

CRIMINAL MINDS: NEUROSCIENCE AND THE LAW

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A man lies motionless on the hard examination table, his pinkish-beige brain resting next to an open skull. A single, nickel-sized tumor and an untimely death differentiate his case from the routine autopsy. It wasn't the tumor that killed Charles Whitman, but three gunshot wounds inflicted only after he, spree killer of 16, took to the top of a Texas building and fired at the people below. The tumor, neuroscientist David Eagleman speculates, still played a crucial role, impinging upon his amygdala and destabilizing his emotional control, distinguishing him from the Adam Lanzas, Charles Mansons, and John Wayne Gacys of criminal history. Whitman, like many other individuals suffering from brain damage, falls under a legal category of people thought to be biologically incapable of making socially appropriate choices. For now, this ambiguously defined group is caught in an ineffective cycle of jails and hospitals. Eagleman hopes that neuroimaging, still a crude technology, will one day allow scientists to detect patterns at unthinkably small levels in the microcircuitry of these lawbreakers, revolutionizing the legal system and redefining criminal culpability.

At least, that's the medical hypothesis. In practice, this neural population conflicts with the prevailing notion that the general populace is composed of so-called moral agents, individuals able to make judgments based on commonly held standards of right or wrong, which is the basis of contemporary criminal law. Still, a small yet strong body of evidence suggesting a relationship between neurological disorders and criminal activity, *neurolaw*—still an emerging interdisciplinary study—is cautiously received in the legal realm. After all, going strictly by the science, Charles Whitman is not guilty. Or, in any case, he should be held less accountable for his crimes. Proponents of *neurolaw* like David Eagleman assert that “human behaviour cannot be separated from human biology,” implying that the cerebral impairments of individuals predispose them to make socially inappropriate choices (3). This view

clearly conflicts with the legal assumption that all humans are equally capable of acting against immoral desires. “Imagine a spectrum of culpability,” says Eagleman in “The Brain on Trial,” that captures the “common intuition that juries hold regarding blameworthiness,” where criminals are strictly guilty or innocent depending on their supposed neural situations (6). This is a problematic approach, because as technology improves and we learn more about the brain, our standards of blameworthiness evolve, causing the concept of culpability to change meaning. The American legal system grounds culpability firmly in the concepts of free will and personal responsibility—concepts that define humans as moral agents. Many parties, however, have been eagerly pushing brain-scanning technologies to the forefront of criminal proceeding: to shift focus away from the “hopelessly complex” concept of blameworthiness (7).

According to Eagleman’s logic, the foundations of the modern criminal justice system—built on the “assumption that we are all ‘practical reasoners’”—fail to account for the fact that “high-level behaviours can take place in the absence of free will,” as seen in the Whitman case (4, 5). Uncertainty surrounding the conscious component of decision-making drives the central argument for a reformation of our justice system. Although examining the biological basis of human behavior can highlight a strong correlation between brain chemistry and criminal actions—exemplified by instances such as Charles Whitman and the 2000 case of a tumor-afflicted pedophile—it is “dangerous to conclude that people with a tumor are free of guilt,” just as it is problematic to assume that those without a detectable disorder are blameworthy (3). Devoid of an understanding of the actual impact of neurological disorders on behavior, courts cannot sentence criminals fairly for the impaired control they had over their actions.

The idea of free will, long debated by philosophers and neuroscientists alike, can be vaguely defined at best. Most people would consider themselves to be freely thinking and acting beings—that is, as long as there are no external restrictions, subjects “*feel* introspectively that they are performing [an] act on their own initiative and that they *are free* to start or not to start the act as they wish” (Libet 529-530). For scientists, however, “acts cannot be understood separately from the biology of the actors,” raising the question of whether or not neurological disorders can prompt criminal behavior and

whether these criminals should be penalized (Eagleman 6). Eagleman's culpability argument relies on disorders influencing the initiation of any action. If his assumption is valid, then a correlation—or lack thereof—between conscious will and voluntary action would make those with brain disorders less culpable.

