded in light of Pinholster. In each of the cases, the failure to adequately investigate or present behavioral genetics evidence (along with other factors) was grounds for vacating a death sentence and remanding for imposition of a sentence of life in prison. In another case, Hawkins v. Wong, the court granted an evidentiary hearing where the petitioner claimed that failure to track down witnesses and records on his background constituted ineffective assistance of counsel. Yet, irrespective of these outcomes, since Pinholster was decided, lower courts have been more reluc-

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454. Id. at 1393.
455. Id. at 1393.
456. Pinholster, 590 F.3d at 715.
457. See infra Chart 2.
459. Detrich v. Ryan, 619 F.3d 1038 (9th Cir. 2010); Jones v. Ryan, 583 F.3d 626 (9th Cir. 2009).
461. Id. at *92.
tant to grant such hearings. 462 Pinholster places a greater burden on a petitioner to adequately develop the factual record in state court, making it uncertain whether federal courts will be permitted to fill the gap in situations where a petitioner is unable to do so. 463 As Professor Wiseman explains, “Without the safeguard of federal fact development under [AEDPA], cases of egregious unfairness in state post-conviction procedures will demand new solutions.” 464

The cases following Pinholster suggest that petitioners seeking habeas relief in the federal courts, particularly those who have claims of ineffective assistance of counsel, will face greater burdens. The Pinholster decision makes clear that federal courts should be basing their determination on whether to grant habeas relief solely on evidence found within the state record. 465 This situation poses a considerable barrier for petitioners whose grounds for relief are rooted in the inadequacy or absence of certain evidence in state proceedings. In seven of the cases in this Article’s study in which the petitioner’s death sentence was vacated or an evidentiary hearing was upheld, the decision was based precisely on the failure to adequately investigate or present behavioral genetics evidence in state court. 466 It is unclear whether the same results would follow had these cases been decided after the Court’s decision in Pinholster. 467

Pinholster, of course, did not mandate that courts take a less favorable approach to behavioral genetics evidence specifically. At the same time, reaction to the Court’s holding indicates that cases seeking appellate relief on the grounds of ineffective assistance of counsel, a category into which behavioral genetics cases have typically fallen, may receive less favorable reception in the federal courts. This potential outcome may have implications for the likelihood of success of behavioral genetics cases in general


463. Wiseman, supra note 410.

464. See Wiseman, supra note 410, at 51.

465. CITATION NEEDED


467. In an effort to address the uncertainty, Professor Wiseman suggests that defendants will search for ways to get around Pinholster. See Wiseman, supra note 410. But for this Article’s purposes, examining such alternatives is for another day.
irrespective of any actual change in courts’ views of genetics evidence. Indeed, a change in standards to one of greater deference to state and attorney determinations might pose additional problems for petitioners seeking to introduce new facts to the record.

One way for a petitioner to avoid the hurdles created by *Pinholster* would be to convince the court that the petitioner’s claims were not “adjudicated on the merits” in state proceedings. The success rate of these claims in the future may be an indicator of whether new evidence remains a fundamental ingredient in obtaining federal habeas relief in the context of behavioral genetics evidence and also in the broader sense of ineffective assistance of counsel claims in habeas proceedings.

**CONCLUSION**

For decades, the concept of ties between behavioral genetics and crime has been haunted with controversy, raising questions about how such evidence is, or should be, applied. This Article addresses those questions by analyzing a unique study of all criminal cases (totaling thirty-three) that used behavioral genetics evidence over the last four years (2007-2011). The study builds upon this Author’s prior research on all criminal cases (totaling forty-eight) that used such evidence during the preceding thirteen years (1994-2007). This combined collection of eighty-one criminal cases employing behavioral genetics evidence offers a rich context for determining how the criminal justice system has been handling genetics factors for nearly two decades, but also why the last four years reveal particularly important discoveries. Results suggest that not only is the controversy surrounding behavioral genetics and crime unwarranted, the use of such evidence has been misunderstood.

