Seeking the Criminal Element

by W. Wayt Gibbs, *staff writer*

Scientists are homing in on social and biological risk factors that they believe predispose individuals to criminal behavior. The knowledge could be ripe with promise—or rife with danger

BRUCE DAVIDSON *Magnum Photos*

TEXAN TEENS playing with gang signs and loaded guns are acting their age—most adolescents dabble in delinquency for several years. But a small fraction grow into the chronic felons that commit the majority of violent crimes. Can scientists identify the dangerous few before they attack—and if so, what then?

Imagine you are the father of an eight-year-old boy," says psychologist Adrian Raine, explaining where he believes his 17 years of research on the biological basis of crime is leading. "The ethical dilemma is this: I could say to you, 'Well, we have taken a wide variety of measurements, and we can predict with 80 percent accuracy that your son is going to become seriously violent within 20 years. We can offer you a series of biological, social and cognitive intervention programs that will greatly reduce the chance of his becoming a violent offender.'

"What do you do? Do you place your boy in those programs and risk stigmatizing him as a violent criminal even though there is a real possibility that he is innocent? Or do you say no to the treatment and run an 80 percent chance that your child will grow up to (a) destroy his life, (b) destroy your life, (c) destroy the lives of his brothers and sisters and, most important, (d) destroy the lives of the innocent victims who suffer at his hands?"

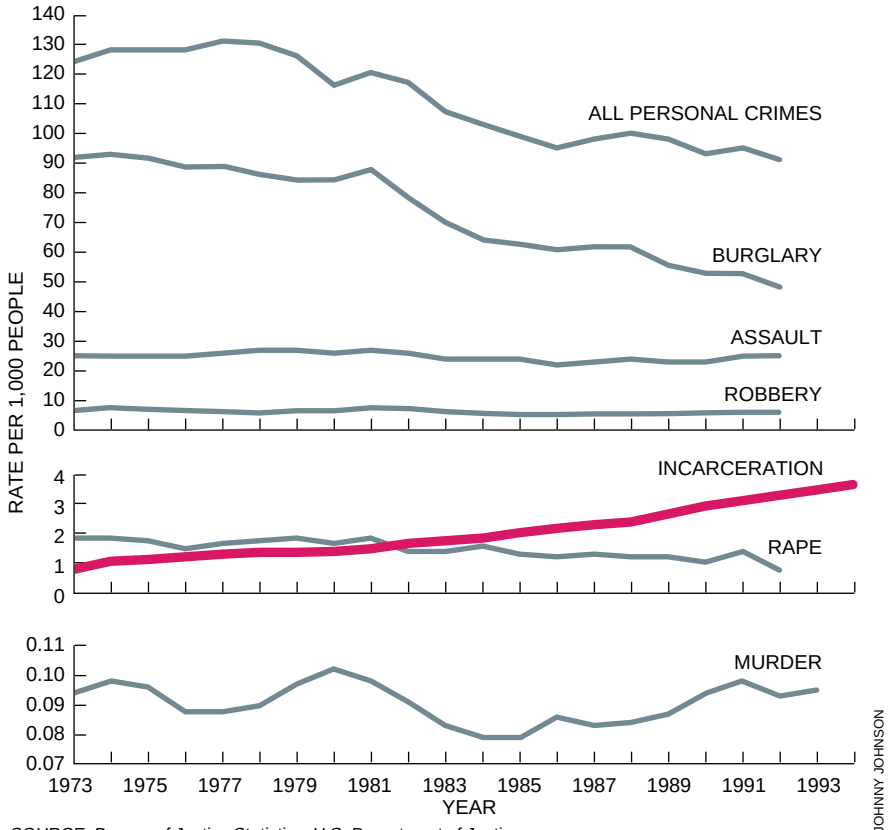
For now, such a Hobson's choice is purely hypothetical. Scientists cannot yet predict which children will become dangerously aggressive with anything like 80 percent accuracy. But increasingly, those who study the causes of criminal and violent behavior are looking beyond broad demographic characteristics such as age, race and income level to factors in individuals' personality, history, environment and physiology that seem to put them—and society—at risk. As sociologists reap the benefits of rigorous long-term studies and neuroscientists tug at the tangled web of relations between behavior and brain chemistry, many are optimistic that science will identify markers of maleficence. "This research might not pay off for 10 years, but in 10 years it might revolutionize our criminal justice system," asserts Roger D. Masters, a political scientist at Dartmouth College.