Following the discovery of a brain activity called the "readiness potential," scientist Benjamin Libet conducted a series of experiments in 1985 published under the title "Unconscious Cerebral Initiative and the Role of Conscious Will in Voluntary Action." Libet found that for spontaneous voluntary acts, "readiness potential onset" consistently preceded a subject's awareness of wanting to move by an average of 400 milliseconds. In other words, if Libet's research is correct, then unconscious processes in the brain may really initiate volitional acts, and, therefore, free will plays no part in their commencement. Coming back to the Whitman case, Eagleman states that this discovery would indicate that the criminal action started before the rational (or irrational) thought took place, effectively minimizing Whitman's culpability and, by extension, the severity of his punishment. But the results of Libet's investigation also suggest that nobody—whether cerebrally impaired or not—is truly free. So the preferential treatment of those with neurological disorders would lead to a similarly inequitable criminal justice system.

The Model Penal Code, a statutory text developed by the American Law Institute in 1962, was written as a guideline for standardizing the codified penal laws of the United States. For states that have enacted its provisions, all criminal liability depends on one principle: "a defendant's guilt must be based on conduct and that conduct must include a 'voluntary act,' or an omission to engage in a voluntary act that the defendant is physically capable of performing" (*Model Penal Code*). From Eagleman's and Libet's perspectives, Whitman did not commit a "voluntary act," either on account of a brain tumor or his readiness potential, so he would be less criminally liable. However, this conclusion raises the question of whether or not Whitman could have put a stop to his crime in the 400-millisecond time lag. Although he could not identify a neural correlate, Libet hypothesized that the conscious mind has the power to "veto" motor performance during an even shorter time period before the action takes place. Thus, "the role of conscious will would be not to initiate

a specific voluntary act but rather to select and control volitional outcome” (Libet 529). Libet would propose that, while Whitman’s brain tumor might have influenced his failure to consciously stop the unconscious decision to act, ultimately it did not force him to commit the crime, and so he is no less blameworthy than any other criminal.

Of course, this statement only holds true if Libet’s “veto power” does indeed require conscious causation. Beyond the scope of brain tumors, patients with neurological disorders like Tourette’s syndrome, for example, clearly have “no free won’t” (Eagleman 4). Regardless of the unconscious initiation of an action, their neural circuitry prevents them from engaging in any veto process, effectively releasing them from blame. On an even greater scale, Eagleman asserts, “unconscious acts [. . .] can be surprisingly sophisticated,” citing the 1987 case of Kenneth Parks, who suffered from homicidal somnambulism—killing while sleepwalking (5). Like the Tourette’s patient, Parks could not possibly have exerted “free won’t” in his sleep, leaving juries unclear about the appropriate sentencing.

Our capacity for free will, whether by means of initiation or inhibition, is believed to reside in the brain’s frontal lobes. Today, neuroimaging has already called into question the volition behind many criminal acts. Introducing the idea of “free won’t” instead of “free will” would likely have little, if any, influence on the legal system. Typically, we see these two concepts as analogous—Whitman is just as guilty for allowing his unconscious acts to manifest as he would have been had he consciously chosen to act in the first place. Legally, he is judged more harshly than Kenneth Parks because, unlike the latter, there is no question about the possibility of “free won’t” playing a role. Are “free will” and “free won’t” really analogous, though?

The dorsal fronto-medial cortex (dFMC), located in the center of the brain behind the forehead, is activated when we inhibit an action, according to researchers Marcel Brass and Patrick Haggard in “To Do or Not To Do: The Neural Signature of Self-Control.” Inspired by Libet’s work, Brass and Haggard set out to identify a neural correlate to the veto process, only to discover that a specific area of the dFMC is “more strongly activated when people prepare manual actions then intentionally cancel them, compared with when they prepare and then complete the same actions” (9141). Their

findings of minimal dFMC activation in action trials were consistent with Libet's experiments on the initiation of movements before cognition, but these results also suggest that the "inhibition of intentional action involves processes that are located higher in the hierarchy of control than the development of the immediate action plan itself" (9144). Placed on a diagram of the brain, we find inhibition activation located closer to the anterior, where higher-order intentionality processes occur, and intentional action inhibition farther back, where physical action generation takes place. Simply put, even if we could deliberately plan and prepare actions, our brain chemistry theoretically has the capacity to automatically override these desires and prevent them from materializing.