Within the last four years, for example, behavioral genetics evidence was applied almost exclusively as mitigating evidence in death penalty cases and primarily in two ways—to support claims of ineffective assistance of counsel for neglecting such evidence or to provide proof and diagnosis of a defendant’s mitigating condition. Strikingly, this Study found no case during 2007-2011 in which behavioral genetics factors were used as aggravating evidence, nor as evidence indicating that a defendant would be a future danger to others. These findings debunk arguments that such evidence will be legally detrimental to a defendant. Indeed, in most cases, the evidence is so tightly intertwined with other factors in a defendant’s life that the particular impact of behavioral genetics can be difficult to isolate. This Study’s results indicate that, at the very least, behavioral genetics evidence has no decipherable impact on a defendant’s case or, at most, it becomes an effective tool along with a range of other kinds of variables in rendering a defendant ineligible for the death penalty. Courts appear willing to accept behavioral genetics evidence as part of a defendant’s mitigation
story, even if genetics renders that story a more troubling one in terms of the defendant’s purported propensities. The last four years also showed a number of break-a-way trends from earlier years. For example, there were substantially more cases that incorporated behavioral genetics evidence of any kind. In addition, there was a clear increase in the number of cases in which defendants submitted proof of a genetic propensity for alcoholism and/or substance abuse.

Overall, this Article’s research shows that courts accept behavioral genetics evidence in the majority of cases in which defense attorneys attempt to offer it. In contrast to past years when courts at times questioned the applicability or relevance of such information, recent findings indicate that their focus has turned elsewhere. In particular, courts emphasize the importance of determining whether the evidence, when used with other factors in mitigation, can outweigh the aggravating factors that support a death sentence. The coming years will reveal whether such trends will be affected by *Pinholster v. Cullen*, the Supreme Court’s recent decision restricting prisoners’ efforts to seek federal habeas relief under AEDPA. Regardless, behavioral genetics evidence seems, on the surface, to have reached a status commensurate with other kinds of evidence without the baggage of abuse with which it has typically been associated.

Chart 1
Severity of Sentencing by Number of Cases
33 Total Cases

<table>
<thead>
<tr>
<th>SENTENCE</th>
<th>NUMBER OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>32</td>
</tr>
<tr>
<td>Life</td>
<td>1</td>
</tr>
</tbody>
</table>

NUMBER OF CASES
### Chart 2

**Tactical Strategies for Using Genetics Evidence by Number of Cases**

33 Total Cases

<table>
<thead>
<tr>
<th>STRATEGY</th>
<th>NUMBER OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Support a Claim of Ineffective Assistance of Counsel</td>
<td>26</td>
</tr>
<tr>
<td>To Provide Proof and Diagnosis of a Defendant’s Mitigating Condition</td>
<td>15</td>
</tr>
<tr>
<td>To Indicate a Defendant’s Future Dangerousness</td>
<td>0</td>
</tr>
</tbody>
</table>

*Categories are not mutually exclusive*
Chart 3
Purpose of Presenting Genetics Evidence by Number of Cases
33 Total Cases

<table>
<thead>
<tr>
<th>PURPOSE</th>
<th>NUMBER OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitigation</td>
<td>29</td>
</tr>
<tr>
<td>Mental Retardation <em>(Atkins Challenge)</em></td>
<td>3</td>
</tr>
<tr>
<td>Competency</td>
<td>1</td>
</tr>
<tr>
<td>Aggravation</td>
<td>0</td>
</tr>
</tbody>
</table>

NUMBER OF CASES
Chart 4
Nature of Genetics Evidence Sought to be Admitted by Number of Cases*
33 Total Cases

<table>
<thead>
<tr>
<th>Nature of Evidence</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert Testimony</td>
<td>24</td>
</tr>
<tr>
<td>Family History</td>
<td>18</td>
</tr>
<tr>
<td>Behavioral History</td>
<td>4</td>
</tr>
<tr>
<td>Medical History</td>
<td>3</td>
</tr>
</tbody>
</table>

*Categories are not mutually exclusive
Chart 5
Reasons for Introducing Genetics Evidence by Number of Cases*
33 Total Cases

- Substance Dependency: 16 cases (12 by Defendant, 4 rejected by Court)
- Alcohol Dependency: 14 cases (10 by Defendant, 4 rejected by Court)
- Mental Illness (Unspecified): 9 cases (5 by Defendant, 4 rejected by Court)
- Depression: 4 cases (3 by Defendant, 1 rejected by Court)
- Mental Retardation: 3 cases (2 by Defendant, 1 rejected by Court)
- Bipolar Disorder: 1 case (1 by Defendant)
- Schizophrenia: 3 cases (2 by Defendant, 1 rejected by Court)
- Predisposition Towards Violence: 4 cases (3 by Defendant, 1 rejected by Court)
- Propensity Toward Criminal Behavior: 4 cases (3 by Defendant, 1 rejected by Court)
- Sexual Sadism: 4 cases (3 by Defendant, 1 rejected by Court)
- Family Dysfunction: 4 cases (3 by Defendant, 1 rejected by Court)

