Are criminals born or made?

New research suggests that some people have a stronger innate tendency towards violence than others. Should this change the way we think about crime and punishment? asks Daniel Dennett

The Anatomy of Violence: The biological roots of crime
by Adrian Raine (Allen Lane, £25)

Monsters have always fascinated us. As soon as we outgrow the spine-tingling dragons and ogres of fairytales we turn our rapt attention to the celebrity monsters of real life: Jack the Ripper, the Unabomber, Charles Manson, Ted Bundy, Adam Lanza. We know their names, don’t we? Behind the voyeurism that tempts even the most “mature” minds there lurks a nagging suspicion that there might be something deeply wrong in our righteous reaction to wrongdoers. Who are we to condemn them? If they’ve got a screw loose, shouldn’t they get treatment instead of punishment? And aren’t we just lucky not to have the same urges that drive them?

Then there is the question of how to explain the violent actions of humans. Do our genes make us do it? Does an abusive childhood and poverty make us do it? Does a culture that glorifies violence make us do it? Whatever long-range effects can be attributed to these background conditions, when push comes to shove, our brains make us do it. All the causes have to be squeezed through the bottleneck of our nervous systems one way or another and aren’t we learning from the triumphant march of neuroscience that we don’t have the minds we thought we did? Tom Wolfe, as always an astute commentator on the current scene, has observed: “The conclusion people out beyond the laboratory walls are drawing is: ‘The fix is in. We’re all hard-wired’ and ‘Don’t blame me; I’m wired wrong.”’ And the comic strip Dilbert, another sensitive barometer, more recently opined: “Free will is an illusion. Humans are nothing but mist robots. Just relax and let it happen.”

Are they right? Will there be nothing left of our freedom and dignity, our responsibility, our autonomy once neuroscience explains the networks of causation inside our brains? When autopsies reveal clear signs of damage in the brains of monsters, what does that portend for the rest of us? Mist robots? And does this mean our vaunted edifice of law and order is no more defensible than witch trials and exorcisms?

It is hard to think calmly about violence, and nobody knows that better than Adrian Raine, a distinguished neuroscientist who has devoted his career to uncovering the causes of human violence. He recognises that these are not just scientific questions, like uncovering the causal mechanisms of earthquakes, but also some of the most important ethical questions facing society. And he is all too familiar with the forces that distort thinking by laypeople and scientists alike, having worked into a headwind of scepticism and opposition for decades. Many different sorts of people do not want science poking around their most cherished verities. Consider this unholy alliance of opponents: religious conservatives who see a threat to their Abrahamic vision of retributive justice, liberal legal scholars and philosophers who fear that neurobabbble and psychobabble will unravel the fabric of responsibility on which civilisation depends; postmodernists who preach that the concept of scientific evidence is a quaint relic of more innocent times; whole schools of so-called social science whose ideologies are threatened by real science encroaching on their turf. And then there are the journalists, salivating for eye-catching headline opportunities.

The message of this important book is an affirmation of what ought to be obvious but is all too often obscured by ideological smoke screens, together with an articulation of what follows from this undeniable truth: every act we ever perform, whether we are sane, normal citizens or serial killers, is the physical effect of a complex combination of genetic, developmental, and experiential factors that make us who and what we are at the moment of action. None of us is miraculously isolated from these causal factors—nor should we want to be—but some of us are better “wired” than others. Some of us are indeed “wired wrong” in ways that science can uncover and confirm, and in some instances fix. The good news, which Raine is intent on conveying to us, is that “biology is not destiny.” While it is true that there really are genetic biases for criminality and violence, it is also true that these genetic biases are not dictatorial and immutable; because our characters are the product of many complex factors, the undesirable tendencies inherent in some of our genes can in principle be neutralised by intervening in the non-genetic components.

Looking at the emerging details of the causal pathways shows how this can be done. A “well-wired” brain must be balanced, and it’s actually a rather delicate balance, maintained by cascades of neuromodulators and neurotransmitters, each of which is regulated by others, focusing attention, damping urges, stoking desires, calming and stimulating in turn. It can seem a wonder that anybody can get through the day without going berserk, and yet most of us maintain a quite robust and reliable degree of self-control, responding appropriately to setbacks and risks, and not even tempted by opportunities to commit crimes that are literally unthinkable—by us.

