

Behavioral Genetics and the Punishment of Crime

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Behavioral genetics would seem to have little impact on the daily work of most mental health professionals, attorneys, judges, and others involved in the criminal justice system. Arcane research findings, often not replicated, that suggest some link between genes and the propensity to commit criminal acts are currently of dubious relevance to a system that struggles simply to provide basic justice to a complex mix of criminal defendants. Recent research findings, however, suggest that behavioral genetics may be the next frontier for the world of criminal justice, and mental health professionals are likely to play a critical role in helping the courts make sense of the new data.

Of course, claims that hereditary factors play a causal role in the genesis of criminal behavior are hardly new. Late 19th- and early 20th-century theories of crime relied heavily on now-discredited beliefs that offenders who manifested hereditary degeneration, which was believed to be apparent by their physiognomy and low intelligence, were responsible for a majority of criminal acts (1). In the 1960s and 1970s men who carried an extra Y chromosome—the so-called XYY syndrome—were thought to be at increased risk of violence, another subsequently disproven contention (2). The latest findings on a connection between genetic predispositions and violent

crime, however, are much more sophisticated and are already stirring considerable interest in the legal literature.

A 1993 report in the respected journal *Science* described a Dutch kindred in which several males exhibited a syndrome of borderline mental retardation and “abnormal behavior, including disturbed regulation of impulsive aggression” (3). They were found to have a complete absence of activity of the enzyme monoamine oxidase A (MAOA), which breaks down many of the brain’s key neurotransmitters. Genetic analysis revealed that the affected men carried a mutation on the X chromosome in the gene that codes for MAOA. As intriguing as this finding was, it seemed to be of limited import for a general understanding of genetic factors affecting violence, because complete absence of MAOA activity was clearly rare.

Just under a decade later, however, *Science* published another paper that extended the scope of the MAOA findings. This time the data came from a major longitudinal study of a birth cohort of 1,037 children in Dunedin, New Zealand. The participants had first been assessed at three years of age and had just completed their ninth follow-up at the age of 26 years (4). Because mutations that lead to an absence of MAOA activity were unlikely to be present, the researchers examined 442 males in the group for differences in the promoter region of the gene, which determines how strongly the gene is expressed (that is, how much MAOA is produced). And rather than merely looking at the effect of MAOA levels on criminal behavior, the investigators explored the

interactions of the participants’ genetic endowments with their environmental circumstances. Specifically, the researchers were interested in how experiences of maltreatment between the ages of three and 11 years affected the later antisocial propensities of participants with either a high or low MAOA activity.

Using four separate measures of antisocial behavior, including convictions for violent crime, the research team found that each measure was significantly increased in the group that had both low MAOA activity and a history of severe maltreatment. In contrast, for participants with high levels of MAOA, no significant increase was found in any of the antisocial measures, even when they had experienced the same level of maltreatment. The overall impact of this gene-environment interaction can be judged from the fact that the 12 percent of the cohort that had both low MAOA and maltreatment accounted for 44 percent of the cohort’s convictions for violent crime. Looked at somewhat differently, 85 percent of the males with both risk factors developed some form of antisocial behavior.

It did not take long for the Dunedin data to be noticed by the legal community and for the potential impact of these findings on the criminal process to become the object of intense speculation (5,6). The elegance of the Dunedin data notwithstanding, it is worth underscoring that the results will, as the authors themselves noted, require replication before being accepted as established fact. However, whether or not the Dunedin findings stand up to scrutiny, it seems likely that with continued advances in behavioral ge-

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netics we will at some point be able to identify genes that combine with environmental stimuli to predispose persons to increased rates of criminality, including violence.

One important question for the criminal justice system, therefore, concerns the applicability of the MAOA data and similar findings for determining criminal responsibility. Anglo-American law has created categories that excuse defendants from culpability when their capacity to choose their behaviors is significantly impaired. The insanity defense and the defense of automatism are two well-known examples. If mental disorders that impair the understanding or appreciation of wrongfulness or the ability to control behavior negate culpability, why should genetic determinants (for example, low MAOA activity) with similar consequences not have the same effect? Indeed, one author has already proposed a defense of “genetic determinism” that would work in this way (7).

