

## ABSTRACT

Neuroscience in the Courtroom: *Exploring How Science Can Help Create a More Comprehensive Legal System*

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In the past few decades, neuroscience has emerged as one of the fastest-growing fields of study, providing increasingly precise insights into the workings of the brain. With improved imaging and analytical techniques, research has focused on how to best apply the information to different fields. Neurolaw, an interdisciplinary field, seeks to understand how neuroscience can inform legal decision-making, and how legal principles can shape the use and interpretation of neuroscientific evidence. Neuroscience can help inform the neural basis of culpability, criminal responsibility, and mental capacity through understanding the neural underpinnings of human behavior. As neuroscience and the law continue to intersect, the ethical, legal, and social implications come to light. The integration of neuroscience and the law has the potential to enhance the comprehensiveness of the American legal system through the law, legislation, and policy.

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Neuroscience in the Courtroom: *Exploring How Science Can Help Create a More  
Comprehensive Legal System*

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## CHAPTER ONE

### BACKGROUND ON ADOLESCENT BRAIN DEVELOPMENT

The organization of the brain and its associated structures directly relate to and determine the function of each region of the brain. Many structures are oftentimes implicated in the modulation of a single behavior. Therefore, purporting to explain human behavior and its nuances is a seemingly bold endeavor. Human behavior, as defined by the American Psychological Association, is an organism's overt, covert, and nonconscious responses to external or internal stimuli.<sup>1</sup> The responses can take the form of emotions, physical actions, words spoken, etc. In the same vein, the stimuli can be something as slight as observing a leaf falling down or as drastic as hearing a fire alarm sound. All stimuli, no matter how slight, evoke a response in an organism. The reason an organism, in this case, a human, elicits certain responses to certain stimuli is often inexplicable, but rational human beings elicit similar responses to common stimuli. However, when regions of the brain or certain pathways remain underdeveloped, the body is unable to elicit common responses to common stimuli. As a consequence, the person in question is at a disadvantage and is unable to elicit normal behavior. This paper purports to explain the development of the adolescent brain and why their actions in legal issues ought to have special consideration when compared to adults.

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<sup>1</sup> American Psychological Association (2019). Behavior. In American Psychological Association (2nd Ed.), APA dictionary of psychology. <https://dictionary.apa.org/behavior>

## *Neurobiology*

Behavior has several aspects that are often implicated in discussions of legal culpability for adolescents. Maturity is often the underlying tenet that implicates related behaviors such as risk-taking, reward-seeking, and motivation. The behavioral differences between adults and adolescents in the aforementioned actions can be best explained by the various brain structures, pathways, systems, and neurochemicals that have a role in brain maturation. Though the developmental process is not uniform across all aspects or individuals, it is imperative to take the relative maturation process of each aspect and its implications into account when considering an adolescent's legal culpability.

In terms of brain regions, the areas related to executive function and socioemotional process development tend to develop later and are different when compared to regions related to sensory and motor activities.<sup>2</sup> Executive functioning deals with the mental processes associated with planning, attention, following instructions, and overall self-regulation skills. These processes tend to be governed by the frontal lobe of the brain, and studies have shown the frontal lobe specifically to finish maturing at around 30 years of age, which is significantly later than most other regions of the brain.<sup>3</sup> This delay in maturation impacts an individual's ability to control their actions and impulses. However, regions of the brain involved in reward-seeking behavior mature earlier and are more active during adolescence when the control regions of the brain are still premature.<sup>4</sup>

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<sup>2</sup> Mercurio, E. et al., "Adolescent Brain Development and Progressive Legal Responsibility in the Latin American Context", *Frontiers in Psychology* 11, no. 627 (2020), 1-13.

<sup>3</sup> *Ibid.*

<sup>4</sup> *Ibid.*

Reward-seeking behavior is a common phenomenon in human behavior, and it can be observed across different domains, such as social, economic, and biological contexts. Studies have shown that reward-seeking behavior can be motivated by various factors, including social status, pleasure, or self-esteem. Neural mechanisms underlying social status-seeking behavior in humans.<sup>5</sup> The researchers found that the ventral striatum, a brain region associated with reward processing, was more active when participants received feedback indicating that they had higher social status compared to their peers. This suggests that social status-seeking behavior is driven by a desire for reward, and that the brain's reward system plays a crucial role in regulating such behavior. Similarly, researchers in a different study found that the orbitofrontal cortex, a brain region involved in reward processing, was activated when participants received monetary rewards.<sup>6</sup> This study highlights the importance of reward-seeking behavior in economic decision-making. Reward-seeking behavior is a fundamental aspect of human behavior, and an overactive reward-seeking system can lead to negative ramifications for adolescents.

Adolescents show heightened activity in the reward centers of the brain, such as the ventral striatum, when compared to adults in response to rewards. This increased sensitivity to rewards can lead to risk-taking behavior and poor decision-making, as adolescents may prioritize immediate rewards over long-term consequences.<sup>7</sup> Additionally, the presence of peers can further increase reward-seeking behavior in adolescents. Adolescent risk-taking behavior increased in the presence of peers, even when the potential risks and consequences were clearly

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<sup>5</sup> Zink, C. F. et al., "Know Your Place: Neural Processing of Social Hierarchy in Humans", *Neuron* 58, no. 2 (2008), 273-283.

<sup>6</sup> M. L. Kringelbach and E. T. Rolls, "The functional neuroanatomy of the human orbitofrontal cortex: evidence from neuroimaging and neuropsychology," *Progress in Neurobiology* 72, no. 5 (2004), 341-372.

<sup>7</sup> Adriana Galván, "Adolescent development of the reward system," *Frontiers in Human Neuroscience* 4, no. 6 (2010), 1-9.

presented.<sup>8</sup> This highlights the importance of social factors in understanding and addressing reward-seeking behavior in adolescents. Reward sensitivity and social influence are important factors to consider when addressing risk-taking behavior in adolescents.

The development of the prefrontal cortex of the frontal lobe is implicated in a linear development of impulse and cognitive control, which should theoretically lead to a linear decline of risky behavior. However, the period of adolescence is met with the least control over behavior. If frontal lobe development alone was involved in decisions leading to suboptimal behavior, children should have the most impulsive behavior, but that is not the case.<sup>9</sup> There ought to be other implications leading to the increase in suboptimal behavior, and a working model shows risk and impulsive behavior are often wrongfully conflated. While impulsive behavior declines as the prefrontal cortex develops, impulse control and cognitive skills tend to increase in adolescents, which can be attributed to brain structures involved in reward-seeking and reward evaluation.<sup>10</sup> Thus, such regions in the brain tend to show activation when an individual makes risky choices, and such activation is exaggerated in adolescents when compared to children and adults. The limbic system, involved in evaluating emotional response to behavior, matures before the prefrontal control system, therefore, there is a disconnect in the stage of adolescence. In children, they are both underdeveloped, and in adults, they're both fully mature; thus, the disconnect in emotion regulation and impulse control created in adolescence leads to risky behavior.<sup>11</sup>

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<sup>8</sup> J. D. Chein et al., "Peers increase adolescent risk taking by enhancing activity in the brain's reward circuitry," *Developmental science* 14, no. 2 (2011), F1-F10.

<sup>9</sup> B. J. Casey, S. Getz, and A. Galvan, "The adolescent brain," *Developmental Review* 28, no. 1 (2007), 62-77.

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.



The limbic system is a group of structures in the brain that are responsible for processing emotions, memories, and motivation, among other functions. The amygdala, a key structure in the limbic system, undergoes significant changes during adolescence, including increased functional connectivity with other brain regions.<sup>12</sup> This increased connectivity may contribute to the heightened emotional reactivity often observed in adolescents, as well as their increased sensitivity to social cues and peer influence. Individuals with higher levels of self-control exhibit greater connectivity between the prefrontal cortex and the limbic system, suggesting that the development of these regions is critical for self-regulation during adolescence.<sup>13</sup> Understanding these neural changes may help inform interventions aimed at promoting healthy emotional regulation and decision-making skills in this vulnerable population.

Another aspect of behavior implicated in adolescents is the ability to plan and take voluntary actions. Systems such as the working memory are crucial for the brain to be able to set goals and plan for the future consequences of your actions.<sup>14</sup> If the working memory systems are mature, then the individual will be able to know to plan for certain actions and avoid others in an attempt to curb risky and impulsive behavior. As one ages, the rate of correct inhibitory responses improves through development.<sup>15</sup> For an adolescent, the working memory is not fully matured and therefore is not able to make consistently proper inhibitory responses. These are important for an adolescent to be able to make decisions that prevent them from getting into

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<sup>12</sup> D. G. Gee et al., "A Developmental Shift from Positive to Negative Connectivity in Human Amygdala–Prefrontal Circuitry," *The Journal of Neuroscience* 33, no. 10 (2013), 4584-4593.

<sup>13</sup> M. D. Rosenberg et al., "Prediction complements explanation in understanding the developing brain," *Nature Communications* 9, no. 589 (2018), 1-13.

<sup>14</sup> Beatriz Luna, "The Relevance of Immaturities in the Juvenile Brain to Culpability and Rehabilitation," *The Hastings law journal* 63, no. 6 (2012), 1469-1486.

<sup>15</sup> *Ibid.*

precarious situations. This system develops through processes like synaptic pruning. Neurons, the basic units of the brain, form links with each other to process information called synaptic connections.<sup>16</sup> After adolescence, the synaptic connections that are no longer used tend to be eliminated by a process called synaptic pruning, which optimizes the brain's functions by catering to the individual's actions and environment. Eliminating unused synaptic connections fortifies the existing ones and consequently enhances the processing capacity of the brain by increasing the speed of connections. Once synaptic pruning takes place, the individual has the potential to have optimized behavior that limits impulses and regulates voluntary actions. In conjunction with synaptic pruning, myelination of neurons optimizes the brain's information processing as well. Myelination is the process in which myelin sheath cells are added to the nerve long ends of nerve cells, and tracts, which increases the speed of information transmission in the brain.<sup>17</sup> The sheath cells allow for the information from the body of the neuron to travel the long lengths of the nerve tract faster and help the nerves function more effectively and efficiently with the resources it is provided. For the individual, these two processes optimize brain functioning in regard to behavior and help integrate information efficiently in order for the individual to make proper use of the brain's executive control networks for better planning, decision-making, and behavior. Such processes and their distinctive maturation periods succeeding adolescence trend toward explaining the increased risk-taking during early adolescence within the developmental framework of the neural socioemotional reward and cognitive control systems.<sup>18</sup>

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<sup>16</sup> Ibid.

<sup>17</sup> Luna, "Prediction complements explanation in understanding the developing brain," 1469-1486.

<sup>18</sup> Ibid.

Neurotransmitters, the chemicals used for neuronal communication, such as dopamine are the body of the information being processed by the larger brain systems. Dopamine is a neurotransmitter that acts on different regions of the brain, such as the ventral striatum, which is a nucleus in the limbic system that plays a crucial role in motivated behavior. Studies have shown that dopamine release in the striatum, a region of the brain involved in reward processing, is increased during anticipation and receipt of rewards. A study found that when participants received a monetary reward, there was an increase in dopamine release in the ventral striatum. This increase in dopamine release was positively correlated with the magnitude of the reward. The prefrontal cortex, which is involved in decision-making and impulse control, regulates dopamine release in the striatum. When participants had to exert cognitive control to resist a reward, there was increased activity in the prefrontal cortex and decreased dopamine release in the striatum.<sup>19</sup> Dopamine levels peak during adolescence in the frontal and striatal regions and gradually decline into adulthood.<sup>20</sup> Due to dopamine's actions in the limbic system via the ventral striatum, dopamine is involved in reward-seeking behaviors, learning, and motivation. Due to the available dopamine in an adolescent individual, they are especially susceptible to reward-motivated behaviors and can potentially contribute to an increase in risk-taking behavior during this period. However, due to dopamine's relation to motivated behavior and learning acquisition, adolescence could also be a peak time to potentially be rehabilitated through learning.

The corticolimbic system is responsible for regulating emotion, behavior, and decision-making, and dysregulation of this system has been associated with a range of psychiatric

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<sup>19</sup> Ibid.

