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Note

The Brain on Death Row: Reconciling Neuroscience & Categorical Exemptions from Execution

Alexa Johnson-Gomez*

I. INTRODUCTION

The death penalty has long been a fixture of the American justice system, but in the 21st century, a new player has entered the arena: the brain. Neuroscience has become a crucial tool in assessing moral blameworthiness and determining whether execution is appropriate.¹ It has been used in crafting Eighth Amendment jurisprudence,² and in practice, as the sentencing phase of capital trials often features stories about defendants' brains during arguments for mitigating factors.³ However, as

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1. While this Note focuses on neuroscience in particular, this analysis necessarily involves other disciplines of neuropsychology, neuropsychiatry, developmental psychology, etc. which all consider the biological bases of learning, perception, and behavior.

2. Modern Eighth Amendment jurisprudence has limited the scope of who is death penalty eligible by exempting certain classes from execution. *See Roper v. Simmons*, 543 U.S. 551, 558 (2005) (holding that execution of juveniles is unconstitutional); *Atkins v. Virginia*, 536 U.S. 304, 307, 321 (2002) (finding that executing someone with an intellectual disability is cruel and unusual punishment).

3. Capital trials are bifurcated into a guilt phase and a sentencing phase. *Gregg v. Georgia*, 428 U.S. 153, 195 (1976) (holding that we can prevent the arbitrary application of the death penalty with “a system that provides for a bifurcated proceeding at which the sentencing authority is apprised of the information relevant to the imposition of sentence and provided with standards to guide its use of the information”). Generally, in criminal law, mitigating factors support leniency in sentencing. *Aggravating and Mitigating Factors in Criminal Sentencing*, JUSTIA, <https://www.justia.com/criminal/aggravating-mitigating-factors/> (last visited Feb. 24, 2023). In capital trials, mitigation

this Note argues, using the brain to establish categorical exemptions from the death penalty has been fraught with challenges, and a fundamental restructuring of its use is necessary.

As background, Part I of this Note will first consider Supreme Court jurisprudence on the Eighth Amendment and proportionality of punishments—a critical aspect of how neuroscience fits into categorical exemptions from execution—then engage in a literature review of neuroscience research relevant to discussions of the death penalty. Part II of this Note will lay out the major categorical exemptions from the death penalty and consider how notions about the brain have been foundational to the creation of these exemptions, arguing that the Supreme Court has largely misapplied or failed to apply neuroscience to these categorical exemptions, resulting in problematic constructs and flawed rules.

II. BACKGROUND

A. CAPITAL PUNISHMENT, THE EIGHTH AMENDMENT, & PROPORTIONALITY REVIEW

Since the 1970s, courts have bifurcated capital trials into guilt and sentencing phases.⁴ The purpose of a sentencing phase is for the jury to consider how blameworthy an individual is when pondering extraneous factors and to ensure that only those deserving of execution receive death sentences.⁵ The Supreme Court has established that only individuals who fall within a “narrow category of the most serious of crimes” should be executed.⁶ To narrow the class of murderers, jurors must contemplate that if an individual has committed a murder, how truly blameworthy is he for his actions—or were there mitigating factors at play? Put another way, we seek to achieve proportionality of punishment from the front end by conducting bifurcated trials.

specifically refers to evidence introduced during sentencing that supports why a defendant should not be sentenced to death. *Mitigation in Capital Cases*, CAPITAL PUNISHMENT IN CONTEXT, <https://capitalpunishmentincontext.org/issues/mitigation> (last visited Feb. 24, 2023).

4. *See Gregg*, 428 U.S. at 195.

5. *Id.* at 197 (“[A jury] must find a statutory aggravating circumstance before recommending a sentence of death.”).

6. *Atkins*, 536 U.S. at 319.

During the sentencing phase, jurors engage in factfinding of aggravating and mitigating factors so that these factors can be weighed to reach a sentence of life or death.⁷ Common aggravating factors are, e.g., having more than one murder victim, being especially vile or involving “depravity of mind,” and committing murder for financial gain.⁸ Common mitigating factors are, e.g., no criminal history, the defendant was under the extreme influence or domination of another, and the defendant was substantially mentally impaired at the time because of drug use or severe mental illness.⁹ Overall, individual-based mitigation allows courts to weigh whether an individual is in the narrow class of murderers who should be put to death, or if his blameworthiness falls short of that required for execution.

Courts consider proportionality in a backward-looking fashion when appellate courts contemplate if execution in certain situations, or of certain classes, is fair or reasonable. These analyses are squarely in the domain of the Eighth Amendment. In the modern era of capital punishment, the Supreme Court has held that the death penalty can comport with the requirements of the Eighth Amendment if it is applied in a manner that is not arbitrary or capricious.¹⁰ Proportional, non-capricious capital punishment is achieved when the class of people sentenced to death has been consistently and genuinely narrowed to those who are “the most deserving of execution.”¹¹ Ultimately, proportionality review allows courts to make big-picture determinations of when classes or persons should be exempt from execution, reflecting the maxim “that the death penalty is reserved for a narrow category of crimes and offenders.”¹²

When proportionality is at issue, the Supreme Court looks to the “history, tradition, and precedent” of the Eighth

7. See JUSTIA, *supra* note 3; Charles Montaldo, *Aggravating and Mitigating Factors*, THOUGHTCO (Feb. 12, 2019), <https://www.thoughtco.com/aggravating-and-mitigating-factors-971177> (explaining that weighing practices differ by state depending on the laws).