*Categories are not mutually exclusive
Figure 1
Genogram Presented in the Susan Smith Case*

- or Deceased
D Depression
S Suicide attempt
A Alcohol abuse according to self or family report
DS Mental retardation, disability

* Modified for presentation purposes
## APPENDIX

### CRIMINAL CASES REFERENCING BEHAVIORAL GENETICS EVIDENCE:

**JUNE 1, 2007 - JULY 1, 2011**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td><strong>Loving v. United States</strong>, 64 M.J. 132 (C.A.A.F. 2006), <em>followed by</em> 68 M.J. 1 (C.A.A.F. 2009), <em>cert. denied</em>, 131 S. Ct. 67 (2010). Defendant was convicted of premeditated murder and sentenced to death. He raised claims of ineffective assistance of counsel for failure to investigate and present mitigating evidence of his family history of alcohol and substance abuse addiction, which could point to a genetic predisposition. Remanding for an evidentiary hearing as to whether counsel closed its investigation prematurely, the court cited that defendant’s traumatic family background and upbringing demonstrated enough cause to remand. At the evidentiary hearing, testimony regarding a family history of drug use, as well as a biopsychosocial assessment of defendant, was presented. Upon conclusion of the evidentiary hearing, the United States Court of Appeals for the Armed Services found that the new evidence was largely cumulative and that its exclusion was not prejudicial to defendant. The habeas relief petition was denied.</td>
</tr>
<tr>
<td></td>
<td><strong>Hamilton v. Ayers</strong>, 458 F. Supp. 2d 1075 (E.D. Cal. 2006), <em>aff’d in part, rev’d in part</em>, 583 F.3d 1100 (9th Cir. 2009). Defendant, facing a murder conviction and death sentence, petitioned for a writ of habeas corpus. Defendant claimed he was incompetent to stand trial and that his counsel failed to investigate his mental state. Defendant’s expert witnesses testified that defendant had a family history of genetic disorders and a traumatic upbringing. The 2006 court rejected the petition, noting the absence of medical records documenting defendant’s mental state, lack of irrational behavior during</td>
</tr>
</tbody>
</table>

* The three 2006 cases are included in this Article’s study because, in addition to their 2006 decisions, their subsequent case histories also made reference to behavioral genetics evidence.
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trial, and lack of indication that defendant did not understand the proceedings. The court held that defendant was competent to stand trial. On appeal in the Ninth Circuit, the court held that counsel was in fact deficient for failing to investigate and present mitigating evidence, such as evidence of defendant’s mental health history and extremely abusive childhood. The court remanded the case to the superior court with instructions to reduce the punishment to a life sentence without possibility of parole.

**Mickey v. Ayers.** No. C-93-0243 RMW, 2006 WL 3358410 (N.D. Cal. Nov. 17, 2006), aff’d in part, rev’d in part, 606 F.3d 1223 (9th Cir. 2010), cert. denied, 132 S. Ct. 419 (2011). Defendant, facing a murder conviction and death sentence, claimed ineffective assistance of counsel at the penalty phase of trial. The defendant claimed his counsel had failed to utilize effectively the skill and knowledge of mental health experts in presenting defendant’s mitigation evidence. The defendant alleged that counsel could have made a successful mitigation case that his genetic propensities, when combined with his family upbringing and mental illness, caused him to be predisposed to alcohol and drug dependency. The court agreed. On appeal, however, the Ninth Circuit found that the additional mitigation evidence was unreliable and that counsel had effectively utilized the input of mental health experts at trial. The court further held that failure to present this evidence was not prejudicial because the prosecution would have rebutted with evidence of defendant’s sexually deviant behavior. With regard to genetics evidence, the court found that the second penalty phase expert’s research into genetic links of certain diseases was in a nascent stage at the time of trial. As a result, counsel was not deficient in failing to provide the expert with defendant’s family history of substance abuse.