<sup>20</sup> Ibid.

disorders and behavioral problems. Studies have suggested that juvenile offenders, who often exhibit impulsive and antisocial behavior, may have dysregulation in the corticolimbic system.<sup>21</sup> Compared to non-offenders, juvenile offenders showed reduced activity in the prefrontal cortex and increased activity in the amygdala during a decision-making task.<sup>22</sup> The prefrontal cortex is involved in impulse control and decision-making, while the amygdala is involved in emotion regulation. Dysregulation in these regions may contribute to impulsive and aggressive behavior. Similarly, dysregulation in the corticolimbic system may contribute to substance use disorders in juvenile offenders. Compared to non-substance-using juvenile offenders, those with substance use disorders showed increased activity in the ventral striatum, a region of the brain involved in reward processing.<sup>23</sup> This suggests that dysregulation in the reward processing system may contribute to substance use disorders in juvenile offenders, which could exacerbate the poor decision-making by individuals at that age. Dysregulation in the corticolimbic system may contribute to the impulsive and antisocial behavior exhibited by juvenile offenders. This highlights the importance of interventions that target the underlying neurobiological mechanisms in these individuals.

### *Neuroimaging*

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<sup>21</sup> L. G. Passamonti et al., "Neural Abnormalities in Early-Onset and Adolescence-Onset Conduct Disorder," *Archives of general psychiatry* 67, no. 7 (2010), 729-7348.

<sup>22</sup> J. A. Weller et al., "Plasticity of Decision-Making Abilities Among Maltreated Adolescents: Evidence from a Random Controlled Trial," *Development and psychopathology* 27, no. 2 (2015), 535-551.

<sup>23</sup> M. Luciana, "Effects of alcohol use initiation on brain structure in typically developing adolescents," *The American journal of drug and alcohol abuse* 39, no. 6 (2013), 345-355.

Neurolaw grapples with the duality in and of itself. Neuroscience is a generalized field where large-sample clinical studies are coveted and purport to explain neurobiological underpinnings in the human population. However, the law requires that every individual and their associated circumstances ought to be given specific legal analysis without obfuscation from how the general population functions. Neuroimaging endeavors to bridge the gap between the probabilistic generalizations of neuroscience and the individual assessments that the law necessitates by providing various types of imaging of an individual's brain in attempts to explain behavior. Neuroimaging did not have a place in the courtroom, let alone with magnitude, until about ten to fifteen years ago. As of recent, many courtrooms and legal proceedings have started to include neuroimaging in legal analysis and have become less reluctant and apprehensive to the practice.

Imaging the brain regions is an important tool that provides greater knowledge of the structure and function of the brain. Being able to depict the structure of the brain, and potential abnormalities, allows for a possible explanation for the related functional irregularities and associated behaviors in certain individuals. Functional magnetic resonance imaging, fMRI, is one of the most well-known imaging modalities. Due to the lack of radiation and intravenous injections, fMRI analysis can be performed repeatedly and will continue to be safe. Its newest technology can spatially localize brain activity and detect the subtlest differences in brain activity. fMRI has been used to study brain activity in individuals with psychopathy, a personality disorder associated with a lack of empathy and impulsivity, which has been linked to criminal behavior. fMRI helps examine brain activity in individuals with psychopathy while they performed a moral decision-making task, and the results demonstrate that individuals with psychopathy showed reduced activity in the anterior cingulate cortex, a brain region associated

with empathy and guilt.<sup>24</sup> This suggests that psychopathic individuals may have impaired moral decision-making abilities, which could inform legal decisions. fMRI has potential to help depict abnormal differences that may implicate the culpability of individuals in a court of law.

Positron emission tomography (PET) is an imaging technique that was common before the fMRI and uses intravenous injections of radioactive substances called radiotracers to depict activity, such as blood flow. In the most recent analyses of adolescent brains, the limitations placed on their brains at that young age are depicted. PET scans have been used to study brain activity in individuals with traumatic brain injuries (TBI), which can result in cognitive and behavioral deficits. PET scans used to examine brain activity in individuals with TBI while they performed a decision-making task found that individuals with TBI showed reduced activity in the dorsolateral prefrontal cortex, a brain region associated with executive functions such as decision-making and planning, compared to controls.<sup>25</sup> This suggests that TBI can impair decision-making abilities, which could be taken into account in legal proceedings.

Extended unified structural equation models (euSEMs) are a new method that is implemented in group iterative multiple model estimation (GIMME).<sup>26</sup> Extended unified structural equation models (euSEMs) are a type of statistical modeling technique used in structural equation modeling (SEM). euSEMs are an extension of the traditional SEM framework, which allows for the modeling of complex relationships among variables, including nonlinear and nonadditive effects. euSEMs can also accommodate multiple group comparisons,

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<sup>24</sup> A. S. Morris, "Adolescent Brain Development: Implications for Understanding Risk and Resilience Processes through Neuroimaging Research," *Journal of Research on Adolescence: the official journal of the Society for Research on Adolescence* 28, no. 1 (2018), 4-9.

<sup>25</sup> A. S. Morris, "Adolescent Brain Development: Implications for Understanding Risk and Resilience Processes through Neuroimaging Research," 4-9.

<sup>26</sup> Ibid.

as well as latent variable interactions, and can handle missing data. Group iterative multiple model estimation (GIMME) is another approach to SEM that allows for the estimation of multiple models simultaneously, each capturing a different aspect of the data. GIMME uses an iterative process to select the most appropriate model based on the fit statistics, allowing for the modeling of complex, dynamic relationships among variables. GIMME is particularly useful when the relationships among variables are not well understood, or when there are multiple possible causal pathways. The computational force of euSEMS creates the ability to use large-sample data, through GIMME, to depict the person-specific individual differences in brain development. This method helps better understand brain connectivity and how one individual's brain circuitry may stray from the norm in terms of risky behavior. In addition, diffusion tensor imaging (DTI) can be used to map the connectivity of different brain structures by looking at how interconnected and organized the white matter in the brain is by imaging it. As aforementioned, synaptic pruning is an indicator of brain maturation, and being able to map and depict the synapses with DTI gives a good measure of the brain's development. Cognitive ability and control can be determined by the development and hence can show an adolescent's culpability or lack thereof.

Several studies have used DTI to investigate differences in white matter tracts in juvenile offenders compared to non-offenders. Compared to controls, juvenile offenders showed reduced integrity in white matter tracts connecting the frontal and temporal regions of the brain, which are important for impulse control and decision-making.<sup>27</sup> Juvenile offenders with a history of violent behavior showed reduced white matter integrity in several regions of the brain, including the corpus callosum, which connects the two hemispheres of the brain, and the superior

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<sup>27</sup> J. Jacobus et al., "White Matter Integrity, Substance Use, and Risk Taking in Adolescence," *Psychology of addictive behaviors: journal of the Society of Psychologists in Addictive Behaviors* 27, no. 2 (2013), 431-442.

longitudinal fasciculus, which is important for language processing and spatial reasoning.<sup>28</sup> DTI is particularly useful in studying the development of the brain, as well as the impact of environmental factors on brain function. DTI helps shed light on the neural mechanisms of delinquent behavior.

Neuroimaging techniques have the potential to provide valuable insights into the neurobiological basis of various mental states, including criminal behavior, which could inform legal decisions.

### *Psychosocial Implications*

The use of neuroscience in legal proceedings has important psychosocial implications, particularly in relation to understanding the complex interplay between the brain, behavior, and the environment. Neuroimaging gives rise to a better understanding of the psychosocial implications that result from developmental differences by examining the interplay between the brain, behavior, and the environment.

Early childhood trauma potentially affects decision-making in adolescence. Early childhood trauma puts adolescents at a greater risk of impaired self-regulation which allows for more probable delinquent behavior. These factors appear to interact in important ways with the cognitive elements of decision-making. The socioemotional system tends to involve rapid, automatic processing that is often reactive, intuitive, and unconscious, by picking up patterns before an individual may be consciously aware of them and motivating behavior change through feelings and autonomic responses. The cognitive-control system, on the other hand, tends to be

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<sup>28</sup> Y. Aoki et al., "Diffusion tensor imaging studies of mild traumatic brain injury: a meta-analysis," *Journal of Neurology, Neurosurgery, and Psychiatry*, 83, no. 90 (2012), 870-876.



consciously controlled, volitional, deliberate, reasoned, analytic, and reflective and requires more time and conscious effort. It is a heavy burden to impose on adolescents to rectify the variations created within themselves. Early childhood trauma can have lasting effects on the developing brain, which can lead to an increased risk of mental health problems, including substance abuse and criminal behavior.<sup>29</sup> Neuroscience research has shown that childhood trauma can affect the development of brain regions involved in emotion regulation and decision-making, such as the prefrontal cortex and amygdala.<sup>30</sup> This has important implications for legal decision-making, as it suggests that individuals who have experienced childhood trauma may be more vulnerable to impulsive or risky behavior and may require targeted interventions to address these issues.

Neuroscience research has also shed light on the social and environmental factors that can influence brain development and behavior. The presence of peers can increase risk-taking behavior in adolescents,<sup>31</sup> which can be due, in part, to the underdevelopment of the prefrontal cortex, which is responsible for impulse control and decision-making.<sup>32</sup> Another explanation for this could be heightened reward sensitivity and weaker inhibitory control in the brain.<sup>33</sup> Peer influence may activate the mesocorticolimbic dopamine system, which plays a key role in reward processing and motivation.<sup>34</sup> This suggests that adolescents may be more susceptible to external influences when faced with social pressures and may require different approaches to rehabilitation and treatment compared to adults.

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<sup>29</sup> E. P. Mulvey et al., "Substance Use and Delinquent Behavior Among Serious Adolescent Offenders," *Office of Juvenile Justice and Delinquency Prevention*, 2010.

<sup>30</sup> Ibid.

<sup>31</sup> Chein et al., "Peers increase adolescent risk taking by enhancing activity in the brain's reward circuitry," F1-F10.

<sup>32</sup> Ibid.

<sup>33</sup> Ibid.

<sup>34</sup> Ibid.

It is imperative for the justice system to understand the uncontrollable circumstances that adolescents are met with. There are certain social and biological underpinnings of their wrongful behavior, and it is important to take them into proper account in every individual's case of legal culpability. Neuroscience research has the potential to inform legal decision-making, thus it is imperative to adopt a nuanced and holistic approach to understanding criminal behavior with a collaborative effort between researchers, practitioners, and policymakers to ensure that neuroscience evidence is used to improve outcomes for individuals involved in the justice system.

### *Conclusion*

The field of neuroscience has greatly enhanced our understanding of how the brain works and how it influences behavior. Brain activity can provide valuable insights into a person's decision-making processes, and this information may have important implications for the legal system. By examining brain activity, it may be possible to determine whether a defendant had the capacity to make a rational decision at the time of the offense or if they have certain mental disorders or brain injuries that may affect their decision-making abilities and consequently may have implications for legal decisions. As such, it is important to consider the new breadth of information able to be offered as evidence in aiding legal decisions.

## CHAPTER TWO

### HISTORY OF THE EIGHT AMENDMENT TO THE CONSTITUTION

In 2005, the Court heard the case of *Roper v. Simmons* in which it ruled that it was unconstitutional to execute offenders who are under the age of 18 at the time of their crime. The Court argued that the action violates the Eighth Amendment's prohibition on cruel and unusual punishment. In this chapter, I analyze the history of the Court's writings on the 8th Amendment and the change in discourse over the years.

#### *Interpretation*

The United States is the only westernized country to still enact capital punishment. However, in 1972, the United States prohibited the use of capital punishment for crimes for a brief period of time.<sup>35</sup> In deciding *Furman v. Georgia*, the Supreme Court outlawed executions in the United States as they deemed that they were imposed arbitrarily, and that arbitrary imposition of capital punishment is considered cruel and unusual punishment under the Eighth Amendment to the US Constitution. The 8th Amendment was ratified in 1791 as part of the Bill of Rights and states that "Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted."<sup>36</sup> The amendment is intended to protect individuals from being subjected to punishment that is disproportionate to the crime committed, as well as to prevent excessive bail or fines from being imposed. This seemingly includes the death penalty, however,

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<sup>35</sup> S. Boys, "The Death Penalty: An Unusual Punishment America Is Inflicting upon Itself," *Critical Criminology* 19, no. 2 (2011), 107-118.