"With the expected advances, we're going to be able to diagnose many people who are biologically brain-prone to violence," claims Stuart C. Yudofsky, chair of the psychiatry department at Baylor College of Medicine and editor of the *Journal of Neuropsychiatry and Clinical Neurosciences.* "I'm not worried about the downside as much as I am encouraged by the opportunity to prevent tragedies—to screen people who might have high risk and to prevent them from harming someone else." Raine, Yudofsky and others argue that in order to control violence, Americans should trade their traditional concept of justice based on guilt and punishment for a "medical model" based on prevention, diagnosis and treatment.

But many scientists and observers do worry about a downside. They are concerned that some researchers underplay the enormous complexity of individual behavior and overstate scientists' ability to understand and predict it. They also fear that a society desperate to reduce crime might find the temptation to make premature or inappropriate use of such knowledge irresistible.

Indeed, the history of science's assault on crime is blemished by instances in which incorrect conclusions were used to justify cruel and unusual punishments. In the early 1930s, when the homicide rate was even higher than it is today, eugenics was in fashion. "The eugenics movement was based on the idea that certain mental illness and criminal traits were all inherited," says Ronald L. Akers, director of the Center for Studies in Criminology and Law at the University of Florida. "It was based on bad science, but they thought it was good science at the time." By 1931, 27 states had passed laws allowing compulsory sterilization of "the feeble-minded," the insane and the habitually criminal.

Studies in the late 1960s—when crime was again high and rising—revealed that many violent criminals had an extra Y chromosome and thus an extra set of "male" genes. "It was a dark day for science in Boston when they started screening babies for it," recalls Xandra



SOURCE: Bureau of Justice Statistics, U.S. Department of Justice

CRIME RATES have not responded consistently to "get tough" approaches to incarceration. Since the early 1970s the proportion of Americans behind bars has more than tripled. Property crime (including burglary, robbery and personal larceny) has dropped about 30 percent, but violent crime remains high.

O. Breakefield, a geneticist at Massachusetts General Hospital. Subsequent studies revealed that although XYY men tend to score lower on IQ tests, they are not unusually aggressive.

False Positive ID

Social science studies on the causes of crime have been less controversial, in part because they have focused more on populations than on individuals. But as consensus builds among criminologists on a few key facts, researchers are assembling these into prediction models that try to identify the juveniles most likely to lapse into delinquency and then into violent crime.

Perhaps their most consistent finding is that a very small number of criminals are responsible for most of the violence. One study tracked 10,000 males born in Philadelphia in 1945 for 27 years; it found that just 6 percent of them committed 71 percent of the homicides, 73 percent of the rapes and 69 percent of the aggravated assaults attributed to the group.

Preventing just a small fraction of adolescent males from degenerating into chronic violent criminals could thus make a sizable impact on the violent crime rate, which has remained persistently high since 1973 despite a substantial decline in property crime. (Females accounted for only 12.5 percent of violent crime in 1992.) "For every 1 percent that we reduce violence, we save the country $1.2 billion," Raine asserts.

The problem, says Terrie E. Moffitt, a psychologist at the University of Wisconsin who is conducting long-term delinquency prediction studies, is that "a lot of adolescents participate in antisocial behavior"—87 percent, according to a survey of U.S. teens. "The vast majority desist by age 21," she says. The dangerous few "are buried within that population of males trying out delinquency. How do you pick them out? Our hypothesis is that those who start earliest are at highest risk."

Marion S. Forgatch of the Oregon Social Learning Center tested that hypothesis on 319 boys from high-crime neighborhoods in Eugene. Last November at the American Society of Criminology meeting, she reported her findings: boys who had been arrested by age 14 were 17.9 times more likely to become chronic offenders than those who had not, and chronic offenders were 14.3 times more likely to commit violent offenses. "This is a good way of predicting," she says.