**Morales v. Mitchell.** 507 F.3d 916 (6th Cir. 2007), rehearing and rehearing en banc denied, 2008 U.S. App. LEXIS 5909 (6th Cir. Mar. 10, 2008). Defendant faced the death sentence for murder. Expert testimony was presented during the trial phase that Native Americans have a genetic predisposition for alcoholism, and defendant, a Native American, had a biological breed disposition to become alcoholic and intoxicated. On appeal, defendant claimed ineffective assistance of counsel for counsel’s failure to adequately investi-
gate a variety of sources related to defendant’s condition: his extensive family history of alcoholism, his cultural background and its effect on him, and a potential neurological cause of his mental and emotional deficiencies due to lifelong alcohol consumption. Counsel also failed to hire a mitigation expert. The court held that defendant’s counsel was ineffective because counsel failed to conduct an investigation for mitigating evidence. Such evidence included the following: indications of alcoholism in defendant’s family, defendant’s own alcoholism and its effects on him (he was prone to blackouts), and defendant’s upbringing (alcoholic, absent parents, and a mentally retarded, abusive brother).

Malone v. State, 168 P.3d 185 (Okla. Crim. App. 2007). Defendant was convicted of first-degree murder and sentenced to death. At trial, a physician and addiction medicine specialist testified about genetic predisposition to addiction and depression, as well as the effects of methamphetamine on the brain. The specialist also testified about the substantial history of addiction and depression in defendant’s family. Defendant appealed his conviction on several issues, including ineffective assistance of counsel. His case was remanded for resentencing on a different issue.

Schurz v. Schriro, No. CV-97-580-PHX-EHC, 2007 WL 2808220 (D. Ariz. Sept. 25, 2007). Defendant was found guilty of first-degree murder and attempted aggravated robbery. Defendant initiated habeas proceedings after his petitions for post-conviction relief were denied. Among his claims was ineffective assistance of counsel for failure to adequately investigate and present available mitigation evidence. Defendant argued that evidence of fetal alcohol syndrome, genetic predisposition to addiction and mental illness, and extreme physical and verbal abuse in the home should have been presented. The court found that this evidence was not significant from the mitigating evidence presented at trial. In addition, defendant had not demonstrated how his dysfunctional background had any effect on his ability to control, comprehend, or perceive his actions at the time of the murder. Habeas relief was denied.

to death. On appeal, defendant claimed that trial counsel had rendered ineffective assistance for two reasons. Counsel had failed to sufficiently prepare defense expert witness, a neuropsychologist, as well as to investigate and present mitigating evidence related to defendant’s social and medical background, including evidence of head injuries and a family history of alcoholism. The court affirmed denial of habeas relief, finding that counsel had actually developed and presented such evidence in detail (counsel had even sought appointment of a neurometric brain-mapping technician).

**Berryman v. Ayers**, No. 1:95-CV-05309-AWI, 2007 WL 1991049 (E.D. Cal. July 10, 2007), *followed by sub nom.* **Berryman v. Wong**, No. 1:95-CV-05309-AWI, 2010 WL 289181 (E.D. Cal. Jan. 15, 2010). Defendant was convicted of rape and murder and sentenced to death. After numerous appeals and petitions, defendant filed a request for an evidentiary hearing on a number of claims, including ineffective assistance of counsel. At trial, it was mentioned that defendant suffered from some organic brain damage, had a family history of alcoholism and substance abuse, and was genetically predisposed to alcoholism and depression. A PET scan of defendant’s brain was introduced, suggesting evidence of abnormal activity. Defendant’s ineffective assistance of counsel claim, and subsequently, his habeas corpus petition, were denied. Since the time **Berryman v. Ayers** was decided, the petitioner was granted a certificate of appealability on the issue of ineffective assistance of counsel for counsel’s failure to uncover evidence of Berryman’s dysfunctional family history. *See* Berryman v. Wong, 2010 U.S. Dist. LEXIS 9910, at *25-26 (E.D. Cal. Jan. 15, 2010).

**2008 Hodges v. Bell**, 548 F. Supp. 2d 485 (M.D. Tenn. 2008). Defendant was convicted of murder and sentenced to death. One of defendant’s claims on appeal was that the trial court had denied him funding for an expert in the field of genetic transmission of drug and alcohol dependency, in violation of defendant’s Eighth and Fourteenth Amendment rights. The court upheld the trial court’s denial of the expert services, stating that counsel was capable of presenting to the court information about the substance addictions, and the court was able to process that information without the need for an expert. The court denied petitioner’s habeas petition and dismissed his action with prejudice.
**Hall v. McPherson**, 663 S.E.2d 659 (Ga. 2008). Defendant was convicted of murder and theft and sentenced to death on the murder charge. Defendant applied for a writ of habeas corpus, alleging ineffective assistance of counsel for failure to present and investigate mitigating evidence. This evidence, presented at the habeas hearing, included testimony from a psychiatrist regarding defendant’s family tree, which indicated defendant’s genetic predisposition to substance dependence disorder. The habeas court vacated defendant’s death sentence, and the warden appealed. On appeal, the court upheld the habeas court’s vacation.