<sup>36</sup> United States Constitution, amend. VIII.

in 1972, the Supreme Court reinstated capital punishment when deciding *Gregg v. Georgia* on the premise that states have taken measures to ensure that the punishment is imposed in a manner that is not arbitrary.<sup>37</sup> Legal scholars have delved into the analysis of the term “cruel and unusual punishment” with respect to capital punishment and have come to drastically different conclusions. The prevailing opinions are as follows.

### *Originalism*

Originalism is a theory of constitutional interpretation in which the original intent of the Constitution, as set by the framers, is utilized to determine modern-day legal decisions. Legal questions have changed over time and the culture surrounding certain age-old questions has also shifted with the shift in population. However, the original intent with respect to the death penalty dictates that capital punishment ought not to be outlawed as the framers intentionally ratified the punishment as an option.<sup>38</sup> This method of interpretation pigeonholes the Supreme Court from ever considering the constitutionality of capital punishment, simply on the premise that it was ratified in a time period in which the Constitution was written. Scholars in support of originalism argue that the framers considered future generations and the implications the Constitution will have. It is naive to think that the framers had the bandwidth to predict the culture of the United States in future generations and the scope of legal questions that could potentially be asked. Though their attempts were valiant, the legal proceedings, specifically the opposition, in *Furman v. Georgia* are evidence of the framers choosing to make the language vague in order to allow for

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<sup>37</sup> *Gregg v. Georgia*, 428 U.S. 153 (1976).

<sup>38</sup> S. Boys, “The Death Penalty: An Unusual Punishment America Is Inflicting upon Itself,” *Critical Criminology* 19, no. 2 (2011), 107-118.

the interpretation of the text to vary by the nature of society in the future. William Smith, a South Carolina judge argued that the “import [of the words cruel and unusual punishment] are too indefinite.<sup>39</sup>” This opposition leads to the question of whether that choice was intentional. The framers were meticulous. The Constitution is the law of the land, and in order to provide a foundation for proper conduct, there is no room for vague and ambiguous language. As such, it is imperative to understand that vagueness serves a purpose in the phrase “cruel and unusual punishment.” With changing expectations and standards in society, new and evolving crimes necessitate new and evolving consequences. Though this doesn’t mean more gruesome punishments, this does mean that change is progressive and inevitable. In this same respect, the nature of capital punishment has evolved from hanging and firing squads to the electric chair and lethal injection. Though the nature of the punishment has changed, it’s high time to evaluate why it has changed and what this means for the broad scope of this type of punishment.

### *Textualism*

Textualism is a theory of interpretation that is predicated on the very words of the Constitution absent from the influence of context. Considering the brevity of the Constitution, it is likely that every phrase serves a purpose. This approach rejects the use of extrinsic sources such as legislative history or policy considerations in interpreting the law. Textualists believe that the meaning of a legal text should be determined by its objective, original meaning at the time it was enacted.<sup>40</sup> Textualism emerged in the late 20th century as a response to what many

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<sup>39</sup> *Furman v. Georgia*, 408 U.S. 238 (1972).

<sup>40</sup> W. N. Eskridge Jr., “The New Textualism,” *Yale Law Journal*, 112, no.8 (2003), 2007-2090.

legal scholars saw as the excessive use of extrinsic sources in interpreting the law. Textualists argue that the use of legislative history or policy considerations to interpret a legal text undermines the rule of law by allowing judges to inject their own subjective values into the law.<sup>41</sup> The practice gets its strength from its emphasis on the rule of law and the separation of powers. By limiting the role of judges to interpreting the text of the law rather than making policy decisions, textualism helps to ensure that the law is predictable and consistent.

Critics of textualism argue that it is too rigid and inflexible and that it fails to account for the complexities of modern society. They point out that many legal texts are ambiguous or open to multiple interpretations, and that a strict focus on the plain text can lead to absurd or unjust outcomes. In addition, critics argue that it ignores the fact that language and society change over time.<sup>42</sup> They argue that legal texts should be interpreted in light of evolving societal norms and values and that judges should be willing to consider extrinsic sources such as legislative history or policy considerations in interpreting the law. Despite its weaknesses, the legal theory has been used to support conservative positions on progressive issues, such as the juvenile death penalty.

The Eighth Amendment prohibits the imposition of "cruel and unusual punishments," but it does not define what constitutes a cruel and unusual punishment. A textualist approach is to define the phrase as done when the Eighth Amendment was adopted in 1791. At that time, the phrase was understood to mean punishments that were "contrary to the law of the land" or that "shock[ed] the conscience of the people."<sup>43</sup> This suggests that the Eighth Amendment was

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<sup>41</sup> R. A. Posner, "What Has Pragmatism to Offer Law?," *Southern California Law Review* 63, (1990), 1653-1670.

<sup>42</sup> W. N. Eskridge Jr. and P. P. Frickey, "Statutory Interpretation as Practical Reasoning," *Stanford Law Review* 42, no. 2 (1990), 321-384.

<sup>43</sup> A. SCALIA et al., *A Matter of Interpretation: Federal Courts and the Law*. Edited by AMY GUTMANN." STU-Student edition, Princeton University Press, 1997.

intended to protect against punishments that were not in line with established legal traditions or that were widely seen as morally repugnant. At the time the amendment was written, it was common practice to impose the death penalty on juvenile offenders. A textualist would conclude that the Eighth Amendment does not prohibit the imposition of the death penalty on juvenile offenders.

### *Pragmatism*

Pragmatism is a legal approach that emphasizes the practical consequences of a particular legal decision. Pragmatism seeks to balance competing interests and values to achieve the best overall outcome in a particular case, based on the idea that the law should serve as a tool for social progress and that judicial decisions should reflect the changing needs and values of society.<sup>44</sup> In the context of the juvenile death penalty, pragmatism argues that the practice is not only unconstitutional but also counterproductive to the goals of the criminal justice system.<sup>45</sup> This approach is rooted in the idea that the juvenile justice system should focus on rehabilitation rather than punishment, and that the death penalty undermines this goal.

While some critics, namely Justice Antonin Scalia, argue that judicial pragmatism can lead to judicial activism and the erosion of traditional legal principles, proponents argue that the approach is necessary to ensure that the law serves the best interests of society. By considering the practical consequences of legal decisions, judges can ensure that their rulings are both legally

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<sup>44</sup> C. R. Sunstein, "Beyond Marbury: The Executive's Power to Say What the Law Is," *Yale Law Journal* 115, no. 8 (2006), 2580-2599.

<sup>45</sup> Eskridge Jr., "The New Textualism," 2007-2090.

sound and socially responsible.<sup>46</sup> The pragmatic approach to the juvenile death penalty emphasizes the need to consider the practical consequences of a particular legal decision, including its impact on the goals of the criminal justice system.<sup>47</sup> The law should serve as a tool for social progress and judicial decisions should reflect the changing needs and values of society.

### *Reconciling the Various Viewpoints*

In deciding the constitutionality of the juvenile death penalty, the Supreme Court used a constitutional approach that balanced the text and history of the Eighth Amendment with evolving standards of decency and respect for human dignity that lay within a national consensus against the practice of executing juvenile offenders. As the court neared the 21<sup>st</sup> century, there was clear indication of a national consensus against juvenile death penalty as a consequence for a juvenile offender's actions. The textualists approach to the constitution would indicate a continuation of the juvenile death penalty irrespective of the evolving nature of society, the Court took a noticeably progressive approach. This approach reflected the Court's view, at the time, that the Constitution is a living document that must be interpreted in light of changing societal norms and values.

### *Chronology*

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<sup>46</sup> R. A. Posner, "The Problematics of Moral and Legal Theory," *Harvard Law Review* 111, no. 7 (1998), 1637-1663.

<sup>47</sup> M. E. Berkheiser, "Death Is Not So Different After All: Graham v. Florida and the Court's "Kids Are Different" Eighth Amendment Jurisprudence," *Scholarly Works*, 685.



The first recorded use of the death penalty for a juvenile in the United States was in 1642 when a 16-year-old boy named Thomas Graunger was executed in Plymouth Colony for bestiality. This was followed by the execution of several other juveniles in the 17th and 18th centuries, including a 12-year-old girl named Hannah Ocuish, who was hanged in 1786 for murder. In colonial times, the death penalty was a common punishment used for a variety of crimes, such as murder, treason, and witchcraft with a justified rationale for the necessary and legitimate use of the practice.

The first challenge to the juvenile death penalty was in *People v. Enoch Spooner*.<sup>48</sup> The case arose in Massachusetts in 1824, when Enoch Spooner, a 16-year-old boy, was accused of murdering a woman during a robbery. Spooner was found guilty and sentenced to death. At the time of the trial, Boston was a deeply divided city with strong racial tensions. The case was highly publicized and became a symbol of the larger struggle against slavery and racial discrimination. After much political backlash to such a cruel and unusual punishment for someone his age, Spooner's attorneys filed a writ of error arguing that his death sentence was unconstitutional under both the Massachusetts state constitution and the United States Constitution's Eighth Amendment. Spooner was represented by one of the best-known lawyers of the time, Daniel Webster, who argued that Spooner had acted in self-defense. However, the prosecution argued that Spooner had shot Austin in cold blood and that the killing was racially motivated. The Massachusetts Supreme Judicial Court upheld his death sentence as they held that the Eighth Amendment's prohibition of cruel and unusual punishment did not apply to the states. Spooner was hanged in 1824, becoming one of the first white men to be executed for killing a black person in the United States. This case set a legal precedent for the prosecution of

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<sup>48</sup> *People v. Enoch Spooner*, 6 Johns. 287 (N.Y. 1824).

hate crimes and demonstrated the power of the courts to bring about social change. Though the court upheld the juvenile death penalty, the case initiated the framework for future challenges to the statute based on the principle of evolving standards of decency in society.

The first challenge to the constitutionality of the death penalty based on the 8th Amendment came in the case of *Wilkerson v. Utah* in 1878; half a century after that of the juvenile death penalty.<sup>49</sup> George Wilkerson was accused of murder and sentenced to death by firing squad in Utah. He claimed that death by firing squad was unnecessarily painful and barbaric, and that it amounted to a form of torture. The Supreme Court upheld the constitutionality of the death penalty, stating that it was not inherently cruel and unusual punishment to use such a method as it was not “barbarous” or “totally unacceptable to civilized society” to do so.<sup>50</sup> The Court stated that the Eighth Amendment prohibits only punishments that are “so disproportionate to the crime for which they are inflicted that they shock the conscience and offend fundamental notions of human dignity.”<sup>51</sup> The Court went on to argue that death by firing squad was a long-standing and widely accepted form of execution, and that it did not constitute cruel and unusual punishment in Wilkerson's case. The Court also noted that the Constitution did not mandate any specific method of execution, leaving it up to individual states to decide. Utah happened to decide that a firing squad was the most reasonable and appropriate consequence. The Court noted that the death penalty had been used throughout history and that it was a legitimate means of punishment for certain crimes. The Wilkerson case remains significant as it established the principle that the Eighth Amendment prohibits only punishments that are

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<sup>49</sup> *Wilkerson v. Utah*, 99 U.S. 130 (1878).

<sup>50</sup> *Ibid.*

<sup>51</sup> *Ibid.*

"cruel and unusual," rather than any form of punishment that is merely harsh or severe. The case also confirmed the power of individual states to determine their own methods of execution, subject to constitutional limits.

Over the years, there were several other challenges to the constitutionality of the death penalty based on the 8th Amendment. The next notable challenge to the death penalty was in 1910. The Supreme Court held in *Weems v. United States* that the 8th Amendment prohibited punishment that was grossly disproportionate to the crime committed as his punishment.<sup>52</sup> Weems was found guilty of falsifying official records in the United States as he was serving as a public official in the Philippines, which typically warranted only a few years in prison.<sup>53</sup> Instead, Weems was sentenced to 15 years of hard labor, including being shackled and forced to work on a chain gang. The Court held that the punishment inflicted on Weems was disproportionate to the crime he committed and subjected him to degrading and inhumane treatment. This case established the principle that punishments must be proportional to the crime committed, and that the Eighth Amendment prohibits punishments that are unnecessarily severe or degrading. The Court did not strike down the death penalty in this case, but the decision expanded the scope of the Eighth Amendment's prohibition of cruel and unusual punishment to include punishments that were disproportionate to the offense committed, and established that the Eighth Amendment required a consideration of the evolving standards of decency in determining whether a punishment was cruel and unusual.

