Neuroscience in Criminal Law

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ABSTRACT

As people, we all have a different understanding of our level of agency and behavior in a situation. While some may believe criminal impulses are situational, and dependent heavily on the environment and less on the individual, others may believe that a person is inherently bad and there is minimal we could do in terms of changing that behavior. Our court system is built for the people by the people: it relies on off evidence and jury interpretation. This diversity in belief makes it difficult to assign a standard to conviction; but what if we could use neuroscience in par with factual evidence to help establish a more concrete idea of defendant agency in a crime? Our criminal justice system should take into consideration neurological disorders when determining the level of guilt of an offender, rather than being dependent on the idea of "blameworthiness" through the lens of human belief. Doing so would allow for a more honed focus on rehabilitation and treatment as opposed to incarceration to prevent future recidivism and create a more beneficial judiciary.

The consideration of neurological disorders in the court of law is critical when evaluating the level of agency one has in a crime and their motives. When attempting to determine the degree of guilt of the defendant, the court must decide if the crime was affective or predatory. Affective violence deals with impulses that are 'correct or explainable'—where the individual had to defend themselves from another by means of protection—while predatory violence is often planned out beforehand and thought of as "pure evil". If the offender is convicted of predatory violence, then the court is assuming that they had clarity during the act and they knew what they were doing. Deciphering whether an action is predatory or affective usually determines the length of a sentence and the treatment that individual receives in a detention center. Individuals who have Cluster-B neurological disorders (categorized as: antisocial personality disorder (ASPD), borderline personality disorder (BPD), and narcissistic personality disorder (NPD), etc.) are often described as dramatic, emotional and erratic. Defendants, specifically those how have BPD, "struggle with aspects of a lawsuit such as negotiations and communication" and sometimes "may show up as paranoid or suspicious about the motives of the other party or even the attorneys involved. There will often be a lot of blame and minimal reasoning gets through in these types of scenarios" (Nikki, 2023). It is already difficult for individuals with personality disorders to present themselves in a court, even more so to stand in front of a jury and convince them that they are either innocent or should receive a reduced sentence. It is valid for a court to rely on previous actions when determining the type of violence, however, predatory violence is also reliant on the remorse and character the defendant displays during the trial (Corwin et al., 2012). If the defendant is not able to properly present themselves in court, how is the jury supposed to adequately interpret their level of involvement in the crime in full consciousness. With neuroscience we can understand how much agency an individual may possess or can possess in a situation. This can only help in scenarios where a personality disorder inhibits the defendant's expression of character.

Neurological disorders, specifically psychopathy, have a prominent role in an individual's ability to process and react to their environment. Such divergence emerges from structural aspects of the brain, such as a decreased volume of white matter. In an experiment done by Hoppenbrouwers in 2013, they found that a disruption in the fibers of an individual's white matter tract—a portion of the brain responsible for connections—was disrupted in psychopathic offenders; because of this, the amygdala is not able to communicate effectively with the prefrontal cortex, leading to inhibition of that individuals processing (Hoppenbrouwers et al., 2013). The prefrontal cortex is where we

process moment to moment interactions, it dictates emotions and response, acting almost as an overseer for the processes of the rest of the brain. Efficient cross talk between the parts of brain and prefrontal cortex isn't only necessary, but critical for an individual to process emotional information, as well as anxiety inducing events. An individual with mal performing amygdalae, especially when put in high stress emotional situations, would have a decreased sensitivity to threats, consequently leading them to process events with less clarity than expected. Research at the University of Washington School of Medicine suggests that "psychopaths have reduced connections between…the part of the brain responsible for sentiments such as empathy and guilt, and the amygdala, which mediates fear and anxiety." The study took use of DTI imaging as well as fMRI, and concluded that "[d]iffusion tensor images (DTI) showed reduced structural integrity in the white matter fibers connecting the two areas…[while fMRI imaging] showed less coordinated activity between the vmPFC and the amygdala. (*Psychopaths' Brains Show Differences in Structure and Function*, n.d.). The study above emanates a connection between structure of the brain and individual behavior, particularly in line with abnormalities in some psychopaths. It is important to consider that the findings are generalizations, and may not apply towards every offender; however, it is crucial for rehabilitation purposes if we can isolate abnormal areas of the brain. An anatomical difference in the brain is a physical disability that should be accounted for when sentencing in the court. If we are assigning blame to individuals who do not have the ability to properly process their surroundings, or neglecting to consider the facts, then we are denying them the right to a fair and due trial. Taking into consideration neurological differences in the brain will help us further understand how to treat these individuals to reduce the likelihood of future recidivism.