**Williams v. Norris**, No. 5:07cv00234 SWW, 2008 WL 4820559 (E.D. Ark. Nov. 4, 2008), *cert. denied*, 130 S. Ct. 403 (2009). Defendant was serving a life sentence for murder, kidnapping, robbery, theft, and arson when he escaped from prison and robbed and killed another victim. He was subsequently convicted of capital felony murder and theft of a vehicle and sentenced to death on the murder conviction. After his appeals and petitions for post-conviction relief were denied, defendant filed for habeas relief in federal court. There he asserted that counsel was ineffective for failing to introduce supporting documentation of mitigating evidence, including evidence of generational family dysfunction. The court denied habeas relief, finding that counsel presented a thorough and lengthy investigation of defendant’s social, physical, educational, and family history.

**2009**

**Brant v. State**, 21 So. 3d 1276 (Fla. 2009). Defendant was convicted of murder, sexual battery, burglary, kidnapping, and grand theft of a motor vehicle. He was sentenced to death on the murder charge. On appeal, defendant argued that his death sentence was disproportionate. At defendant’s trial, a forensic psychiatrist testified that defendant suffered from sexual sadism, a condition that normally arises from a combination of a genetic predisposition to sexual sadism and an unhealthy childhood environment. Defendant’s mother also testified to a family history of depression. A PET scan of defendant’s brain was produced at trial, indicating low activity in the areas governing impulse control and good judgment. Defendant’s death sentence was affirmed by the court, which found that the mitigating evidence did not outweigh the aggravating evidence.
**Simpson v. State**, 3 So. 3d 1135 (Fla. 2009). Defendant was convicted on two counts of murder and sentenced to death. Although not an issue on appeal, during the trial, defendant presented evidence from a psychiatrist who testified that defendant had a genetic predisposition to alcohol and substance abuse. The inheritance pattern and observation of violence during defendant’s youth made it twenty percent more likely that defendant would have a behavioral problem or become a criminal. The court reaffirmed defendant’s death sentence.

**Henry v. Ryan**, No. CV 02-656-PHX-SRB, 2009 WL 692356 (D. Ariz. Mar. 17, 2009). Defendant was convicted of first-degree murder, robbery, kidnapping, and theft, and was sentenced to death. In his third petition for post-conviction relief, defendant argued that his resentencing counsel had performed ineffectively by failing to obtain a complete life history and present mitigating evidence regarding defendant’s mental health. A presentence investigation report noted defendant’s family history of schizophrenia and defendant’s own schizophrenic symptoms. Since the information had been available at presentencing, the court denied relief.

**Jones v. Ryan**, 583 F.3d 626 (9th Cir. 2009), vacated, remanded by, Ryan v. Jones, 131 S. Ct. 2091 (2011). Defendant was convicted on two counts of murder and one count of attempted murder and sentenced to death. Defendant filed a petition for post-conviction relief, claiming ineffective assistance of counsel because of counsel’s failure to: hire a mental health expert, move for neurological and neuropsychological testing, and present additional mitigating witnesses and evidence. The petition was denied, and defendant appealed. On appeal, one of the mitigating factors considered by the court was defendant’s longstanding substance abuse problem that may have been caused by genetic factors and further aggravated by head trauma. The court agreed that defendant’s counsel was ineffective, reversed the district court’s decision, and remanded with instructions to issue a writ of habeas corpus. The U.S. Supreme Court later reversed and remanded the decision in light of **Cullen v. Pinholster**, 131 S. Ct. 1388 (2011).
**Rienhardt v. Ryan**, 669 F. Supp. 2d 1038 (D. Ariz. 2009). Defendant was convicted of kidnapping, attempted transfer of a dangerous drug, attempted arson, and first-degree murder. He was sentenced to death on the murder charge. On appeal, defendant argued that his counsel performed ineffectively at sentencing in violation of his rights under the Sixth, Eighth, and Fourteenth Amendments. Counsel had failed to conduct a mitigation investigation to advise him on whether to present mitigation, and to present any mitigation evidence. The documents contained in defendant’s presentence report included such information as defendant’s social history, childhood details, education, family background, employment history, and alcohol and drug abuse. The court found that defendant failed to demonstrate prejudice.