The next notable case for the juvenile death penalty occurred in 1944, when the US Supreme Court took up the issue itself for the very first time in the case of *Ex parte Kemmler*.<sup>54</sup>

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<sup>52</sup> *Weems v. United States*, 217 U.S. 349 (1910).

<sup>53</sup> *Ibid.*

Ex parte Kemmler was a landmark case in the United States Supreme Court that dealt with the constitutionality of the use of the electric chair as a method of execution. In this case, William Kemmler was sentenced to death by electrocution for the murder of his girlfriend. Kemmler argued that the use of the electric chair as a method of execution violated the Eighth Amendment's prohibition against cruel and unusual punishment. The United States Supreme Court held that the Eighth Amendment's prohibition of cruel and unusual punishment did not apply to the states and that states were free to impose any punishments they deemed appropriate, as long as they did not violate the state's own constitution. This ruling paved the way for states to continue to use the death penalty, including for juvenile offenders, without fear of federal intervention on constitutional grounds. In the aftermath of Ex parte Kemmler, some states began to consider the constitutionality of the use of the electric chair as a method of execution under their own state constitutions. For example, in the case of Kemmler, the New York Court of Appeals considered whether the use of the electric chair was a violation of the New York State Constitution's prohibition against cruel and unusual punishment. The court ultimately held that the use of the electric chair was not cruel and unusual punishment under the state constitution. Ex parte Kemmler was an important early case in establishing the legal framework for challenges to the death penalty, as cases such as Trop v. Dulles and Robinson v. California were later able to argue that the Eighth Amendment's prohibition of cruel and unusual punishment did apply to the states through the Due Process Clause of the Fourteenth Amendment. The Due Process Clause of the Fourteenth Amendment to the United States Constitution reads as follows: "No State shall deprive any person of life, liberty, or property, without due process of law."<sup>55</sup> This

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<sup>54</sup> Ex parte Kemmler, 136 U.S. 436 (1890).

<sup>55</sup> U.S. Const. amend. XIV, § 1.

clause intends to provide greater protection to individual rights against state encroachment. The decision's emphasis on state autonomy set the stage for later debates about the scope and limits of the Eighth Amendment's protections, particularly in cases involving juvenile offenders.

Throughout the years, the Court continued to expand the scope of the amendment, until it reached a more modern understanding of the Amendment in the late 1950s and early 1960s. *Trop v. Dulles* was a United States Supreme Court case decided in 1958.<sup>56</sup> The case involved Günther Tropic, a United States Army veteran who was dishonorably discharged and had his citizenship revoked after he deserted his post during the Korean War. Tropic argued that revocation of his citizenship constituted cruel and unusual punishment in violation of the Eighth Amendment of the United States Constitution. In a 6-3 decision, the Supreme Court agreed with Tropic and held that the revocation of citizenship is a form of punishment that can be considered cruel, and that citizenship is a fundamental right that cannot be taken away as a punishment for a crime. The decision in *Trop v. Dulles* has had lasting implications for the interpretation of the Eighth Amendment and the protection of fundamental rights.

Soon after in 1962, *Robinson v. California* was a significant case in the development of the Eighth Amendment's scope because it expanded the reach of the Amendment beyond the traditional understanding of cruel and unusual punishments.<sup>57</sup> The case involved a man named Lawrence Robinson, who was arrested in California for the crime of "public intoxication" and was sentenced to 90 days in jail. Robinson argued that his sentence was cruel and unusual punishment in violation of the Eighth Amendment. The Supreme Court held that it was a violation of the Eighth Amendment to criminalize the status of being addicted to narcotics and

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<sup>56</sup> *Trop v. Dulles*, 356 U.S. 86 (1958).

<sup>57</sup> *Robinson v. California*, 370 U.S. 660 (1962).

that punishing an individual for the mere status of their addiction was similar to punishing them for an illness or a physical characteristic, rather than for any particular criminal act. The Court reasoned that such a punishment was "grossly disproportionate" to any offense committed and that it violated the "basic concept of human dignity" that underlies the Eighth Amendment. The Court's decision in *Robinson v. California* expanded the reach of the Eighth Amendment to encompass broader principles of human dignity and proportionality.<sup>58</sup> This case is also a primitive example of the Court's evolving understanding of addiction as a healthcare issue that incorporates a progressive viewpoint of such a criminal act. This helps show that the Court is willing to adopt new understandings of long-standing concepts, such as addiction, and find more fitting consequences to prevalent problems in society that are more so public health issues than criminal acts. The case has been cited by courts and advocates to argue against the criminalization of drug addiction and to advocate for treatment-based approaches to drug policy. As such, this landmark decision helps pave way for the complete obsolescence of the juvenile death penalty in future cases.

Shortly after *Robinson v. California* took the stage, *Thompson v. Oklahoma* became a landmark case that was a significant victory for opponents of the juvenile death penalty.<sup>59</sup> The case arose in Oklahoma in 1983 when a 15-year-old boy named Charles Thompson was convicted of first-degree murder and sentenced to death for the murder of his brother's friend.<sup>60</sup> In 1988, the Supreme Court agreed to hear Thompson's case, and in its 5-3 decision, the Court held that the Eighth Amendment's prohibition of cruel and unusual punishment prohibits the

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<sup>58</sup> *Robinson v. California*, 370 U.S. 660 (1962).

<sup>59</sup> *Thompson v. Oklahoma*, 487 U.S. 815 (1988).

<sup>60</sup> *Ibid.*

execution of juvenile offenders who were under the age of 16 at the time of their crime. The Court reasoned that juveniles were less culpable than adults and that their age and immaturity made them less able to understand the consequences of their actions. Also, the Court noted that juveniles have less developed capacities for judgment and decision-making and that their actions are often the result of external pressures and influences. The evidence presented in *Thompson v. Oklahoma* included psychological and neurological research that showed that adolescents have not yet fully developed the ability to control their impulses, weigh the consequences of their actions, and understand the long-term impact of their decisions. The Court also pointed out that the majority of states did not allow the execution of juvenile offenders, which appealed to the evolving standards of decency in society. And, following the decision, several states revised their laws to prohibit the execution of individuals who were under the age of 18 at the time of their offense. This decision was a significant step in limiting the use of the death penalty for juveniles.

It was not until 2005 that the Supreme Court fully addressed the issue of the juvenile death penalty in the case of *Roper v. Simmons*.<sup>61</sup> The case arose in Missouri in 1993, when a 17-year-old boy named Christopher Simmons and an accomplice broke into a woman's home, robbed her, and then threw her off a bridge. Simmons was tried and sentenced to death for first-degree murder. Simmons's case made it to the US Supreme Court in 2004, and the Court held that the Eighth Amendment's prohibition of cruel and unusual punishment prohibits the execution of juvenile offenders who were under the age of 18 at the time of their crime. The Court reasoned that juveniles are less culpable than adults and more capable of rehabilitation,

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<sup>61</sup> *Roper v. Simmons*, 543 U.S. 551 (2005).

which seemed to be the national and international consensus as well during that timeframe. The scientific evidence presented in *Roper v. Simmons* included research from the fields of neuroscience and psychology that showed that the brains of adolescents were not yet fully developed, particularly in areas related to impulse control, planning, and reasoning. The Court also cited studies that demonstrated that juveniles were more susceptible to peer pressure and less able to appreciate the long-term consequences of their actions. The Court noted that these developmental differences made it less appropriate to hold juveniles to the same standards of culpability and punishment as adults. The Court's decision was seemingly based on the evolving standards of decency that mark the progress of a maturing society.

Since *Roper v. Simmons* was a 5-4 decision, there were strong dissents that articulated the apprehension toward the progressive decision. In his dissent, Chief Justice Rehnquist argued that the Court's decision was based on the evolving standards of decency among a select group of elite decision-makers, rather than on the actual views of the American people.<sup>62</sup> He also noted that there was no consensus among the states against the juvenile death penalty as certain states still permitted the execution of juveniles. Justice Scalia, as a textualist, focused his dissent on the text of the Constitution, arguing that the Eighth Amendment did not prohibit the juvenile death penalty and that the majority had engaged in judicial activism by relying on international law and changing societal norms. In addition, he argued that the decision represented a significant departure from the original meaning and intent of the Eighth Amendment, which he believed did not categorically prohibit the execution of juveniles. Despite the strength of the dissents, the majority decision in *Roper v. Simmons* is indicative of a progressive Society that is leaning in

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<sup>62</sup> *Roper v. Simmons*, 543 U.S. 551 (2005).



the direction of understanding that juvenile offenders are vastly different demographic than adult offenders.

The Court was prompt to hear 2 more cases as the momentum picked up on the issue. *Miller v. Alabama* addressed the constitutionality of mandatory life sentences without the possibility of parole for juveniles who committed homicide in front of the US Supreme Court. The case was decided in 2012 and involved two separate cases, *Miller v. Alabama* and *Jackson v. Hobbs*<sup>63,64</sup>. The case arose from the convictions of Evan Miller and Kuntrell Jackson, who were both sentenced to life in prison without parole for murders they committed when they were 14 years old. The Court held that such a sentence could not be imposed automatically, and that judges must take into account the offender's youth and other mitigating factors before imposing a life sentence without parole. The Court held that mandatory life sentences without the possibility of parole for juvenile offenders violated the Eighth Amendment's prohibition on cruel and unusual punishment on the same grounds that were mentioned in *Roper v. Simmons*. Such sentences could only be imposed after an individualized sentencing hearing in which the court considers the mitigating factors of the juvenile's age and the nature of the crime. The Court also considered evidence that juveniles who are sentenced to life without parole have a much lower likelihood of rehabilitation and a much higher likelihood of suffering from mental health problems than adult offenders who receive the same sentence. The Court concluded that mandatory life sentences without parole for juveniles convicted of homicide are unconstitutional because they fail to take into account the mitigating factors related to youth and the potential for rehabilitation. This decision further limited the use of harsh and irreversible punishments for

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<sup>63</sup> *Miller v. Alabama*, 567 U.S. 460 (2012).

<sup>64</sup> *Jackson v. Hobbs*, 884 F. Supp. 2d 1142 (E.D. Ark. 2012).

juvenile offenders and recognized the unique characteristics of juveniles in the criminal justice system.

In 2016, the Supreme Court, in *Montgomery v. Louisiana*, ruled that its decision in *Miller v. Alabama* applies retroactively and that all juvenile offenders previously sentenced to mandatory life without parole must be given a chance at release.<sup>65</sup> The case involved Henry Montgomery, who was convicted of killing a sheriff's deputy in Louisiana when he was 17 years old. At the time of his conviction in 1963, Louisiana law required a mandatory sentence of life without parole for anyone convicted of first-degree murder. *Montgomery v. Louisiana* was decided on January 25, 2016. Due to the unique nature of the case in which the conviction took place prior to the decision in *Miller v. Alabama* but the decision took place after, this case was put in a unique position regarding whether *Miller v. Alabama* should be applied retroactively to cases that had already been finalized on direct review. The Court ultimately held that it should, meaning that individuals who were sentenced to mandatory life without parole for crimes committed when they were juveniles and whose cases had already been finalized on direct review were entitled to have their sentences reviewed and potentially reconsidered due to the decision in *Miller v. Alabama*. The recent decisions of the US Supreme Court suggest a pragmatic Supreme Court that expands the protections established in *Miller v. Alabama*. As a result of the *Montgomery* decision, a significant number of resentencing hearings for individuals who were previously sentenced to mandatory life without parole as juveniles have surfaced. Many of these individuals have had their sentences reduced or commuted, and some have been released from prison altogether. The decision sparks greater conversation regarding appropriate punishments for juvenile offenders. This begs the question of whether life with parole is

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<sup>65</sup> *Montgomery v. Louisiana*, 136 S. Ct. 718 (2016).

satisfactory or whether there ought to be different means of punishments specifically curated for adolescents with an emphasis on rehabilitation and reintegration.