Good is a relative term. For if one were to predict that every boy in her study who was arrested early would go on to commit violent crimes, one would be wrong more than 65 percent of the time. To statisticians, those so misidentified are known as false positives. "All of these predictors have a lot of false positives—about 50 percent on average," says Akers, who recently completed a survey of delinquency prediction models. Their total accuracy is even lower, because the models also fail to identify some future criminals.

The risk factors that Akers says researchers have found to be most closely associated with delinquency are hardly surprising. Drug use tops the list, followed by family dysfunction, childhood behavior problems, deviant peers, poor school performance, inconsistent parental supervision and discipline, separation from parents, and poverty. Numerous other controlled studies have found that alcoholism, childhood abuse, low verbal IQ and witnessing violent acts are also significant risk factors. Compared with violent behavior, however, all these experiences are exceedingly common. The disparity makes it very difficult to determine which factors are causes and which merely correlates.

Preventive Intervention

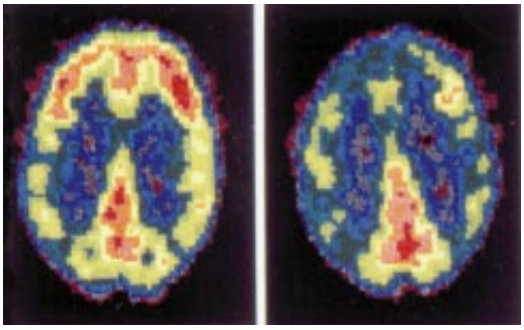
The difference is important, notes Mark W. Lipsey of Vanderbilt University, because "changing a risk factor if it is not causal may have no impact," and the ultimate goal of prediction is to stop violence by intervening before it begins. Unfortunately, improvements in predictive models do not necessarily translate into effective intervention strategies. Lipsey recently analyzed how well some 500 delinquency treatment programs reduced recidivism. "The conventional wisdom that nothing works is just wrong," he concludes. But he concedes that "the net effect is modest"—on average, 45 percent of program participants were rearrested, versus 50 percent of those left to their own devices. Half of that small apparent improvement, he adds, may be the result of inconsistency in the methods used to evaluate the programs.

Some strategies do work better than others, Lipsey discovered. Behavioral programs that concentrated on teaching job skills and rewarding prosocial attitudes cut rearrest rates to about 35 percent. "Scared straight" and boot camp programs, on the other hand, tended to increase recidivism slightly.

Patrick H. Tolan of the University of Illinois at Chicago has also recently published an empirical review of delinquency programs. To Lipsey's findings he adds that "family interventions have repeatedly shown efficacy for reducing antisocial behavior and appear to be among the most promising interventions to date." According to Forgatch, two experiments in Eugene, Ore., showed that teaching parents better monitoring and more consistent, less coercive discipline techniques reduces their kids' misbehavior. "We should make parenting skills classes compulsory for high school students," argues Raine of the University of Southern California.

Unfortunately, Tolan observes, family intervention is difficult and rarely attempted. The most common kinds of programs—counseling by social workers, peer mediation and neighborhood antiviolence initiatives—are hardly ever examined to see whether they produce lasting benefits. "It usually is hard to imagine that a good idea put into action by well-meaning and enlightened people cannot help," he noted in the paper. "It may seem that any effort is better than nothing. Yet our review and several of the more long-term and sophisticated analyses suggest that both of these assumptions can be dangerously wrong. Not only have programs that have been earnestly launched been ineffective, but some of our seemingly best ideas have led to worsening of the behavior of those subjected to the intervention."

Many researchers are thus frustrated that the Violent Crime Control and Law Enforcement Act of 1994 puts most of its $6.1 billion for crime prevention in untested and controversial programs, such as "midnight basketball" and other after-school activities. "Maybe these programs will help; maybe they won't," Tolan says. "No one has done a careful evaluation." The Crime Act does not insist that grant applicants demonstrate or even measure the effectiveness of their approach. For these and other reasons, Republicans vowed in their "Contract with America" to repeal all prevention programs in the Crime Act and to increase funding for prison construction. But that strategy also ignores research. "We do know," Tolan asserts, "that locking kids up will not reduce crime and may eventually make the problem worse."