**Woodall v. Simpson**, No. 5:06-CV-P216-R, 2009 WL 464939 (W.D. Ky. Feb. 24, 2009). Defendant was convicted of kidnapping, rape, and murder, and sentenced to death. Defendant then filed a writ of habeas corpus to the district court, citing thirty errors, multiple of which were based on an ineffective assistance of counsel claim. Part of this claim alleged that counsel was ineffective for failing to present a genetic defect defense, and neglecting to link defendant’s mental state to his genetic history. The court held on this claim that the jury could have inferred that defendant’s family had a genetic history of mental problems. However, the court found that two other claims made by defendant warranted relief, and granted habeas on these claims. Defendant’s sentence was vacated and remanded to state trial court.

**Hall v. Quarterman**, No. 4:06-CV-436-A, 2009 WL 612559 (N.D. Tex. Mar. 9, 2009). Defendant was convicted of capital murder and sentenced to death. Following a series of appeals, the U.S. Supreme Court vacated the Texas Court of Criminal Appeals’ decision and remanded the case for reconsideration in light of *Atkins v. Virginia*, 536 U.S. 304 (2002). In defendant’s habeas action, the trial court ordered a hearing by way of affidavits on the issue of defendant’s mental retardation; on the basis of this hearing, the court concluded that the defendant was not mentally retarded. One of the affidavits contained the contested assertion that defendant demonstrated characteristics consistent with a genetic disorder. After subsequent appeals, the U.S. Court of Appeals for the Fifth Circuit vacated the district court’s judgment denying
habeas relief and remanded for further proceedings, including an evidentiary hearing. After a review of the record and an evidentiary hearing, the district court denied habeas relief.

2010 **Hawkins v. Wong**, No. CIV S-96-1155 MCE EFB DP, 2010 WL 3516399 (E.D. Cal. Sept. 2, 2010). Defendant was convicted of felony murder, attempted murder, and robbery, and then sentenced to death. Defendant claimed counsel provided ineffective assistance for failing to investigate and present mitigating evidence during the penalty phase of defendant’s trial. Defendant asserted such evidence would have shown that he was genetically predisposed to alcoholism and mental illness, and that his immediate family and generations before them demonstrated extraordinary pathology and dysfunction. A social historian could have testified about defendant’s family tree, which included many alcoholics, thereby indicating a genetic predisposition to alcoholism. The court allowed an evidentiary hearing on defendant’s ineffective assistance of counsel claim.

**Morris v. Malfi**, No. C 06-7409 SI, 2010 WL 2629738 (N.D. Cal. June 29, 2010), aff’d, 449 Fed. Appx. 686 (9th Cir. 2011). Defendant was convicted of carjacking and first-degree murder. In a petition for writ for habeas corpus, defendant claimed his due process rights were violated because he was tried while mentally incompetent. He also claimed for the first time that he suffered from paranoid delusions and schizophrenia. During the penalty phase of his trial, defendant submitted evidence of sustained head injuries in the frontal lobe of his brain, which governs impulse control. Defendant also submitted a 2009 declaration from a psychologist stating that defendant suffered from cognitive deficits and a genetic predisposition to chronic psychopathology. The psychologist also conducted neurological testing on defendant and found a “‘severe impairment of memory, judgment, insight, and other cognitive functions needed to understand legal proceedings and meaningfully assist counsel.’” *Id.* at *15 (quoting declaration). The court denied the writ of habeas corpus on the basis that the new evidence did not raise real questions of defendant’s competence at the time of the crime, but issued a certificate of appealability.

**Creech v. Hardison**, No. CV 99-0224-S-BLW, 2010 WL 1338126 (D. Idaho Mar. 31, 2010). Defendant was serving two life sentences for murder when he murdered another
prisoner. He was convicted of this murder and sentenced to death. He petitioned for a writ of habeas corpus, but at his resentencing hearing, the court found that the aggravating factors outweighed the mitigating factors and reaffirmed defendant’s death sentence. Defendant claimed ineffective assistance of counsel at resentencing for counsel’s failure to conduct a reasonable mitigation investigation. At the resentencing hearing, a psychologist testified that defendant might have a biological or genetic predisposition for violence. On appeal from the resentencing court’s judgment, defendant introduced new evidence showing he had “‘bilateral brain damage that affected [his] insight, judgment and capacity to exercise social inhibitions.’” *Id.* at *14 (alteration in original) (quoting docket). The district court dismissed his claims and denied reconsideration, but issued a certificate of appealability.