The ideal of the well-governed mind has been articulated by thinkers since Plato, and we’re now learning how the internal economy and politics of the brain achieve this salutary state—and how we can often intervene to restore it when a brain goes bad. It is quite easy to see how a small genetic difference (an allele, a mutant form of a normal gene) can put a brain into imbalance, much the way alcohol or drugs can, by flooding the brain with too much of one neuromodulator or starving it of one that puts on the brakes. Once an imbalance is discovered and understood, the road to treatment can be explored, and it might involve directly supplying the lacking chemical, or adjusting the environmental conditions that normally provoke its production, or both. Sometimes the root cause of the imbalance is an anatomical defect in the brain—a stunted or underdeveloped region. This is harder to fix but
there are work-arounds. The brain is a spectac-\n\ntacularly versatile and opportunistic finder \nof new pathways if given half a chance. But \nsome brains, to be sure, are beyond repair \nnow, and probably forever.

O\n\now what should we do about all \nthis? Would it be best to replace \nour system of law and punish-\n\n\nment with a treatment model \nin which people are no more held responsible \nfor their crimes than they are for their \ncancers or heart attacks? Some neuroscien-\ntsists, psychologists and philosophers have \nbeen beating the drum for this revolu-\ntionary vision and one might think Raine would \nbe at the head of the parade, but he has been \nworking on these issues, up close, for longer

than most of them, and takes a more circum-\nspect approach. There are different kinds of \nways that brains get people into trouble, and \nthey require different approaches. There are \n“hot-blooded” criminals and “cold-blooded” \ncriminals, for instance, and the physiologi-\nal differences between them are even more \nsalient than blood temperatures would \nbe. He tentatively presents more nuanced \n
prescriptions.

Tradition (or better, ancient myth) has it \nthat you have free will only if your decisions \nare not caused or determined by any ante-\ncedent conditions. That variety of free will is \nas illusory as poltergeists, but we don’t want \nto replace one profoundly unscientific ideology \nwith another oversimplified “scientific” or “medical” ideology, according to which

nobody is ever responsible for what they do \nbecause everybody’s decisions have a cause. \nWe need to understand, in detail, how peo-\nple’s decisions are caused if we want to iden-\ntity those who are “wired wrong.” In our \ndesire to base our policies on facts, estab-\nlished by scientific research, we must be \npatient and scrupulous, and not jump to con-\clusions inspired by a few anecdotes or sin-\ngle studies.

One of the strengths of the book is Raine’s \ncareful presentation and explanation of the \nevidence that supports his striking claims. \nHe knows that most lay people and not a few \nscientists routinely misinterpret statistical \nevidence, so he is careful to provide perspec-\tive. Lower resting heart rate in youngsters \nhas a surprisingly strong correlation with
"delinquent, criminal and violent behaviour" in adults. How strong? Raine cites a study by David Farrington of Cambridge University which claims that "low heart rate was even more strongly related to measures of violence than having a criminal parent—one of the best social predictors of later crime." If we look at resting heart rate when given a "stressor" (a demanding task, such as counting backwards from 100 by 7), low heart rate is a predictor "as strong as the ability of mammograms to detect breast cancer." Meta-analyses (critical surveys reviewing the studies in an area) confirm the relationship, showing that it is a better predictor than any other that has been found to date, and at least one meta-analysis shows that prescribing stimulants to raise heart rate in youngsters diminishes later antisocial behaviour.

Raine goes out of his way to forestall misinterpretation, but not always far enough. One study recounted at some length compared thousands of Danish babies over 18 years and divided them into four groups: those with birth complications, those who had been rejected by their mothers, those with neither of those early misfortunes, and those with both. The first three groups did not differ significantly from each other, with rates of violence at about 3 per cent. It was the fourth biosocial group—the one with both the biological and the social hits—that had the highest rates of violence. This group had three times the average of the other three groups—9 per cent of them became violent offenders." Three times! Yes, but notice: even in that group, nine out of ten babies burdened with both birth complications and maternal rejection did not exhibit any violence in young adulthood. (Raine’s main claim is secure: factors can multiply the risks, even if they don’t always.) Similarly, he points out that a female schizophrenic is 22 times more likely to kill than a non-schizophrenic female, but still, as he observes, the vast majority of schizophrenic females are not killers.

This pattern of vast normality (most people are nonviolent) in spite of significant predictors at the margins is ubiquitous in the research on violence but tends to be overlooked, distorting public imagination. Only a rather small minority of adults exhibit any signs of pathology or even deficiency, and a small proportion of those turn out to be criminals. Just as important, not all criminals show signs of brain defect.

In an unusual lapse, Raine indulges in a serious overstatement: "Criminals do have broken brains, brains that are physically different from those of the rest of us." All of them? No, he hasn’t come close to establishing that—or even trying to establish that. This is important, because there is a tendency in discussions of law and punishment to surmise that anybody who isn’t actually deterred by the risk of punishment on some occasion must have some sort of broken brain; they must be undeterrable. This is a mistake. The reliability of self-control on which the law depends, for instance, is not perfect reliability—thank goodness, since none of us could meet that standard. What Raine is talking about, as he occasionally makes explicit, is recidivist criminals, those who demonstrate time and again that they are not deterred by the threat of punishment.