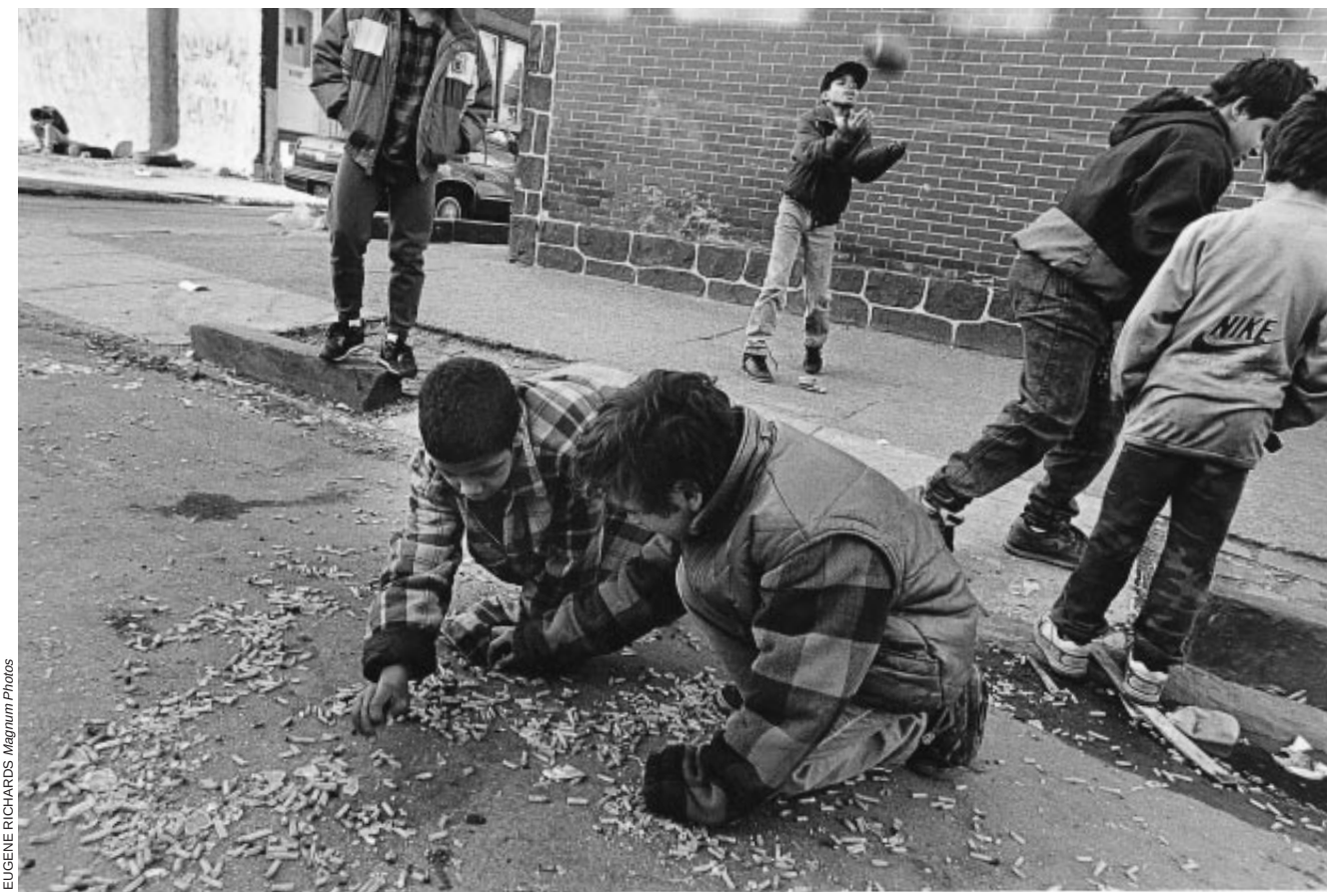


ADRIAN RAINE AND MONTE S. BUCHSBAUM

BRAIN OF MURDERER (*right*) shows less activity in the frontal cortex (*top third of image*) than the brain of a nonviolent subject of the same age and sex. In one study of 22 murderers, about 75 percent had low frontal activity, which is believed to indirectly regulate aggressive impulses.