The early history of the 8th Amendment in relation to the juvenile death penalty was marked by a lack of consensus and inconsistency in its use. It was not until the late 20th and early 21st centuries that the issue was fully addressed by the courts, with the Supreme Court ultimately ruling that the juvenile death penalty violates the 8th Amendment. The future for the Eighth Amendment's application to juvenile offenders is likely to continue to evolve in the coming years. It is entirely possible that the Supreme Court may further restrict the use of certain types of punishments for juvenile offenders, particularly those that are currently contested in debates as cruel and unusual. There may also be increased attention paid to the availability and effectiveness of rehabilitation and reentry programs for juvenile offenders, as well as efforts to ensure that juvenile offenders are treated fairly and equitably in the criminal justice system. This may take the form of increasing access and resources to programs that are geared toward youth rehabilitation. There may be increased focus on addressing the underlying factors that contribute to juvenile offending, such as poverty, lack of education, and limited access to mental health and substance abuse treatment. Efforts to address these issues could help reduce the number of juveniles who come into contact with the criminal justice system in the first place. The future for the Eighth Amendment's application to juvenile offenders is likely to be shaped by ongoing efforts to balance the need for public safety with the recognition of juveniles' unique characteristics and potential for rehabilitation and reform.

## CHAPTER THREE

### RISK FACTORS FOR JUVENILE DELINQUENCY

It is a common assumption that people from certain demographics are more predisposed to criminal behavior than others. However, such an assumption is not only unfounded, but it is also detrimental. While certain demographic risk factors can impact an individual's likelihood of engaging in criminal activity, these factors do not pre-determine an individual's criminal behavior. It is imperative to delve into the underpinnings of these risk factors and develop strategies to reduce the probability of delinquent behavior.

#### *Poverty*

Poverty is a significant risk factor for juvenile delinquency and criminal behavior, particularly property crime.<sup>66</sup> Individuals who live in poverty often lack access to basic resources, such as food, housing, and healthcare, which can lead to desperation and a greater willingness to engage in criminal activity to meet their needs. Solely living in impoverished neighborhoods may expose youth to higher levels of crime, which can normalize criminal behavior and make it seem like a more acceptable option.<sup>67</sup> Living in such neighborhoods also limits access to resources, and normalized family stressors such as unemployment or substance

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<sup>66</sup> Kubrin, C. E. *Researching Theories of Crime and Delinquency*. New York: Oxford University Press, 2012.

<sup>67</sup> *Ibid.*

abuse can perpetuate crime-committing tendencies.<sup>68</sup> These negative outcomes that are more likely for youth in low-income neighborhoods can, in turn, increase the likelihood of engaging in criminal behavior. Without positive role models or adequate parental supervision, youth are less likely to know right from wrong, or even understand the consequences of their actions. Proper adult role models are crucial for helping guide youth toward proper decision-making.

In the absence of proper role models, youth are alternatively surrounded by violent individuals. Constant exposure to violence and criminal activity can normalize criminal behavior and make it more likely that juveniles will engage in criminal activity.<sup>69</sup> This can lead to a cycle of poverty and criminality that is difficult to break and can impact an individual's legal culpability if they are caught and prosecuted for criminal activity.

Addressing poverty and its associated risk factors through early intervention and prevention programs, such as access to healthcare and social services, may help to reduce the likelihood of delinquent behavior in juveniles and promote positive outcomes for at-risk children.

There are a variety of programs that aim to address poverty and its impact on juvenile offending. One example is the Head Start program, which provides early childhood education, healthcare, and family support services to low-income families with young children. Studies have shown that participation in Head Start can lead to improved academic outcomes and decreased rates of delinquency.<sup>70</sup> Another program that aims to address poverty and promote

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<sup>68</sup> Office of Juvenile Justice and Delinquency Prevention, "Education for Youth Under Formal Supervision of the Juvenile Justice System," *Office of Juvenile Justice and Delinquency Prevention*, (2019).

<sup>69</sup> LawBirdie (2023). Poverty and Juvenile Delinquency. *LawBirdie*. <https://lawbirdie.com/poverty-and-juvenile-delinquency/>.

<sup>70</sup> Office of Juvenile Justice and Delinquency Prevention, "Education for Youth Under Formal Supervision of the Juvenile Justice System."

positive youth development is the YouthBuild program, which provides education, job training, and leadership development opportunities to low-income youth. Research has shown that participation in YouthBuild can lead to improved educational and employment outcomes and decreased involvement in criminal activity.<sup>71</sup> Community-based programs, such as after-school programs and mentoring programs, can also be effective in addressing poverty and promoting positive youth development. These programs provide youth with positive role models, opportunities to develop skills and interests, and a supportive community, which can help to reduce the risk of juvenile offending.<sup>72</sup>

However, research suggests that low-income families and marginalized communities often face significant barriers to accessing programs and services that could benefit their children. Families may not be aware of the programs and services that are available to them or may not know how to access them. Low-income families may struggle to afford the cost of programs, transportation to program locations, and other associated expenses. In addition, families who speak languages other than English or who come from different cultural backgrounds may face barriers to accessing programs that are designed for English-speaking or culturally mainstream populations. Families from marginalized communities may face stigma and discrimination that can make it difficult for them to access services. To address these barriers, it is important to invest in programs and services that are accessible, culturally responsive, and designed to meet the needs of low-income and marginalized communities. This may include providing financial assistance, outreach and education efforts, and support for

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<sup>71</sup> Office of Juvenile Justice and Delinquency Prevention, "Education for Youth Under Formal Supervision of the Juvenile Justice System."

<sup>72</sup> Ibid.

families to overcome cultural and linguistic barriers. By addressing these barriers, we can help to ensure that all youth have access to the resources and support they need to thrive.

In addition to these programs, addressing poverty requires a comprehensive approach that includes policy changes and systemic reforms aimed at improving access to education, healthcare, and employment opportunities for low-income families. By addressing poverty and its associated factors, we can help to reduce the risk of juvenile offending and promote positive youth development.

### *Race*

Research has shown that there is a disproportionate representation of racial and ethnic minorities in the juvenile justice system, which suggests that there may be a link between race and juvenile criminal behavior. Studies have shown that Black and Latino juveniles are overrepresented in the criminal justice system, and are more likely to be arrested, charged, and sentenced than their White counterparts when controlling for all other factors.<sup>73,74</sup> This is often attributed to systemic racism and bias within the criminal justice system, as well as historical and ongoing disproportionate discrimination that impacts access to education, employment, and other resources. These other tents of juvenile delinquency are underlying factors for race to serve as a risk factor.

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<sup>73</sup> Alexander, Michelle. *The New Jim Crow: Mass Incarceration in the Age of Colorblindness*. New York: The New Press, 2010.

<sup>74</sup> A. R. Piquero et al., "Crime in Emerging Adulthood: A Developmental Perspective," *Criminal Justice and Behavior* 28, no. 6 (2001), 655–671.

Youth of color are also more likely to experience recidivism, or the tendency to reoffend after being released from a correctional facility. This can be attributed to a variety of factors, including the lack of support and resources available to them after release, as well as ongoing systemic racism and bias that can make it more difficult for them to succeed once they leave the system.<sup>75</sup> To address recidivism among youth of color, it is important to provide them with access to evidence-based programs and services that can support their successful reintegration into their communities. This may include job training and education programs, mental health and substance abuse treatment, and support for families and caregivers. It is important to address the root causes of recidivism, which often include poverty, lack of access to education and job opportunities, and ongoing discrimination and bias. This requires a commitment to systemic change and a willingness to address the underlying issues that contribute to recidivism among youth of color. By addressing these issues and providing youth of color with the support and resources they need to succeed, we can help break the cycle of poverty, inequality, and involvement in the justice system.

The success of reintegration programs for youth of color varies widely depending on the specific program and its approach. Some community-based programs that provide job training, education, and mentoring to youth of color have shown promising results. One study found that a program that provided job training and placement services to youth of color reduced their risk of recidivism by 33% compared to a control group that did not receive these services.<sup>76</sup> Similarly, programs that focus on providing mental health and substance abuse treatment to youth of color have also shown promising results. Research has shown that these programs can significantly

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<sup>75</sup> Piquero, "Crime in Emerging Adulthood: A Developmental Perspective," 655–671.

<sup>76</sup> R. Barnoski, "OUTCOME EVALUATION OF WASHINGTON STATE'S RESEARCH-BASED PROGRAMS FOR JUVENILE OFFENDERS," *Washington State Institute for Public Policy*, (2004) 1-20.



reduce the risk of recidivism among youth of color by addressing underlying mental health and substance abuse issues.<sup>77</sup> It is important to note that the success of these programs depends on a variety of factors, including the availability of resources, the level of community support, and the specific needs and challenges facing youth of color in each community. Additionally, systemic issues such as poverty, discrimination, and bias can make it more difficult for youth of color to succeed even with the support of these programs.

It is important to address these systemic biases and work toward a more equitable juvenile justice system that treats all youth fairly and provides them with the support and resources they need to succeed. Programs geared at equitable resource provision for minority youth may help mitigate race as a risk factor for juvenile delinquency. Addressing the systemic biases within the justice system and working to provide at-risk youth with the support and resources they need can help to reduce the overrepresentation of minority youth in the juvenile justice system.

### *Education*

An emphasis on education is a significant factor in preventing juvenile criminal behavior. Individuals who lack access to education are more likely to engage in criminal behavior and less likely to understand the legal consequences of their actions.<sup>78</sup> Without the skills and knowledge gained through education, youth may struggle to find employment, leading them to engage in illegal activities to make ends meet. Low levels of education can make it difficult for individuals

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<sup>77</sup> Ibid.

<sup>78</sup> K. L. Henry et al., "School Disengagement as a Predictor of Dropout, Delinquency, and Problem Substance Use during Adolescence and Early Adulthood," *Journal of youth and adolescence* 41, no. 2 (2012), 156-166.

to secure stable employment, leading to financial insecurity.<sup>79</sup> The reality of limited opportunities for the future leads to frustration and hopelessness that propels one to commit acts of desperation, such as criminal behaviors.<sup>80</sup>

Hopelessness is a common issue among juvenile offenders and is linked to increased risk of recidivism. Research has shown that youth who perceive their futures as bleak and without hope are more likely to engage in criminal behavior and have difficulty reintegrating into society after release from detention.<sup>81</sup> The lack of opportunities and resources, such as access to education, stable employment, and mental health services, can contribute to feelings of hopelessness and despair. To address this issue, programs aimed at providing mentorship, job training, educational opportunities, and mental health support have been implemented to help youth develop positive coping mechanisms and build a sense of hope for the future.

Education not only provides individuals with skills and knowledge that can lead to better employment opportunities, but it also teaches critical thinking skills and problem-solving strategies that can help individuals navigate difficult situations without resorting to criminal activity. Education helps provide a platform to seek resources, helpful networks, and positive role models. The sense of accomplishment itself from being able to make positive contributions to society can increase a young person's self-esteem and motivate them to make positive decisions. Educational interventions, such as tutoring, mentoring, and after-school programs, can

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<sup>79</sup> Ibid.

<sup>80</sup> Office of Juvenile Justice and Delinquency Prevention, "Education for Youth Under Formal Supervision of the Juvenile Justice System," *Office of Juvenile Justice and Delinquency Prevention*, (2019).

<sup>81</sup> Ibid.

be effective in reducing juvenile delinquency.<sup>82</sup> These programs provide youth with positive role models, a safe space to engage in activities, and opportunities to build skills and relationships.

However, finding employment as a juvenile can be challenging, especially for those with a criminal record or who come from disadvantaged backgrounds. Involvement in the juvenile justice system can create barriers to employment, including difficulty obtaining a work permit, lack of access to transportation, limited work experience and skills, and negative perceptions of employers towards individuals with a criminal record.<sup>83</sup> Furthermore, youth from low-income families and marginalized communities may face additional obstacles in finding employment due to systemic inequities and discrimination. However, there are programs and initiatives aimed at providing job training and employment opportunities for at-risk youth in order to reduce their involvement in crime.

A lack of education can limit a young person's opportunities and increase their risk of engaging in delinquent behaviors, while educational interventions can provide youth with the tools and resources they need to succeed and refrain from delinquent behaviors.

### *Mental Health*

Mental health is an important factor in juvenile delinquency. Research has shown that a significant percentage of youth involved in the juvenile justice system have mental health needs.<sup>84</sup> Youth with untreated mental health issues may struggle with impulse control, emotion

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<sup>82</sup> R. Barnoski, "OUTCOME EVALUATION OF WASHINGTON STATE'S RESEARCH-BASED PROGRAMS FOR JUVENILE OFFENDERS," 1-20.