And now we face the fundamental quandary that besets any project to reform our system of punishment with measures that take proper account of incapacities while protecting civil liberties. You can’t identify recidivist criminals until after they have committed numerous crimes. Nobody is a likely recidivist in advance of committing a crime. That is to say, even the best predictors so far uncovered don’t raise the probabilities above a coin flip. Raine would like to intervene early, to prevent violence, instead of just responding after violence has occurred: "We can wait until the milk is already spoiled and we have to deal with the adult recidivistic offender who is so very hard to change," or we can follow his advice and intervene as early as possible, while brains are young and malleable. This makes fine sense as long as the interventions are not freedom-limiting, or stigmatising. Let’s eliminate lead from the environment as fast as we can, since it has a clearly demonstrated harmful effect on young brains, and let’s also respond swiftly and strongly to curb child abuse and poverty, clearly marked as predictors of later violence. But what are we to do about those interventions that would require identifying children with the relevant brain conditions and subjecting them (involuntarily) to treatments that might well save them from a life of lawbreaking and prison? "At what cost civil liberties?" Raine asks. But he attempts only half the answer.

He makes sure we know the likely benefits by describing a future, in lively detail, of just such a project. He calls it the LOMBRASO programme, an acronym for Legal Offensive on Murder: Brain Research Operations for the Screening of Offenders, but more pointedly he has named it after Cesare Lombroso, the 19th-century phrenologist and criminologist who first proposed that "criminal brains" could be identified. It is courageous—or maybe just rash—to name his pet project after a figure whom textbooks typically revile, but there is a method to be discerned here and it should be taken seriously. Knowing that his readers will be on high alert, ready to pounce on any telltale symptom of political incorrectness, he chooses to brandish his challenges, apparently confirming the worst fears of his readers. Then, that settled, he gets them to think clearly about what really might be good or bad about one policy or another. It works—at least most of the time. He uses this strategy in both directions, providing a ringing defence of retributive punishment—easing the anxiety of retributivists and showing that he really understands where they are coming from—before calmly dismantling it, showing where the weaknesses lie.

Raine wants us to think about a disturbing topic, and has chosen—wisely, I think—to live dangerously; to confront the reader with a remorseless clinical objectivity about the details of unspeakable atrocities, with occasionally over-calculating formulations that seem designed to provoke outrage from those who think such taboo topics should be handled with the utmost decorum and gravity. He clearly enjoys the role of museum-guide in the macabre chamber of horrors where the exhibits are real-life cannibals, heartless psychopaths, child killers in both senses of that ambiguous phrase, and other walking time-bombs. He uses our relish for such fare to propel the reader through the patient explanation of the methods of brain scanning, the recitation of statistics and the meta-analyses. It is Raine who arranged to scan the brains of 41 murderers on death row, with significant and disturbing results. Murderers from "good homes," for instance, showed significantly reduced frontal lobe activity compared with murderers who had deprived upbringings. Should we draw the conclusion that children from good homes grow up to be murderers only if they have broken brains? No. It could be that murderers with good brains from good homes don’t get caught. It’s complicated.

An even more audacious study, published in 2000, was one he conducted with "free range," "successful" psychopaths—never arrested for any crime, never before identified in the wild. How on earth did he find them? An educated hunch suggested that a significant proportion of male temp workers would be psychopaths, so he got a ▶
grant that permitted him to hire dozens of them in the Los Angeles area. Their job: to fill out questionnaires and in some instances have their brains scanned, and then participate in interviews. Sure enough, 21 men (and no women) qualified as "psychopaths" on the standard test used in prisons. Their brains were scanned and they showed the telltale prefrontal deficiency in grey matter as well as other well-established markers of psychopathy. The interviews were the most striking aspect of the study. None of the 21 had criminal records, but reassured by the certificate of confidentiality Raine secured for the experiment (a standard provision where subjects could be at risk otherwise), they readily provided detailed accounts of the crimes they had committed, including armed robbery, rape and even murder. Raine thinks there is scant chance that they were making any of this up, and he has perhaps more experience than any other researcher in talking with violent criminals. "Perhaps for the first time in their lives, they could talk about their wrongdoings at length with a professional in full confidence and without risk—even getting into the nitty-gritty of rape and homicide."

He eventually briefly confronts the fear that, once on the slippery slope he has embarked on, scientific research into the links between our brains and our tendency towards violence will bring about the demise of moral responsibility altogether. He calls the fear a "coping-out," arguing that there is firm ground underfoot and ample opportunity for turning up and down that slope to choose where to stand—if we have the courage to do so." But that is not enough, because courage isn't in short supply; what we need are reasons, and he doesn't provide so much as a hint as to what the grounds will be for taking a stand in one place rather than another.