All in Our Heads?

The failure of sociology to demonstrate conclusively effective means of controlling violent crime has made some impatient. "There is a growing recognition that we're not going to solve



EUGENE RICHARDS *Magnum Photos*

POOR PARENTAL SUPERVISION is a major risk factor for later delinquency. These children in Philadelphia play with empty crack cocaine vials. Parent training programs have been among the most successful in reducing kids' antisocial behavior.

The Tangled Roots of Violence

The failure of expensive prison booms and welfare programs to beat back the historically high violent crime rates of the past 20 years has prepared fertile ground for new approaches to crime control. Encouraged by research that tentatively links a few instances of antisocial aggression with biological abnormalities, some politicians and activists are turning to science, perhaps too hastily, to identify and treat those who are likely to become dangerous.

Take the case of Everett L. "Red" Hodges, a California oilman who has spent more than $1 million to support research that implicates the trace metal manganese as a marker for violent criminal behavior. Hodges was struggling to tame a delinquent son in 1984 when he came across a *Science News* story on a study that had found high levels of lead, cadmium and copper in the head hair of violent felons.

Intrigued, Hodges offered funding to Louis A. Gottschalk, a psychiatrist at the University of California at Irvine, to conduct a controlled study to replicate the results. Analysis of hair clipped from convicted and accused felons at a prison and two county jails in southern California revealed no unusual levels of lead, cadmium or copper. But Gottschalk did find that average levels of manganese were about 3.6 times higher in the alleged felons than in men of similar age and race at local barbershops. "A new paradigm is opening in criminal justice," Hodges says, beaming. "It's a marker."

That judgment may be premature. Critics of Gottschalk's research, published in 1991 in a psychiatric (rather than a nutrition) journal, point out that average manganese levels varied from 2.2 parts per million in the prisoners to just 0.71 in one of the groups of jail inmates. Previous studies had found *lower* manganese levels in inmates than in control subjects. Skeptics also note that Gottschalk threw a wide net, measuring levels of 23 trace metals. "If you look at enough variables, you're bound to find a statistically significant association," comments Curtiss D. Hunt of the Grand Forks Human Nutrition Research Center in North Dakota. "But it may be meaningless." Hunt adds that the concentration of a metal in the hair does not tell one how much is

KELLY NEWS AND ENTERTAINMENT *KCRA, Sacramento*

any problem in society using just one discipline," says Diana Fishbein, a professor of criminology at the University of Baltimore. "Sociological factors play a role. But they have not been able to explain why one person becomes violent and another doesn't."

Some social scientists are looking to psychiatrists, neurologists and geneticists to provide answers to that question, ready or not. "Science must tell us what individuals will or will not become criminals, what individuals will or will not become victims, and what law enforcement strategies will or will not work," wrote C. Ray Jeffery, a criminologist at Florida State University, last year in the *Journal of Research in Crime and Delinquency*.

As medical researchers have teased out a few tantalizing links between brain chemistry, heredity, hormones, physiology and assaultive behavior, some have become emboldened. "Research in the past 10 years conclusively demonstrates that biological factors play some role in the etiology of violence. That is scientifically beyond doubt," Raine holds forth. The importance of that role is still very much in doubt, however.

As with social risk factors, no biological abnormality has been shown to *cause* violent aggression—nor is that likely except in cases of extreme psychiatric disorder. But researchers have spotted several unusual features, too subtle even to be considered medical problems, that tend to appear in the bodies and brains of physically aggressive men. On average, for example, they have higher levels of testosterone, a sex hormone important for building muscle mass and strength, among other functions. James M. Dabbs, Jr., of Georgia State University has found in his experiments with prison inmates that men with the highest testosterone concentrations are more likely to have committed violent crimes. But Dabbs emphasizes that the link is indirect and "mediated by numerous social factors," such as higher rates of divorce and substance abuse.

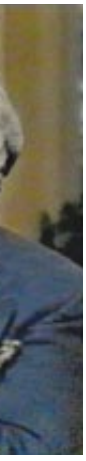
"Low resting heart rate probably rep-

EUGENE RICHARDS *Magnum Photos*

SINS OF THE PARENT are often visited on the child. Delinquents are more likely to have parents who abuse drugs or alcohol, commit crimes or beat them. But risk factors are generally poor predictors: most children of such parents do not become chronic criminals.

in the blood or the brain. "We know so little about manganese's role in the body that we haven't even set an RDA [recommended daily allowance] for it."