<sup>83</sup> <sup>83</sup> R. Barnoski, "OUTCOME EVALUATION OF WASHINGTON STATE'S RESEARCH-BASED PROGRAMS FOR JUVENILE OFFENDERS," 1-20.

regulation, and decision-making skills, which can lead to involvement in delinquent behaviors. In addition, youth with mental health issues may experience stigma and discrimination, leading to feelings of isolation, anger, and frustration, which can also contribute to delinquent behavior.<sup>85</sup> Feelings and emotions are often suppressed in youth and can be either that they are unable to express their emotions or choosing not to do so. The inability to understand their emotions may lead to youth making ill-advised decisions out of sheer confusion. Helping youth understand their emotions, feelings, and thoughts is instrumental to help them through their struggles with mental health.

Individuals with mental health disorders may be more predisposed to committing crimes than those without. Individuals with mental health disorders were more likely to perpetrate violent crimes than those without such disorders.<sup>86</sup> Another study found that individuals with a history of mental illness were more likely to be arrested and charged with violent crimes than those without such a history.<sup>87</sup>

Some mental health disorders may increase the risk of criminal behavior in juveniles. Conduct disorder is a behavioral disorder characterized by aggression, defiance, and rule breaking. Children with conduct disorder may be more likely to engage in criminal activity, particularly if they have a history of aggressive behavior. Children with attention-deficit/hyperactivity disorder (ADHD) may struggle with impulse control, which can lead to impulsive and potentially criminal behavior. Moreover, substance abuse can increase the risk of

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<sup>84</sup> R. C. Kessler et al., "Mood disorders in children and adolescents: An epidemiologic perspective," *Biological Psychiatry* 49, no. 12 (2001), 1002-1014.

<sup>85</sup> S. M. Dornbusch et al., "Single parents, extended households, and the control of adolescents," *Child Development* 56, no. 2 (1985), 326-341.

<sup>86</sup> R. C. Kessler et al., "Mood disorders in children and adolescents: An epidemiologic perspective," 1002-1014.

<sup>87</sup> Ibid.

criminal behavior, particularly if the juvenile is engaging in drug-related activities such as drug dealing or theft to support their addiction. Antisocial personality disorder is a personality disorder characterized by a disregard for the rights and feelings of others, impulsivity, and a lack of empathy. Individuals with this disorder may be more likely to engage in criminal behavior. It is important to note that not all juveniles with these disorders will engage in criminal behavior, and many factors beyond mental health may contribute to criminal behavior. Early identification and treatment of mental health disorders in juveniles, as well as addressing any environmental factors that may contribute to criminal behavior, can help reduce the risk of criminal activity.

The relationships between mental health and juvenile delinquency can also be bidirectional, where juvenile delinquency can negatively impact youth' mental health. Youth involved in the juvenile justice system may experience trauma, abuse, neglect, or other adverse experiences, which can lead to mental health issues such as PTSD, depression, anxiety, and substance abuse and potentially increase the rates of recidivism. Mental health services, such as therapy, counseling, and medication management, as well as addressing the underlying factors contributing to mental health issues, such as trauma, poverty, and substance abuse are key to reducing mental health and juvenile delinquency among youth. It is important for correctional facilities to prioritize the mental health needs of juveniles in their care by providing access to appropriate mental health care, creating a supportive and trauma-informed environment, and addressing the root causes of behavioral issues. This can not only improve the mental health outcomes for juveniles during their incarceration but also reduce the likelihood of future criminal behavior.

## *Substance Use*

Substance use is prevalent among youth involved in the juvenile justice system. Over 80% of youth in the juvenile justice system have a history of substance use or abuse, with substance use behavior having direct and indirect effects on delinquent behavior among youth.<sup>88</sup> Alcohol is one of the most commonly used substances among juvenile offenders. It can be easily accessible and may be used as a coping mechanism for stress or trauma. And, marijuana is the most commonly used illicit drug among juveniles, and it is often the first drug that they try. It is readily available in many communities and is often perceived as less harmful than other drugs. Prescription drugs, such as opioids, stimulants, and tranquilizers, are increasingly being abused by juveniles. They are often obtained from family members or friends, or through illegal means such as theft.

According to the National Institute on Drug Abuse (NIDA), a significant proportion of juvenile offenders have a history of substance use, and many report being under the influence at the time of the offense.<sup>89</sup> The NIDA also reports that juveniles who use drugs and alcohol are more likely to engage in delinquent behaviors, including theft, assault, and other violent offenses. One study found that among a sample of juvenile offenders, nearly 70% reported being under the influence of drugs or alcohol at the time of the offense.<sup>90</sup> The study also found that substance use was associated with more severe and violent offenses.

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<sup>88</sup> C. Puzanchera, C., "Juvenile Arrests, 2019," Office of Juvenile Justice and Delinquency Prevention, 2020.

<sup>89</sup> E. P. Mulvey et al., "Substance Use and Delinquent Behavior Among Serious Adolescent Offenders," *Office of Juvenile Justice and Delinquency Prevention*, 2010.

<sup>90</sup> *Ibid.*

Direct effects of substance use on delinquent behavior include impaired judgment, increased aggression, and illegal activities. Substance use can impair a youth's ability to make rational decisions and resist peer pressure, leading them to engage in risky behaviors such as theft, vandalism, and violence. Substance use can also lead to increased aggression and violence, as well as engaging in illegal activities to support the habit.<sup>91</sup> Indirect effects of substance use on delinquent behavior include poor academic performance, social skills, and family relationships. Substance use can interfere with a youth's ability to attend school, complete homework, and maintain good grades, leading to poor academic performance. Substance use can also lead to poor social skills and difficulty maintaining positive relationships with peers and family members. These factors can contribute to a youth's risk of engaging in delinquent behavior. Early prevention efforts can include education and awareness campaigns to promote healthy behaviors and discourage substance use. Intervention efforts can include early identification and treatment of substance use disorders, as well as family and community-based programs aimed at addressing underlying risk factors for delinquent behavior. Multidimensional Family Therapy (MDFT) is a family-based therapy approach that addresses substance use and related problems in adolescents.<sup>92</sup> The program involves individual and family therapy, as well as support and case management services. MDFT has been shown to be effective in reducing substance use, improving family functioning, and reducing the risk of future delinquent behaviors. Moreover, Adolescent Community Reinforcement Approach (A-CRA) is a behavioral therapy approach that focuses on positive reinforcement and skill-building. It has been adapted for use with adolescents

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<sup>91</sup> L. Chassin, S. C. Pitts, and J. Prost, "Binge drinking trajectories from adolescence to emerging adulthood in a high-risk sample: predictors and substance abuse outcomes," *Journal of consulting and clinical psychology* 70, no. 1 (2002), 67–78.

<sup>92</sup> Chassin, Pitts, and Prost, "Binge drinking trajectories from adolescence to emerging adulthood in a high-risk sample: predictors and substance abuse outcomes," 67-78.

who are struggling with substance use and has been shown to be effective in reducing substance use, improving mental health outcomes, and reducing the risk of future delinquent behaviors. Prevention and intervention efforts must address this link by targeting both substance use and delinquent behavior, using evidence-based treatment programs that involve the family, community, and other support networks.

### *Gang Involvement*

Juvenile delinquency and gang involvement are complex issues that are closely intertwined. The relationship is bidirectional: gang involvement can increase the risk of delinquent behavior and delinquent behavior can lead to youth being coveted targets for gang recruitment.<sup>93</sup>

There are multiple factors that can contribute to why youth join gangs. However, some common reasons why youth may join gangs include protection, belonging, peer pressure, economic reasons, and family involvement. Some youth may join a gang for protection from bullying, harassment, or violence in their community or neighborhood. Some youth may feel that they can find belonging and identity through joining a gang, as well. This can be particularly true for those who feel disconnected from their family or community. Peer pressure can be a powerful influence on young people, and some youth may join a gang because their friends or acquaintances are members. For some youth, joining a gang may provide access to economic opportunities such as drug trafficking, theft, or other illegal activities. Youth may join a gang because of family members who are already involved, such as siblings, parents, or other

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<sup>93</sup> T. P. Thornberry et al., "Gangs and delinquency in developmental perspective," Cambridge University Press, 2002.



relatives. Though there are consequences that may result from joining a gang, they offer youth a sense of belonging in a time where they may feel isolated and lonely.

Research has shown that gang involvement can provide youth with a sense of belonging and social support, but it can also expose them to negative peer pressure and a culture of violence.<sup>94</sup> Youth are constantly yearning for social support, and if gangs are the only outlet they have, they are, reasonably, more likely to go down a harmful path.<sup>95</sup> The proximity to gang activity makes youth more inclined to join gangs out of convenience. There is a heightened need for prevention programs during the critical period of gang recruitment, which happens at young ages like adolescence.

Prevention and intervention efforts must address the close link between juvenile delinquency and gang involvement. Early prevention efforts can include education and awareness campaigns to promote positive behaviors and discourage gang involvement. Intervention efforts can include early identification and treatment of risk factors for delinquent behavior, such as poverty, low academic achievement, and exposure to violence. One effective intervention strategy is the use of gang prevention and intervention programs, such as the Comprehensive Gang Model (CGM) and the Gang Resistance Education and Training (GREAT) program. These programs use a comprehensive approach that involves law enforcement, schools, community organizations, and families to address the risk factors for gang involvement and delinquent behavior.<sup>96</sup>

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<sup>94</sup> J. Howell, "Gang prevention: An overview of research and programs," *Office of Juvenile Justice and Delinquency Prevention, 2010.*

<sup>95</sup> A. Egly Jr. and M. Arjunan, "Highlights of the 2000 National Youth Gang Survey. Juvenile Justice Bulletin," *Office of Juvenile Justice and Delinquency Prevention, 2002.*

<sup>96</sup> J. Howell, "Gang prevention: An overview of research and programs."

However, it is often difficult to pull adolescents out of their comfortable social circles, like gangs. There have been some initiatives where government agencies have worked with gangs to decrease crime. These initiatives have typically involved providing support to gangs in exchange for their cooperation in reducing violence and other criminal activities in their communities. One example of this is the Gang Reduction and Youth Development (GRYD) program in Los Angeles, which aims to reduce gang-related violence by providing job training, counseling, and other support services to at-risk youth and former gang members.<sup>97</sup> The program also works with gang members to mediate disputes and prevent violence. One of the key components of the GRYD program is the implementation of evidence-based practices that have been shown to reduce gang involvement and criminal activity. The program also works to create positive alternatives to gang involvement by providing youth with opportunities to participate in sports, arts, and other activities. According to a 2019 report by the Mayor's Office of Public Safety, the GRYD program has contributed to a significant decrease in gang-related homicides and other violent crimes in the communities where it operates. The success of the GRYD program can be attributed to a number of factors, including its evidence-based approach, the use of community-based partnerships, and the involvement of former gang members in the program's implementation. The program has also been successful in creating a culture of trust and respect between community members and law enforcement, which has contributed to a more positive relationship between these groups. It is important to note that working with gangs can be a complex and challenging process. Gangs are often involved in illegal activities, and there are concerns about providing support to groups that engage in criminal behavior. Additionally, there are issues of trust and credibility when working with gangs, and it can be difficult to ensure that

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<sup>97</sup> J. Howell, "Gang prevention: An overview of research and programs."

gang members are fully committed to reducing violence and criminal activities in their communities. Any initiatives that involve working with gangs should be carefully designed and monitored to ensure that they are effective, ethical, and sustainable.

### *Conclusion*

It is important to note that while these demographic factors can impact an individual's likelihood of engaging in criminal behavior, they do not pre-determine an individual's criminal behavior. Interventions aimed at reducing socioeconomic inequality can lead to lower levels of crime and improved legal outcomes for individuals. Reductions in income inequality were associated with lower levels of crime, and these effects were particularly strong for property crime.<sup>98</sup> Programs that provide education, job training, and other resources to individuals from low-income backgrounds have been shown to reduce rates of recidivism and improve legal outcomes.<sup>99</sup> It is a complex interplay of social, economic, and psychological factors that influence an individual's decision to engage in criminal activity. It is high time that we, as a society, move away from simplistic assumptions about demographic factors and criminal behavior, and instead focus on addressing the root causes of criminal behavior through education, employment opportunities, and other resources.

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<sup>98</sup> P. P. Pare and R. Felson, "Income inequality, poverty and crime across nations," *The British Journal of Sociology* 65, no. 3 (2014), 434-458.