**Allison v. Cullen**, 725 F. Supp. 2d 924, No. CV 92-06404 CAS, 2010 U.S. Dist. LEXIS 82957 (C.D. Cal. July 22, 2010). Defendant and his co-conspirator were tried separately in the home invasion and murder of the victim. Defendant was convicted and sentenced to death. Defendant applied for a writ of habeas corpus alleging ineffective assistance of counsel for counsel’s failure to investigate and present mitigating evidence during his trial. While most of this evidence focused on defendant’s traumatic childhood, one expert witness stated that defendant might have a genetic predisposition to alcoholism, substance abuse, and mental illness. There was widespread alcoholism on the defendant’s mother’s side of the family, as well as depression and alcoholism on his father’s side of the family. The court vacated the death sentence and granted relief for defendant’s ineffective assistance of counsel claim.

**Detrich v. Ryan**, 619 F.3d 1038 (9th Cir. 2010), *vacated, remanded by*, Ryan v. Detrich, 131 S. Ct. 2449 (2011). Defendant faced the death sentence for murder, kidnapping, and sexual abuse. Defendant claimed that counsel provided ineffective assistance for failing to present mitigating evidence. Defendant presented evidence of head injuries and expert witnesses who testified that defendant had neuropsychological deficits (some of which may have been inherited) that prevented him from controlling his impulses. The Court of Appeals found that failure to include evidence of defendant’s
neuropsychological damage, along with his abusive and traumatic childhood, constituted ineffective assistance of counsel. Defendant’s death sentence was vacated and his case was remanded to the district court. The U.S. Supreme Court later reversed and remanded the case in Ryan v. Detrich, 131 S. Ct. 2449 (2011), in light of Cullen v. Pinholster, 131 S. Ct. 1388 (2011).

Ex parte Smith, __ So.3d __, No. 1080973, 2010 WL 4148528 (Ala. Oct. 22, 2010). Defendant was convicted of three counts of murder and sentenced to death. The issue on appeal was whether defendant was mentally retarded and therefore ineligible for the death penalty. Defendant claimed he had a genetic predisposition for mental retardation and that five of his family members suffered from the same condition. The trial court had held an Atkins hearing (pursuant to Atkins v. Virginia, 536 U.S. 304 (2002)), and concluded that defendant was not mentally retarded. The Alabama Supreme Court affirmed the trial court but remanded the case based on another issue.

Keough v. State, No. W2008-01916-CCA-R3-PD, 2010 WL 2612937 (Tenn. Crim. App. June 30, 2010), vacated, 356 S.W.3d 366 (Tenn. 2011). Defendant was convicted of first-degree murder of his wife and attempted murder of his neighbor, and sentenced to death. He applied for post-conviction relief on the basis of ineffective assistance of counsel for counsel’s failure to investigate further into his mental state. At the post-conviction hearing, a specialist in addiction medicine testified that alcoholism was genetically inherited and that defendant had a family history of alcoholism. When the petition was denied, defendant appealed to the Court of Criminal Appeals of Tennessee. The court affirmed defendant’s convictions and death sentence, stating that the additional evidence would not have changed the outcome of the case. The Tennessee Supreme Court then vacated the Court of Criminal Appeals’ judgment after finding a state statute governing cross examination in post-conviction procedures was violated.

filed a petition under the Post Conviction Relief Act in which he sought in part to vacate the death penalty and impose a sentence of life on the ground that he was mentally retarded and could not be executed under U.S. Const. amend. VIII. At his post-conviction relief hearing, both the defense and the Commonwealth presented expert witnesses regarding the issue of whether or not defendant had mental retardation. The court held that defendant had mental retardation based on three criteria: limited intellectual functioning, significant adaptive limitations, and onset prior to age 18. In addition to these three criteria, defendant had submitted other evidence that supported his claim of mental retardation: brain damage, severe childhood abuse, genetic predisposition to mental retardation, lack of maternal prenatal care, and poor nutrition during defendant’s developmental years. Citing *Atkins v. Virginia*, 536 U.S. 304 (2002), the court granted the portion of defendant’s petition seeking to vacate the death penalty and impose a sentence of life imprisonment.

**Purkey v. United States.** No. 06-8001-CV-W-FJG, 2010 WL 4386532 (W.D. Mo. Oct. 28, 2010). Defendant was convicted of kidnapping, rape, and murder, and then sentenced to death. After several appeals, defendant sought a certificate of appealability on four issues, one of which was whether he was denied effective assistance of counsel due to his counsel’s failure to adequately investigate and present available mitigating evidence. Mitigating evidence introduced included evidence of brain injuries and a genetic predisposition to alcoholism and substance abuse. The court found that it was not reasonably possible that the testimony of additional witnesses would have swayed a change in a juror’s vote, and denied the certificate of appealability.