Hodges remains convinced he is on the right track. "Violence can be detected and treated," he argues. In 1987 a mugger fractured the skull of another of Hodges's sons. That year Hodges founded the Violence Research Foundation (VRF) to lobby public officials to experiment with treatment programs that use what he calls "the power of nutrition" to pacify violent criminals.



The VRF found an ally in Senator Robert Presley of California, who pushed through a bill in 1989 authorizing a study of male prisoners by Stephen Schoenthaler of California State University at Stanislaus. In the first part of the study, 402 offenders were divided randomly into three groups and given vitamin-mineral supplements equivalent to the RDA, three times the RDA or a placebo. Preliminary results showed that rule violations among the first group dropped 38 percent during the study. Strangely, the behavior of inmates getting the higher dose did not improve significantly, and violations rose 20 percent among the placebo group.

Although encouraging, the equivocal results are so inconclusive that Schoenthaler has decided not to publish them until he completes further studies with more controls. Hodges, however, has publicized the results widely at conferences and on television talk shows (*left*), much to the scientist's annoyance. "We have asked that all reports on the study be embargoed until the final paper goes through the peer-review process," Schoenthaler says, "but he [Hodges] continues to make an example of it."

With two studies in hand, Hodges has redirected his crusade to Washington. "What we need is a leap of faith from the Justice Department," he says. So he has begun searching for converts. Hodges claims to have the support of former attorney general Edwin Meese, with whom he has met several times, and Senator Tom Harkin of Iowa. "I have an invitation from [Utah senator] Orrin G. Hatch to come up to Washington as soon as he becomes chairman of the Judiciary Committee," Hodges stated in December. A member of Hatch's staff says that Hodges's "material is under review, but no agreements have been made yet."

Trace element deficiencies are just one of many frequently cited but poorly demonstrated claims that nutritional problems can cause criminal and violent behavior. A 1992 report by the Federal Bureau of Prisons stated that correctional facilities in 46 states have incorporated a wide array of dietary intervention and testing programs, even though "such programs are perceived by many physicians, scientific researchers, registered dietitians, and other health care professionals as an incorporation of food faddism into public policy."

—Steven Vames and W. Wayt Gibbs

resents the best replicated biological correlate of antisocial behavior," Raine observes, pointing to 14 studies that have found that problem children and petty criminals tend to have significantly lower pulses than do well-behaved counterparts. A slower heartbeat "probably reflects fearlessness and underarousal," Raine theorizes. "If we lack the fear of getting hurt, it may lead to a predisposition to engage in violence." But that hypothesis fails to explain why at least 15 studies have failed to find abnormal heart rates in psychopaths.

Jerome Kagan, a Harvard University psychologist, has suggested that an inhibited "temperament" may explain why the great majority of children from high-risk homes grow up to become law-abiding citizens. One study tested pulse, pupil dilation, vocal tension and blood levels of the neurotransmitter norepinephrine and the stress-regulating hormone cortisol to distinguish inhibited from uninhibited, underaroused two-year-olds. An expert panel on "Understanding and Preventing Violence" convened by the National Research Council suggested in its 1993 report that inhibited children may be protected by their fearfulness from becoming aggressive, whereas uninhibited children may be prone to later violence. The panel concluded that "although such factors in isolation may not be expected to be strong predictors of violence, in conjunction with other early family and cognitive measures, the degree of prediction may be considerable."

Perhaps the most frequently cited biological correlate of violent behavior is a low level of serotonin, a chemical that in the body inhibits the secretion of stomach acid and stimulates smooth muscle and in the brain functions as a neurotransmitter. A large body of animal evidence links low levels of serotonin to impulsive aggression. Its role in humans is often oversimplified, however. "Serotonin has a calming effect on behavior by reducing the level of violence," Jeffery wrote in 1993 in the *Journal of Criminal Justice Education.* "Thus, by increasing the level of serotonin in the brain, we can reduce the level of vi-

STEPHEN SHAMES *Matrix*

CHILDHOOD AGGRESSIVENESS, seen in this boy threatening his brother with a broom, is one of the strongest known predictors of later violence. Yet in 1990 a 17-year study found that of 209 hyperaggressive preschoolers predicted to develop antisocial behavior, 177 did not.