Brass and Haggard provide precisely the scientific research needed to support Eagleman's stance: that criminals with neurological deficiencies have no "free won't," but they also highlight a new problem. "Because the initiation of action is unconscious," they write, "then the initiation of inhibition may also be unconscious" (9144). If nobody has "free will," and nobody has "free won't," then what is the significance of "free," and how do neurological disorders fit into the puzzle? Suddenly, Whitman is lumped into a group with Parks and the Tourette's patient, that neural population unable to exert "free won't" in the face of unconscious will, which is subsequently lumped into an even broader category. This revelation should not come as a surprise though: as Eagleman already established, the law's traditional dichotomies are frail. But now we find that a deeper investigation into the nature of free will does not yield any meaningful solutions. Regardless of the degree of action or inhibition mechanisms in these criminals, our attention falls on the need for a more flexible spectrum of blame.

"Blameworthiness," as Eagleman puts it, is a "backward-looking concept" which prevents the legal system from moving forward and focusing on customized sentencing, an empirical system based on recidivism (7). The serious reality is that while science has moved on, the law has not. Deborah Denno points out in "A Mind to Blame: New Views on Involuntary Acts" that the "voluntary act requirement, interpreted by courts primarily through the defenses of automatism and unconsciousness, conflicts conceptually with other criminal law defenses, primarily insanity" (603). The significance of this conflict is substantial: individuals who successfully claim automatism or

unconsciousness can be acquitted, while individuals who plead insanity can be committed to mental asylums for long periods of time. Individuals who do not fall into either category are incarcerated or even put to death. The fact of the matter is, according to Denno, “[c]ourts treat factually similar cases in vastly different ways because the doctrines and defenses are not distinct” (603). Like Eagleman, Denno believes there is a flaw in the way our legal system handles criminals with neurological disorders, but she also attributes the major obstacle to a lack of a systematic approach to these cases.

If Whitman truly had no control over his actions because they were an immediate result of his neural condition, then punishment by means of incarceration would have been ineffective and retribution would have been unjust given the circumstances. Similarly, had the compression of his amygdala resulted in emotional instabilities, he, an otherwise sane man, might have been institutionalized with the insane. The unclear lines distinguishing automatism and unconsciousness from insanity, which Eagleman acknowledges are both “based in the biological details of the brain,” hinder the first step in assessing sentencing under the *Model Penal Code*: the voluntariness of an act (5). In order for Eagleman’s empirically-based model to be implemented, we must begin by making firm changes to the existing legal code, so as to account for anomalous cases like Charles Whitman.

New consciousness research, including that of Libet and Brass and Haggard, suggests that much of our behaviour “takes place in a gray-coloured world of semi-conscious impulses, automatisms, and reflexes,” regardless of the presence of a neurological disorder (Denno 608). Eagleman shares this realization, and this unfamiliar, middle ground compels him to advocate for an expansion of the legal code. In evaluating the unclear approaches to sentencing for cases like Charles Whitman, Eagleman unwittingly highlights the greater issue of inadequate legal syntax. Given the limited definition of the voluntary act requirement and the complicated psychoanalytic aspect of voluntary conduct, Denno suggests a three-tiered approach to our understanding of voluntariness. The voluntary act requirement, which currently covers voluntary and involuntary acts, needs a third category—“semi-voluntary acts” (613). This new legal classification would “rely on consciousness research as well as a layperson’s assessment of how that research should be interpreted in the context of society’s norms and values” (613). Denno gives a name to the

imprecise, gray-colored middle of Eagleman's spectrum, bypassing syntactic restrictions and inviting proposals for criminal rehabilitation, including Eagleman's own strategies.

Had Whitman not been killed that day, there might have been a consensus that he did not belong in jail. But where else would he go? At the end of the day, we cannot forget about everything else that unfolded the day Charles Whitman died—the unborn child lost, the cry of a grieving family. Whitman might not have been Lanza, Manson, or Gacy, but he did cause just as much irreparable emotional damage. Eagleman's suggestion of customized sentencing, appealing to both the public and the best interests of the perpetrator, can bridge the legal gap between equality and equity, especially when coupled with rehabilitative strategies to prevent repeat offenses. As neuroscience progresses, it is becoming increasingly clear that we are in need of more “biologically informed jurisprudence” (Eagleman 10). But until we rethink the way we interpret key criminal law doctrines, the push for a more forward-looking judicial system is inhibited by antiquated standards. It's time for a legal model as complex as our brains, starting with criteria that acknowledge more than two kinds of criminal liability.

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