**Darling v. Sec’y.** No. 6:07-cv-1701-Orl-31GJK, 2010 WL 2471441 (M.D. Fla. June 17, 2010), *cert. denied*, Darling v. McNeil, 131 S. Ct. 1492 (2011). Defendant was convicted of murder and sexual battery, and sentenced to death on the murder charge. After numerous appeals and petitions for post-conviction relief, defendant filed a writ of habeas corpus for ineffective assistance of counsel for counsel’s failure to submit mitigating evidence of defendant’s abuse and frontal lobe brain damage. Defendant’s evidentiary hearing provided expert witness testimony that defendant suffered from neuropsychological cognitive dysfunction, and that defendant’s
brain damage limited his ability to inhibit his behavior. The court found, however, that counsel’s investigation of mitigating evidence was reasonable. Although counsel did not know of the neurological damage, counsel had presented evidence that defendant’s father was an alcoholic and defendant had an abusive childhood. Furthermore, it was questionable whether defendant had neurological damage. The writ of habeas corpus was denied.

**Turner v. Epps**, No. 4:07CV77-WAP, 2010 WL 653880 (N.D. Miss. Feb. 19, 2010). Defendant was convicted on two counts of capital murder and sentenced to death. Defendant submitted a writ of habeas corpus after his appeal and petition for post-conviction relief were unsuccessful. One of defendant’s claims turned on ineffective assistance of counsel for counsel’s failure to present mitigating evidence during the sentencing phase of the trial. Defendant claimed that counsel did not investigate or present evidence of defendant’s depressive disorders, family history of mental illness, or genetic predisposition to mental illness. The court denied defendant’s petition for habeas relief.

**Worthington v. Roper**, 631 F.3d 487 (8th Cir. 2011), cert. denied, 132 S. Ct. 763 (2011) Defendant was convicted of rape, murder, and burglary of his neighbor and sentenced to death on the murder charge. After a number of appeals, defendant applied for a writ of habeas corpus, claiming ineffective assistance of counsel for failure to investigate and present a more detailed social history. The medical history he wished to present included evidence of a genetic predisposition to and family history of depression, bipolar disorder, schizophrenia, and inherited brain dysfunction. The court ruled that the trial counsel’s decision to forgo presentation of this evidence was informed and strategic.

**Rhoades v. Henry**, 638 F.3d 1027 (9th Cir. 2011). Defendant was convicted of kidnapping, robbery, and murder, and then sentenced to death. On appeal, defendant claimed that trial counsel was ineffective in failing to conduct or complete an investigation that would have uncovered mitigating evidence about the defendant’s youth in a family context of physical and emotional violence, drugs, alcohol, and sexual abnormality. Defendant submitted a 1,000 page proffer that included assessments from both a neuropsychologist and a neurologist. According to both experts, the alcoholism and
suicides in defendant’s family very likely played a genetic role in the mental and emotional health of defendant. Defendant was genetically loaded for substance abuse, and he had inherited the diseases of alcoholism and drug abuse. The court expressed skepticism about the genetics evidence and its ability to shed light into the defendant’s state of mind at the time of the crime. Ultimately, the court determined that the mitigating factors would not have made a difference in the actual outcome of the cases and affirmed defendant’s convictions and death sentence.

**Cullen v. Pinholster**, 131 S. Ct. 1388 (2011). Defendant was convicted of murder and sentenced to death. Defendant was eventually granted habeas relief on his ineffective assistance of counsel claim for counsel’s failure to investigate and present mitigating evidence. Evidence that should have been presented included family members’ criminal, mental, and substance abuse problems, and defendant’s medical and mental health history (such as his epileptic disorder). The prison warden challenged the judgment, and the U.S. Supreme Court reversed the judgment, holding that counsel had investigated the mitigating evidence.

**Commonwealth v. Gibson**, 19 A.3d 512 (Pa. 2011). Defendant was convicted of murder and sentenced to death in a 1997 trial. Defendant was later granted post-conviction relief on the basis of ineffective assistance of counsel. The Commonwealth appealed. At the 2009 evidentiary hearing, a forensic psychiatrist referenced a multi-generational pattern of alcohol abuse in support of defendant’s claim of genetic predisposition to substance abuse. The court concluded that the new evidence would not have affected the outcome. Defendant’s post-conviction relief petition was denied.