There is an evident correlation between neurological disorders, such as Cluster B—mentioned above—and criminal behavior. Antisocial Personality Disorder, ASPD, is often categorized as a disregard for empathy, or violation of other feelings, and often expresses itself in a lack of understanding between right and wrong. Consequently, the disorder can cause harmful behaviors with little to no remorse shown by the offender. Currently it is estimated that upwards of 84% of incarcerated people have ASPD (Seid et al., 2022). The existence of personality disorders "in the target population is indicative of the need for judicial officials' attention to this effective factor in crime and the use of mental health services and treatment instead of the penalty of deprivation of liberty." The thought is then followed up with the fact that "87.3% of women and 83.3% of men had a personality disorder at the time of committing the crime" (Fakhrzadegan et al., 2017). If we continue to neglect/downplay the role of personality disorders in criminals, we are only harming ourselves; as our judiciary system—which we invest money into—not only fails to provide a productive allocation of resources, but does almost nothing in terms of decreasing future crime. It is critical if we want to reduce the probability of recidivism and create a safer society for all that we acknowledge and provide proper rehabilitation for individuals with neurological disorders.

Rehabilitation programs should be implemented in addition to, or in supplement of, detention facilities for offenders with neurological disorders, to prevent re-offense. A trial in the Medina Juvenile Treatment Center (MJTC) experimented with a form of the decompression model, "a form of rehabilitation built off the values of positive reinforcement, in juvenile psychopaths. When compared to a juvenile detention facility not using the decompression model, they found that '98% of the non-MJTC youth were arrested again within four years, while only 64% of MJTC youth were. In other words, the MJTC program had resulted in a 34 percent reduction in recidivism,'" (*Can Psychopaths Be Cured? | Mechanisms of Disinhibition (MoD) Laboratory*, n.d.). The treatment center was able to reduce recidivism by 34% just through understanding the importance of neuroanatomy, and individualized treatment. There are also a series of non-invasive practices that can increase individual perception of environment and emotional control, such as practicing "studying, reading, executive control, cognitive function, exercise and speech, and even some macro functions, such as breathing." (Jiang et al., 2019). Acknowledging the fact that through certain repetitive actions we can structurally alter the brain is critical in addressing neurorehabilitation and takes us a step closer to decreasing the probability of re-offense. Understanding, the possibilities and benefits to neurorehabilitation is crucial in addressing treatment for incarcerated individuals and can lead to greater long-term benefits in not only our justice system but in society.

It is essential to acknowledge that the use of neuroscience in the court of law is still a blurry field. Though this paper argues on its importance and necessity in our judiciary system, there is no one factor or predicator of criminal activity. We do not have the technology to predict what an individual is going to do in the future or how they are going to respond to every emotional situation they are faced with. In other words, the situation has an aspect of contingency. What neuroscience allows us to do is provide an explanation and a window into a person's thought process. Human interpretation comes down to belief, and in court this belief fluctuates between individuals, this leads to a pliable standard when it comes to sentencing. To make this standard more concrete must consider neuroscience parallel to evidence when determining the defendant's agency in a situation as not only would we end up with a more accurate and reliable judicial system, but also a safer society for all.

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