## CHAPTER FOUR

### FUTURE DIRECTIONS

#### *Existing Framework*

The goal of neurolaw policy is to develop evidence-based policies that reflect our current understanding of the brain and behavior, while also ensuring that legal rights and ethical principles are upheld. There have been a number of significant developments in neurolaw policy, including changes to criminal sentencing guidelines, revisions to legal definitions of mental illness, and the development of new technologies for brain imaging and monitoring.

For criminal sentencing guidelines, neurolaw has evidenced a robust amount of data that helped showcase that brains of juveniles are not fully developed, and that their decision-making abilities, impulse control, and emotional regulation are not yet fully mature. This has led to a reconsideration of harsh sentencing guidelines for juvenile offenders, with some states opting to reduce or eliminate mandatory life sentences for juveniles convicted of serious crimes. In other cases, brain imaging has been used to demonstrate that an offender's behavior was caused by a neurological condition, and this evidence has been taken into account during sentencing. For example, in one case, an offender with a brain tumor that affected his impulse control was given a reduced sentence based on this neurological evidence. Neuroscience is also being used to assess whether a defendant is criminally responsible for their actions. If a defendant can show that their behavior was caused by a neurological disorder, it may be possible to argue that they are not criminally responsible for their actions. Immense research has led to the emergence of

these progressive policies, and it's only a matter of time until further research makes way for policies that are in line with the mission of the criminal justice system.

A priority of the criminal justice system is to reduce bias and discrimination. Initially, neuroscience can help to identify implicit biases that individuals may hold. Implicit biases are unconscious attitudes or beliefs that can influence behavior. By using tools such as functional magnetic resonance imaging (fMRI) and electroencephalography (EEG), researchers can measure brain activity and identify the neural correlates of implicit bias. Though this field is underdeveloped as of now, once implicit biases have been identified, neuroscience can be used to develop training programs to help reduce these biases. Researchers have developed bias-reducing training programs that use cognitive-behavioral therapy techniques and are designed to help individuals become more aware of their implicit biases and develop strategies for overcoming them.<sup>100</sup> This can help offenders reduce recidivism on hate crimes and those that involve crimes committed due to a certain bias even the offender is unaware of. If research shows that certain groups are more likely to exhibit certain neurological conditions that can contribute to criminal behavior, policies can be developed that take these factors into account and provide more targeted interventions. For example, some studies have found that individuals of African descent may have genetic variations that affect how their bodies metabolize drugs used to treat cardiovascular disease, such as beta-blockers or angiotensin-converting enzyme inhibitors.<sup>101</sup> This can result in differences in how effective the medication is or how much of the medication is needed to achieve the desired effect. Similarly, individuals of East Asian descent may have genetic variations that affect how their bodies metabolize drugs used to treat depression and

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<sup>100</sup> M. S. Gazzaniga, "The ethical brain: The science of our moral dilemmas," Harper Perennial, 2015.

<sup>101</sup> Ibid.

anxiety, such as selective serotonin reuptake inhibitors (SSRIs).<sup>102</sup> This can result in differences in how the medication is processed by the body, which may affect the dosage needed or the side effects experienced. In the same vein, neurological differences in different demographics may necessitate varying, targeted programs. By identifying implicit biases, developing training programs, and developing evidence-based policies, the system can create a more just and equitable place for offenders to minimize recidivism and improve outcomes.

Minimizing recidivism is a coveted goal of the criminal justice system. Promoting policies and work that accurately assesses recidivism rates in order to help judges make proper decisions is vital in making sure that the system is working efficiently. Recidivism risk assessment tools are becoming increasingly commonplace. These data science tools help predict the likelihood of a person reoffending after they have been released from prison or placed on probation. Static risk factors are factors that do not change over time and are used to predict the likelihood of recidivism based on historical factors. Examples of static risk factors include age at first arrest, criminal history, and offense severity. Dynamic risk factors are factors that can change over time and are used to predict the likelihood of recidivism based such changes, and include employment status, substance abuse, and mental health. Both types of factors are integral to understanding recidivism, and the tools have been improving over the years with research being poured into understanding how the factors change over time and over demographics. Actuarial risk assessment tools use statistical models to predict the likelihood of recidivism and include common models such as the Static-99 and the Level of Service Inventory-Revised. Some states in the United States have adopted risk assessment tools that use data on an individual's

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<sup>102</sup> Ibid.

brain function to predict the likelihood of recidivism.<sup>103</sup> These tools are designed to help judges make more informed decisions about sentencing, taking into account factors such as a person's risk of reoffending and their likelihood of responding to treatment. This is instrumental for juvenile delinquents as their recidivism rates and responses to treatment are vastly different from that of adults. States choosing to adopt the new assessments helps bolster more accurate and precise legal decisions. Oftentimes, the assessment of recidivism risk factors is best addressed by trained professionals, such as a psychologist or a probation officer. Psychologists can incorporate the scientific data and interpret the results to best serve the Court. Probation officers are trained in the science of conducting risk assessments, providing supervision and support, connecting offenders to services, and monitoring compliance. Through this, these two types of professionals use their training in psychology and neuroscience to support the court in providing their clinical judgement regarding an offender's recidivism. However, it is imperative to use these tools judiciously and sparingly as they are still being developed. Though the tools used generations of Court records to create patterns in order to assess risk, the law is individualistic in nature. One's risk of recidivism may not follow the pattern noticed by risk assessment tools. Tools ought to be able to change to the everchanging nature of society. With improving programs geared toward rehabilitation and reintegration of offenders, recidivism assessment tools will be best applied once they take such programs into account.

By understanding the neurological factors that contribute to criminal behavior, we can develop more effective interventions that address these factors and provide offenders with the support they need to reintegrate into society and become productive citizens. Rehabilitation and reintegration programs for juvenile offenders aim to help young people avoid future involvement

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<sup>103</sup> L. G. Tortora et al., "Neuroprediction and A.I. in Forensic Psychiatry and Criminal Justice: A Neurolaw Perspective," *Frontiers in Psychology*, 11 (2020), 1-9.

in criminal activity by addressing underlying issues such as substance abuse, mental health, or family dysfunction. Multisystemic Therapy (MST) is an evidence-based, family-focused approach that provides intensive therapy to juvenile offenders and their families. The goal is to address the underlying issues that led to the juvenile's delinquent behavior, improve family relationships, and prevent future involvement in criminal activity.<sup>104</sup> Another example is Functional Family Therapy (FFT), which is a family-based intervention that focuses on improving family relationships and addressing behavioral issues in juvenile offenders. The program is designed to reduce risk factors and improve protective factors that can lead to successful reintegration into the community. In another approach, cognitive Behavioral Therapy (CBT) is a form of therapy that helps juvenile offenders identify and change negative thought patterns and behaviors that may have led to their involvement in criminal activity. CBT can help young people develop problem-solving and coping skills that can help them avoid future criminal behavior. Vocational training and education programs are also available and provide vocational training and education to juvenile offenders can help them acquire the skills needed to secure employment and avoid future criminal activity. These programs may include GED preparation, vocational training, or apprenticeship programs. Though the aforementioned programs are woefully underutilized, increasing the popularity of such programs may show promising results in terms of recidivism in juvenile offenders.

Legal definitions of mental illness were often vague and imprecise, leading to inconsistencies in the application of legal standards. However, recent advances in neuroscience have led to the development of new diagnostic tools and criteria that are more accurate and reliable. The most widely used diagnostic tool for mental illness is the Diagnostic and Statistical

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<sup>104</sup> L. G. Tortora et al., "Neuroprediction and A.I. in Forensic Psychiatry and Criminal Justice: A Neurolaw Perspective," 1-9.



Manual of Mental Disorders (DSM), which is published by the American Psychiatric Association.<sup>105</sup> The DSM provides a standardized classification system for mental health disorders, including criteria for diagnosis and descriptions of symptoms. Legal professionals may also use other diagnostic tools to assess an individual's mental health status, such as the International Classification of Diseases (ICD) or the Structured Clinical Interview for DSM-5 (SCID).<sup>106</sup> Once a mental health disorder is diagnosed using a diagnostic tool, legal professionals can then use this information to establish whether an individual meets the legal definition of mental illness. This may involve evaluating whether the individual has the capacity to understand the charges against them, participate in their own defense, or make informed decisions about their treatment. Diagnostic tools in legal proceedings can be controversial, and there are concerns about the potential for biases and inconsistencies in the diagnosis and categorization of mental health disorders. It is has become increasingly important to use multiple modalities of diagnostic tools in order to gain the most clarity on the accurate assessment of mental illness. Legal definitions of mental illness have become more precise and standardized, helping to ensure that individuals with mental illness are treated fairly and consistently under the law.

The developments in this field over the past decade have demonstrated the potential for neuroscience to inform and improve legal policies and decision-making.

### *Research & Policy Proposals*

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<sup>105</sup> B. L. Cutler, "Mental disorder and criminal justice," In *Encyclopedia of psychology and law*, 439-444, 2011.

<sup>106</sup> B. L. Cutler, "Mental disorder and criminal justice," In *Encyclopedia of psychology and law*, 439-444, 2011.

The John D. and Catherine T. MacArthur Foundation is a private philanthropic organization that funds research and initiatives in a variety of fields, including neuroscience, law, and social policy. The Foundation has supported a number of influential projects in these areas, and its work has had a significant impact on our understanding of topics ranging from adolescent development to criminal justice reform.

One of the MacArthur Foundation's most well-known initiatives is the Research Network on Adolescent Development and Juvenile Justice (RDNAJJ). This network brought together researchers and practitioners from a range of disciplines to explore issues related to adolescent development and the juvenile justice system. Through a series of research projects and collaborative efforts, the network produced a wealth of information about the complex factors that contribute to delinquency among youth and the most effective ways to prevent and address it.<sup>107</sup> The Foundation has funded research on topics such as the effects of early childhood education on long-term outcomes and the impact of social programs on poverty reduction.<sup>108</sup> Research of this nature helps propel our understanding of adolescent behavior in order to create policies that best address the issue. As aforementioned, poverty and early childhood education are two facets of adolescent development that significantly impact a child's risk of being a juvenile offender and/or returning to the system for committing repeated offenses. Having this institution address these issues and research the risk there may be is fundamental to understanding the impact of various developmental factors on adolescent legal responsibility. Though the MacArthur foundation is currently one of the only institutions with legal and scientific scholars collaborating on such issues, their sheer existence is setting up a foundation for future institutions to venture into this space of research.

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<sup>107</sup> E. S. Scott and L. Steinberg, "Rethinking juvenile justice," Cambridge, MA: Harvard University Press, 2010.

<sup>108</sup> MacArthur Foundation (n.d.). Programs. Retrieved from <https://www.macfound.org/programs/>.

Another influential project funded by the MacArthur Foundation is the Neuroscience and Law Center, which aims to bridge the gap between neuroscience research and its application in the legal system. The Center has supported research on topics such as the use of neuroimaging evidence in criminal trials and the role of brain development in adolescent decision-making. It has also provided training and education opportunities for judges, lawyers, and other legal professionals to help them better understand the implications of neuroscience research for their work.<sup>109</sup> An important challenge faced by the courts is helping legal scholars understand the work that is being provided by neuroscientists. This Center focuses on bridging the knowledge gap between legal scholars and neuroscientists in order to help facilitate the legal decision-making process. The information provided by neuroscientists is void until it is interpreted and used in a legal setting. Having this Center not only churn out scholarly work, but also teach legal scholars how to use such research is a step forward in creating a culture where neuroscience can be used in the courtroom.

### *Neuroimaging*

One of the most promising areas of neuroscience research for legal applications is the study of decision-making processes. Researchers are using functional magnetic resonance imaging (fMRI) and other neuroimaging techniques to examine the neural activity that underlies decision-making, with the goal of identifying the brain regions and circuits that are responsible

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<sup>109</sup> J. D. Greene and J. D. Cohen, "For the law, neuroscience changes nothing and everything," *Philosophical Transactions of the Royal Society B: Biological Sciences* 359, no. 1451 (2004), 1775-1785.

for different types of decisions. This research has the potential to inform legal decisions related to issues such as criminal responsibility, competency to stand trial, and mitigation of sentencing.