This would not be the first time that courts have had to grapple with such claims. In the 1970s several defendants attempted to introduce evidence of their XYY status in an effort to negate their culpability. Courts uniformly rejected the defense, but the grounds for their decisions varied. Their rulings were based alternatively on the conclusions that only a showing of legal insanity would excuse the defendant, that XYY syndrome did not constitute a requisite “mental disease or defect,” that evidence demonstrating a causal link between XYY and violence was not sufficiently certain to be admitted, and that even if XYY predisposed a defendant to violence, it was not possible to show that any particular behavior was linked conclusively to the genetic abnormality (8). Taken as a whole the XYY decisions reflect the deeply inbred skepticism of the criminal law for nonculpability defenses. Substantial hurdles must be overcome to convince any court that someone who committed a proscribed act should not be punished for it.

What then is the future of nonculpability defenses that are based on

genetic variables such as low MAOA, combined with relevant environmental factors like severe childhood maltreatment? The very nature of genetic evidence will likely make it difficult to meet traditional standards for exculpation. One can imagine that most relevant genetic data will demonstrate an increased predisposition among people with a particular combination of genetic and experiential factors to engage in violent and other criminal behavior but will not be able to establish a definitive causal link between the genetic defect and the defendant’s act. Genetic data will probably be inadequate to meet criteria for an insanity defense and may not even be sufficient to satisfy more lenient approaches, such as the proposed defense of genetic determinism. Genetic data may even run afoul of standards for admissibility of evidence, because guidelines such as the Federal Rules of Evidence exclude testimony aimed solely at demonstrating that the defendant has a propensity to behave in a particular way. Successful defenses based on genetic factors are not very likely.

Even if genetic predispositions are not exculpatory, they might be seen as mitigating and be taken into account at sentencing. Indeed, a convicted murderer in Georgia tried to take advantage of the potential mitigating effect of genetic data soon after the Dutch study first documented a link between the absence of MAOA and violence (9). Although the Georgia courts declined to authorize the prisoner to be tested for MAOA activity at state expense to establish a basis for appealing his death sentence—probably because he offered no basis to believe that he might have the rare condition reported in the Netherlands—many more such requests can be anticipated in the wake of the dissemination of the Dunedin data. Oddly, at present no reported cases exist in which genetic data of any sort have been cited as the basis for mitigation at criminal sentencing. The most widely discussed case is of questionable relevance; the Supreme Court of California overturned the disbar-

ment of an attorney, noting that evidence that he had not been told of his “genetic predisposition to addiction” was mitigating—although what role this comment really played in the Court’s decision is unclear (10).

Should genetic propensities mitigate punishment for criminal behavior? The answer to that question depends in part on whether one believes that factors reducing but not eliminating one’s capacity for self-control ought to reduce moral responsibility for one’s behavior. Moral philosophers differ on this question, with some requiring an impairment of normal deliberative processes or at least a repudiation of the desires that the person finds difficult to control before they would accept an argument for mitigation (6). In the end utilitarian considerations are likely to determine how the courts deal with this issue. Unlike most mental illnesses, genetic propensities for criminality are currently not treatable. Hence, no clear means exists of reducing the risk presented by these defendants. That leaves defense attorneys with the rather unpersuasive argument that because their clients are more likely than most people to offend—and presumably to reoffend—as a result of their genetic endowment, they should be sentenced more leniently. Until effective interventions emerge for any condition that serves as the basis for a genetic claim for leniency, such arguments are not likely to make much headway in the courts.

Although I have focused on the use of genetic information for mitigating punishment, it is worth noting that its impact at sentencing might run in the opposite direction as well. Whether prosecutors can introduce genetic evidence of a predisposition to criminality as an aggravating factor that should lead to more severe punishment is an open question. In a small number of states, such as Texas, which require prosecutors to establish that defendants are likely to commit future acts of violence before the jury can impose a death sentence, one can imagine prosecution efforts to introduce MAOA levels in support of that contention. The power of the state to test a defendant’s

genetic profile without his or her consent is another issue that may well be subject to future litigation.

We stand, in all likelihood, at the threshold of an era in which we will see progressive growth in our knowledge of the genetic bases of behavior. Genes that alone or in combination with environmental influences put persons at high risk of violence and other crimes will be identified. Faced with that prospect, it would behoove us to think through now how we believe our criminal justice system should be responding to the inevitable dilemmas that will arise. ♦

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