KENNETH JARECKE *Contact Press Images*

ANDREW LICHTENSTEIN *Impact Visuals*

SOCIAL RISK FACTORS that seemingly push youths toward violent behavior include repeatedly witnessing assaults, heavy drinking or drug use (implicated in about 60 percent of all offenses), association with deviant peers and gun possession.

olence." A front-page article in the *Chicago Tribune* in December 1993 explained that "when serotonin declines… impulsive aggression is unleashed."

Such explanations do violence to the science. In human experiments, researchers do not generally have access to the serotonin inside their subject's braincase. Instead they tap cerebrospinal fluid from the spinal column and measure the concentration of 5-hydroxyindoleacetic acid (5-HIAA), which is produced when serotonin is used up and broken down by the enzyme monoamine oxidase (MAO). Serotonin does its job by binding to any of more than a dozen different neural receptors, each of which seems to perform a distinct function. The low levels of 5-HIAA repeatedly seen in violent offenders may indicate a shortage of serotonin in the brain or simply a dearth of MAO—in which case their serotonin levels may actually be high. Moreover, serotonin can rise or drop in different regions of the brain at different times, with markedly different effects.

Environment, too, plays a role: nonhuman primate studies show that serotonin often fluctuates with pecking order, dropping in animals when they are threatened and rising when they assume a dominant status. The numerous pathways through which serotonin can influence mood and behavior confound attempts to simply "reduce the level of violence" by administering serotonin boosters such as Prozac, a widely prescribed antidepressant.

Nevertheless, the link between 5-HIAA and impulsive aggression has led to a concerted hunt for the genes that control the production and activity of serotonin and several other neurotransmitters. "Right now we have in our hand many of the genes that affect brain function," says David Goldman, chief of neurogenetics at the National Institute

For Biological Studies, Minorities Need Not Apply

Scientists pursuing the role of biology in violent behavior have been twice shy since 1992, when shrill public criticism forced the National Institutes of Health to withdraw financial support of a conference on the ethical implications of "Genetic Factors in Crime" and compelled former health secretary Louis Sullivan to abort his proposed "Violence Initiative." Led by firebrand psychiatrist Peter Breggin, critics charged that in a society where blacks account for 12.4 percent of the population but 44.8 percent of arrests for violent crimes, such research plays into the hands of racists.

The controversy did little to dissuade scientists from their studies, which continue to grow in number. The NIH has reinstated funding for the genetics conference and increased its budget for violence-related research to $58 million. Most Violence Initiative projects have found support in other programs. And last December the National Science Foundation began soliciting proposals for a $12-million, five-year violence research consortium.

But the political wrangling seems to have intimidated investigators from including minorities in any violence studies with a biological tinge—and from collecting medical data in multiracial studies. Designers of an 11,000-subject, eight-year study of the causes of crime in Chicago, for example, were forced last summer to ditch plans to collect blood and urine samples when Breggin organized rallies to block the project, says Felton Earls, a Harvard University professor and co-director of the study. As a result of such pressure, asserts Adrian Raine of the University of Southern California, "all the biological and genetic studies conducted to date have been done on whites. Scientifically, we can make no statements on the biological basis of violence and crime in blacks or Hispanics or Asians."

There is no reason to suspect that any genetic connection links race to antisocial behavior. But there is reason to be concerned that ostensibly objective biological studies, blindly ignoring social and cultural differences, could misguidedly reinforce racial stereotypes. Still, Earls, Raine and other researchers emphasize that biological factors, if they exist, are important only insofar as they protect individuals from—or make them vulnerable to—bad influences in their family, school and neighborhood. Research that excludes those who are most burdened by such pressures may be most expedient, but is it most useful?