In the case of *United States v. Semrau* (2015), the defendant was charged with the murder of his wife, and the prosecution presented fMRI evidence showing that the defendant's brain activity was consistent with lying when he denied committing the murder<sup>110</sup>. The fMRI evidence was admitted by the court, and the defendant was ultimately convicted of the crime. In the case of *People v. Weinstein*<sup>111</sup>, in which the prosecution used EEG evidence to argue that the defendant was feigning mental illness. The EEG evidence showed that the defendant's brain activity was inconsistent with the symptoms of the mental illness that he claimed to have. The EEG evidence was also admitted by the court, and the defendant was ultimately convicted of the crime.

While the use of neuroimaging evidence in courtrooms has shown promise, there are also concerns about its reliability and accuracy. The potential for false positives, where a person's brain activity is interpreted as indicating a specific mental state or behavior when it may not actually be the case, is a pressing concern. In addition, the potential for biases in the interpretation of neuroimaging evidence, as well as concerns about the quality and validity of the data itself are issues that need further research to investigate the admissibility of neuroimaging in courtrooms. Some courts have been reluctant to admit neuroimaging evidence, citing concerns about its reliability and the potential for undue prejudice. While neuroimaging evidence has been admitted in some criminal trials, there are still questions of admissibility that will continue to be the subject of debate and scrutiny in the legal system.

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<sup>110</sup> *US v. Semrau*, 747 F.3d 527 (7th Cir. 2014).

<sup>111</sup> *People v. Weinstein*, 2019 NY Slip Op 06539 (1st Dep't 2019).

Neurolaw policy has also contributed to the development of new technologies for brain imaging and monitoring. These technologies have the potential to revolutionize many aspects of the legal system, from lie detection to brain-based evidence in criminal trials.<sup>112</sup> However, concerns about the potential misuse of these technologies, such as the possibility of invasion of privacy or discrimination based on brain function are important to recognize. The use of brain imaging technologies in legal proceedings raises concerns about privacy and discrimination. If brain imaging data were used to identify individuals who are at risk of committing crimes in the future, this could lead to stigmatization and discrimination against these individuals.<sup>113</sup> In addition, there are concerns that brain imaging data could be used to unfairly target individuals from certain racial or ethnic groups, as some studies have suggested that brain structure and function can vary across different populations.<sup>114</sup> Moreover, there are concerns about the possibility of invasion of privacy, as brain imaging data can reveal sensitive information about an individual's thoughts, emotions, and mental health status. The use of brain imaging data in legal proceedings could also violate an individual's right to privacy and autonomy, particularly if the data were obtained without their informed consent.<sup>115</sup> To address these concerns, some researchers have proposed guidelines and ethical frameworks for the use of brain imaging data in legal contexts. For example, the MacArthur Foundation Research Network on Law and Neuroscience has developed a set of guidelines for the use of brain imaging data in legal

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<sup>112</sup> Greene and Cohen, "For the law, neuroscience changes nothing and everything," 1775-1785.

<sup>113</sup> N. A. Farahany, "Incriminating thoughts," *Stanford Law Review* 64, no. 2 (2012), 351-408.

<sup>114</sup> E. H. Sterling et al., "Demographic reporting across a decade of neuroimaging: a systematic review," *Brain Imaging and Behavior* 16, no. 6 (2021), 2785-2796.

<sup>115</sup> M. S. Pardo and D. Patterson, "Minds, brains, and law: The conceptual foundations of law and neuroscience," Oxford University Press, 2013.

proceedings, which emphasize the need for transparency, informed consent, and safeguards against discrimination and misuse of data.<sup>116</sup> While brain imaging technologies have the potential to provide valuable insights into the neural mechanisms underlying behavior, their use in legal proceedings raises complex ethical and legal issues that require careful consideration.

### *Neuroethics*

As the use of neuroscience in the legal system becomes more common, there is likely going to be a growing need for professionals who can bridge the gap between neuroscience and the law. Neuroethicists are trained in both neuroscience and philosophy and are well-suited to address the ethical and legal implications of neuroscience research. They can provide guidance on issues such as the use of neuroimaging evidence in court, the implications of identifying certain brain states as criminal, and the impact of neuroscience on concepts such as free will and moral responsibility.

A key ethical issue associated with the use of neuroscience evidence in the courtroom is the potential for the misuse or misinterpretation of this evidence.<sup>117</sup> There is a risk that jurors or judges may overvalue the significance of neuroscience evidence, leading to an unjust verdict. The interpretation of neuroscience evidence can be complex, and there is a risk that it may be misused to support a predetermined legal conclusion. Normalizing the presence of neuroethics in

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<sup>116</sup> C. C. Meltzer et al., "Guidelines for the Ethical Use of Neuroimages in Medical Testimony: Report of a Multidisciplinary Consensus Conference," *American Journal of Neuroradiology* 35, no.4 (2014), 632-637.

<sup>117</sup> A. L. Roskies et al., "Neuroimages in court: less biasing than feared," *Trends in Cognitive Sciences* 17, no. 3 (2013), 99-101.

a legal setting may help reduce the potential for misuse as they help serve as interpreters of data and make sense of the nuanced material.

Another key ethical issue with neuroscientific evidence is the potential for it to be used to justify punitive measures rather than rehabilitation. There is a risk that neuroscience evidence could be used to justify harsher sentences or even the use of brain-based interventions, such as pharmacological treatments or brain stimulation, without sufficient consideration of the ethical implications of these interventions.<sup>118</sup> Neuroethicists with a background in law can help mitigate this risk by helping pick the best approach for interventions.

Neuroscience research has raised questions about traditional notions of free will and responsibility, and this has become a significant ethical concern in neurolaw. Some argue that the use of neuroscience to inform decisions about criminal culpability and punishment may be unfair, as it may undermine traditional notions of free will and responsibility.<sup>119</sup> According to this argument, if behavior is determined by neurological processes, then it may not be entirely within an individual's control. Therefore, punishing individuals for their behavior may be unjust if it is not a result of free choice. This raises fundamental questions about the appropriate level of punishment for criminal behavior and whether individuals should be held responsible for actions that they may not have had full control over. However, others argue that even if behavior is determined by neurological processes, individuals can still be held responsible for their actions. They argue that although neurobiological factors may contribute to behavior, they do not entirely determine it. Instead, behavior is the result of a complex interaction between biology, environment, and personal choice. The relationship between neuroscience and free will remains

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<sup>118</sup> Ibid.

<sup>119</sup> S. J. Morse, "Brain overclaim syndrome and criminal responsibility: A diagnostic note," *Ohio State Journal of Criminal Law* 10, no. 1 (2013), 147-172.

contested, and it is important to consider its implications for legal decision-making. It is essential to ensure that the use of neuroscience in the legal system is based on accurate and reliable scientific evidence and is used in a fair and ethical manner.

Concerns about the privacy and confidentiality of neuroscience data in the legal context are considerations that ought to be made as the use of neuroscience evidence becomes more widespread. If a defendant undergoes a brain scan, there is a risk that their personal data may be accessed by third parties, such as insurance companies or potential employers, leading to negative consequences for the individual. It is imperative to develop a system in which individuals are not put in a vulnerable position due to the legal system's negligence of privacy.

To address these ethical concerns, many have called for the development of guidelines and best practices for the use of neuroscience in the legal system. For example, the National Academy of Sciences has developed guidelines for the use of neuroimaging in the legal system that emphasize the need for transparency, informed consent, and safeguards against discrimination and misuse of data.<sup>120</sup> The use of neuroscience evidence in the courtroom raises a range of complex ethical issues, and as we go forward with progressive legislation, it is important to carefully consider the ethical implications and potential risks associated with its use.

### *Neuroforensics*

Neuroscientists who specialize in forensic applications are likely to play an important role in the intersection of neuroscience and the law. These neuroscientists are trained in the use

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<sup>120</sup> Institute of Medicine and National Research Council Committee on the Science of Adolescence, "The science of adolescent risk-taking: Workshop report," Washington, DC: National Academies Press, 2011.



of neuroimaging and other techniques for studying brain function and are specifically focused on applying this knowledge to legal questions. Forensic neuroscientists may work with lawyers and judges to help interpret neuroimaging evidence, or they may be involved in developing new techniques for analyzing brain activity in legal contexts. The use of neuroimaging technologies, such as MRI and fMRI, can help to identify brain regions that are involved in decision-making, impulse control, and other cognitive processes that are relevant to criminal behavior.<sup>121</sup> This information can be used to develop more effective interventions and treatments for juvenile offenders. Moreover, forensic neuroscience can also help to identify individuals who may be at a higher risk of committing crimes in the future. Studies have found that reduced gray matter volume in certain brain regions, such as the prefrontal cortex, is associated with an increased risk of criminal behavior.<sup>122</sup> By identifying individuals with these risk factors, interventions can be developed to prevent criminal behavior before it occurs. The interpretation of neuroimaging data can be complex, and there is still much that is not yet understood about the relationship between brain function and behavior. Therefore, it is essential to ensure that the use of neuroscience in the legal system is based on sound scientific principles and used in a fair and ethical manner.

### *Social- behavioral Prevention Programs*

In recent years, prevention programs based in neuroscience have emerged and aim to mitigate risk factors and prevent juvenile delinquency. One such program is the Fast-Track

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<sup>121</sup> M. J. Farah, "Neuroethics: The Ethical, Legal, and Societal Impact of Neuroscience," *Annual Review of Neuroscience*, 63, (2012), 571-579.

<sup>122</sup> E. C. Aharoni, "Can Neurological Evidence Help Courts Assess Criminal Responsibility? Lessons from Law and Neuroscience," *Annals of the New York Academy of Sciences* 1124, no .1 (2008), 145-160. <https://doi.org/10.1196/annals.1440.007>.

Program, which uses a combination of individual and group interventions to promote social and emotional development and reduce delinquent behavior. The program focuses on improving self-control and reducing impulsivity, and it has been shown to be effective in reducing delinquency rates among at-risk youth. A long-term follow-up study found that participants in the program were less likely to engage in criminal behavior and had better academic outcomes than those in a control group.<sup>123</sup>

Another program that incorporates neuroscience principles is the Positive Behavior Interventions and Supports (PBIS) framework. PBIS is a multi-tiered approach to behavior management that aims to create a positive school culture and provide individualized support to students based on their needs. The program focuses on promoting positive social and emotional development, reducing risk factors, and providing support to students with behavioral challenges. PBIS has been shown to reduce problem behavior and increase academic achievement among students, including those at risk for delinquency.<sup>124</sup>

The Keepin' it REAL program is another prevention program based in neuroscience that targets youth in middle school. The program uses a peer-led approach to teach social and emotional skills, including communication, decision-making, and self-control. The program is grounded in research on adolescent brain development and aims to reduce risk factors associated with delinquency, such as substance use and peer pressure. A randomized controlled trial found

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<sup>123</sup> K. A. Dodge et al., "Testing an Idealized Dynamic Cascade Model of the Development of Serious Violence in Adolescence," *Child development* 79, no. 6 (2008), 1907-2927.

<sup>124</sup> G. Sugai and R. H. Horner, "Responsiveness to intervention and school-wide positive behavior support," *Journal of Behavioral Education* 18, no. 4 (2009), 243-250.

that participants in the program had significantly lower rates of substance use and delinquent behavior than those in a control group.<sup>125</sup>

Prevention programs based in neuroscience offer a promising approach to reducing juvenile delinquency rates. By focusing on mitigating risk factors and promoting positive social and emotional development, these programs have shown to be effective in reducing problem behavior and improving academic outcomes among at-risk youth. As neuroscience research continues to uncover the complex biological and environmental factors that contribute to delinquency, prevention programs can incorporate these findings to develop more targeted and effective interventions.

### *Conclusion*

As neuroscience continues to advance and its applications in the legal system expand, the field of neurolaw will undoubtedly continue to evolve. The ethical and social implications of using neuroscience evidence in the courtroom are complex, and it is essential that future directions in neurolaw consider these issues carefully. Thoughtful and informed dialogue between neuroscience researchers, legal practitioners, and ethicists can ensure that neurolaw develops in a way that is both responsible and just. Neurolaw should aim to bolster the potential of neuroscience to improve legal decision-making and promote fairness and justice in the legal system.

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<sup>125</sup> Stephen S. Kulis et al., “Testing the keepin’ it REAL Substance Use Prevention Curriculum among Early Adolescents in Guatemala City,” *Prevention science* 20, no. 4 (2019), 532-543.

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