We need a clear account of what moral responsibility requires and although Raine takes a few stabs at the free will issues, he wisely retreats. (If only the other neuroscientists confronting this tangled philosophical mess were as circumspect!)

entists confronting this tangled philosophical mess were as circumspect! This is not his area of expertise, so he leaves the issue unresolved. The main obstacle to his understanding, I submit, is his failure to discern the difference between a retributive justification of punishment (which he is right to dismiss) and a consequentialist justification of punishment. Some thinkers—even some philosophers—make the mistake of equating punishment with retribution: an eye for an eye, a tooth for a tooth, with no concern for the consequences.

The consequentialists say "we should punish wrongdoers simply because they deserve to suffer, even if punishment doesn't deter them or others." The consequentialist says that the institution of punishment has a moral justification in virtue of its fostering respect for the law. We don't just try to "fix" wrongdoers; we punish them, whether or not this improves them, in order to maintain the rule of law. (Handling out a red card in football may have the effect of reforming the offending player, but that is not the consequence that matters; the game is made better if everybody plays by the rules.) Such a consequentialist justification of punishment can define a defensible class of responsible citizens, who, if they transgress, are eligible for punishment, not treatment, because they are, in general, reliably deterreable. But demonstrating this to the satisfaction of the corps of philosophers and legal scholars wrestling with the issue is a job for another book by another author.

The Anatomy of Violence is a most valuable contribution to the current debates on these topics. Raine provides the details, and the evidentiary backing, for a host of distinctions that need to be drawn by those of us intent on reforming our obscenely unjust system of criminal justice. His ultimate reticence on the big ethical and legal questions is itself not an abdication but a measure of his own sense of responsibility: he tells us about what he can responsibly vouch for, and invites us to finish the story using our own expertise. That is perhaps the most important task facing philosophy and jurisprudence.

Daniel Dennett is a philosopher, cognitive scientist and author of the forthcoming "Intuitions Pumps and Other Tools for Thinking".

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**An experiment with anarchy**

The philosophy of Silicon Valley is shallow and self-serving, says *Thomas Meaney*

*The New Digital Age: Reshaping the Future of People, Nations and Business*  
by Eric Schmidt and Jared Cohen (John Murray, £25)

*Who Owns the Future?*  
by Jaron Lanier (Allen Lane, £20)

*To Save Everything, Click Here*  
by Evgeny Morozov (Allen Lane, £20)

It's 2075 and you're lounging on the beach. You receive a message informing you that microscopic robots are ready to start applying your sunscreen. How would you like to pay? You can watch a two minute advert for a local casino or transfer some nano-payments you've collected from your blog. Now for some lunch. While you eat, you decide to watch a holographic replay of the 1936 Olympics games, seating yourself in the stands next to Adolf Hitler to watch Jesse Owens win gold. Your desires are automatically monitored by particles in the sand, which send a robot to massage your back.

Feeling better? It's another beautiful day in the late 21st century.

If this seems like a world you might like to inhabit, Eric Schmidt and Jared Cohen have plenty more to offer. The executive chairman of Google and the director of Google Ideas have crammed their new book with futuroist technodazzle which, they assure us, is only a few clicks away. For Schmidt and Cohen, the genius of the internet is that it lacks any "top-down control." "The largest experiment involving anarchy in history," as they call it, will not only enrich nearly everyone's lives but—barring a few disasters—usher in a golden age for individual citizens who have until now been at the mercy of their states.

Schmidt and Cohen are not the only ones positioning themselves as guides to our "new digital age." This spring also sees the publication of two new books by writers more sceptical about the utopian promise of the internet. Jaron Lanier and Evgeny Morozov (of whom more later). A pioneer of virtual reality, and a promiscuous consultant in the digital industry, Lanier is now better known as a coast-to-coast tech guru, with millions of fans. He casts himself as a heroic dissenter from conventional Silicon Valley thinking, like that of Schmidt and Cohen. His main concern in *Who Owns the Future?* is that companies like Google and Facebook are responsible for the looming spectre of mass unemployment. In a world where so much manual labour—laundry, paperwork, policing, truck-driving—will soon be done by highly efficient robots, Lanier sees wealth ending up in too few hands. He is particularly worried by the way in which the internet tends to produce information monopolies. Mega-sites such as Facebook and Google collect tremendous amounts of data about their users, which they sell for tremendous profits. In return for their lucrative personal data, the users of Facebook or Gmail are compensated by not having to pay for those services. For Lanier this is too little