STEPHEN SHAMES *Matrix*

Shown here (*left to right*) are boys in Omaha detained after a drive-by shoot-out, underage drinking in New York City and the aftermath of a shooting in Houston.

on Alcohol Abuse and Alcoholism. Although none has yet been shown to presage violence, "I believe the markers are there," he says. But he warns that "we're going to have to understand a whole lot more about the genetic, environmental and developmental origins of personality and psychiatric disease" before making use of the knowledge.

Yudofsky is less circumspect. "We are now on the verge of a revolution in genetic medicine," he asserts. "The future will be to understand the genetics of aggressive disorders and to identify those who have greater tendencies to become violent."

A Compelling Option

Few researchers believe genetics alone will ever yield reliable predictors of behavior as complex and multifarious as harmful aggression. Still, the notion that biologists and sociologists might together be able to assemble a complicated model that can scientifically pick out those who pose the greatest threat of vicious attack seems to be gaining currency. Already some well-respected behavioral scientists are advocating a medical approach to crime control based on screening, diagnostic prediction and treatment. "A future generation *will* reconceptualize nontrivial recidivistic crime as a disorder," Raine predicted in his 1993 book, *The Psychopathology of Crime.*

But the medical model of crime may be fraught with peril. When the "disease" is intolerable behavior that threatens society, will "treatment" necessarily be compulsory and indefinite? If, to reexamine Raine's hypothetical example, prediction models are judged reliable but "biological, social and cognitive intervention programs" are not, might eight-year-old boys be judged incorrigible before they have broken any law?

Calls for screening are now heard more often. "There are areas where we can begin to incorporate biological approaches," Fishbein argues. "Delinquents need to be individually assessed." Masters claims that "we now know enough about the serotonergic system so that if we see a kid doing poorly in school, we ought to look at his serotonin levels."

In his 1993 article Jeffery emphasized that "attention must focus on the 5 percent of the delinquent population who commit 50 percent of the offenses.... This effort must identify high-risk persons at an early age and place them in treatment programs *before* they have committed the 10 to 20 major felonies characteristic of the career criminal."

Yudofsky suggests a concrete method to do this: "You could ask parents whether they consider their infant high-strung or hyperactive. Then screen more closely by challenging the infants with provocative situations." When kids respond too aggressively, he suggests "you could do careful neurologic testing and train the family how not to goad and fight them. Teach the children nonviolent ways to reduce frustration. And when these things don't work, consider medical interventions, such as beta blockers, anticonvulsants or lithium.

"We haven't done this research, but I have no doubt that it would make an enormous impact and would be immediately cost-effective," Yudofsky continues. While he bemoans a lack of drugs designed specifically to treat aggression, he sees a tremendous "opportunity for the pharmaceutical industry," which he maintains is "finally getting interested."

But some worry that voluntary screening for the good of the child might lead to mandatory screening for the protection of society. "It is one thing to convict someone of an offense and compel them to do something. It is another thing to go to someone who has not done anything wrong and say, 'You look like a high risk, so you have to do this,' " Akers observes. "There is a very clear ethical difference, but that is a very thin line that people, especially politicians, might cross over."

Even compelling convicted criminals to undergo treatment raises thorny ethical issues. Today the standards for proving that an offender is so mentally ill that he poses a danger to himself or others and thus can be incarcerated indefinitely are quite high. The medical model of violent crime threatens to lower those standards substantially. Indeed, Jeffery argues that "if we are to follow the medical model, we must use neurological examinations in place of the insanity defense and the concept of guilt. Criminals must be placed in medical clinics, not prisons." Fishbein says she is "beginning to think that treatment should be mandatory. We don't ask offenders whether they want to be incarcerated or executed. They should remain in a secure facility until they can show without a doubt that they are self-controlled." And if no effective treatments are available? "They should be held indefinitely," she says.

Unraveling the mystery of human behavior, just like untangling the genetic code of human physiology, creates a moral imperative to use that knowledge. To ignore it—to imprison without treatment those whom we define as sick for the behavioral symptoms of their illness—is morally indefensible. But to replace a fixed term of punishment set by the conscience of a society with forced therapy based on the judgment of scientific experts is to invite even greater injustice.

FURTHER READING

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Crime statistics and violence prevention program information are available at gopher://justice2.usdoj.gov:70/1/ojp on the World Wide Web.