8. See, e.g., MO. REV. STAT. § 565.032.

9. See, e.g., NEB. REV. STAT. § 29-2523.

10. *Pulley v. Harris*, 465 U.S. 37, 49–50 (1984).

11. *Atkins*, 536 U.S. at 319; see also *Zant v. Stephens*, 462 U.S. 862, 877 (1983).

12. *Roper v. Simmons*, 543 U.S. 551, 568–69 (2005).

Amendment in addition to regard “for its purpose and function in the constitutional design.”¹³ To that end, a textualist interpretation of the Eighth Amendment must always be tempered with the “evolving standards of decency that mark the progress of a maturing society,” standards which are usually a focal point in Eighth Amendment cases.¹⁴ For example, the Court ruled in *Thompson v. Oklahoma* that standards of decency prohibit the execution of an offender who was under sixteen at the time of an alleged murder, in part because “respected professional organizations” and “leading members of the Western European community” had called for a ban on such executions, and these bodies are important figureheads of society’s standards of decency.¹⁵ Admittedly, it is hard to know whether the current Supreme Court would continue to approach Eighth Amendment interpretation through the lens of evolving standards of decency when recent holdings indicate modern legal rules need a historical “analogue” to withstand scrutiny.¹⁶ But an Eighth Amendment case addressing evolving standards of decency as a tool for assessing cruel and unusual punishment has yet to come before the current Court.

In sum, to engage in a proportionality review, we must think about the blameworthiness of individuals and if certain classes of individuals are less blameworthy because of a particular status. One tool used by the Court to assess blameworthiness is neuroscience. Additionally, the analysis must look to case precedent on the Eighth Amendment and think about the history and tradition of punishment alongside the evolving standards of decency. Societal consensus can help us figure out modern standards of decency, which we can measure through the actual practices of states.

B. CATEGORICAL EXEMPTIONS

Because of the discussed proportionality concerns, there are specific instances when the Supreme Court has held certain classes should be per se exempt from the death penalty. These classes are those with intellectual disabilities and individuals who were juveniles when they committed a murder. Another

13. *Id.* at 560.

14. *Trop v. Dulles*, 356 U.S. 86, 100–01 (1958) (plurality opinion).

15. *Thompson v. Oklahoma*, 487 U.S. 815, 830 (1988) (plurality opinion).

16. *N.Y. State Rifle & Pistol Ass’n v. Bruen*, 142 U.S. 2111, 2133 (2022).

class, albeit ill-defined, is those who are “not competent to be executed” because of significant psychiatric delusion or so-called insanity.

In 2002, the Supreme Court decided *Atkins v. Virginia*, holding that the execution of people with intellectual disabilities (“ID”) is unconstitutional.¹⁷ The Court observed that a national consensus had emerged by states no longer practicing execution of those with ID.¹⁸ The Court acknowledged that the issue often became how to determine who has ID instead of whether or not to execute the intellectually disabled, but left it to the states to develop ways to enforce this rule.¹⁹ *Hall v. Florida* later nuanced the rule in *Atkins*, establishing that a rigid rule delineating intellectual disability at an IQ of 70 and refusing to litigate the possibility of ID in “borderline” defendants was an unconstitutional application of *Atkins*.²⁰

The Supreme Court then held in *Roper v. Simmons* (2005) that if a murder was committed by an individual who was younger than eighteen at the time of the alleged crime, execution would be cruel and unusual punishment.²¹ The Court reasoned that scientific evidence on brain development indicated that juveniles are less blameworthy for their actions, which reflects how society does not trust juveniles “with the privileges and responsibilities of an adult,” and that a juvenile’s “irresponsible conduct is not as morally reprehensible as that of an adult.”²² The Court also relied upon societal consensus, i.e., actual practices of states moving away from the teenage death penalty: only three states in the decade before the *Roper* opinion executed individuals who had been juveniles,²³ and thus the Court reasoned that society had reached a consensus that juveniles are categorically less blameworthy for their actions.²⁴

17. *Atkins*, 536 U.S. at 321. This Note uses the term “intellectual disability” instead of “mental retardation,” the language used in *Atkins v. Virginia*. See generally Schalock et al., *The Renaming of Mental Retardation: Understanding the Change to the Term Intellectual Disability*, 45 INTELL. DEV. DISABILITIES 116 (2007).

18. *Id.* at 314–15.

19. *Id.* at 317.

20. *Hall v. Florida*, 572 U.S. 701, 704 (2014).

21. *Roper*, 543 U.S. at 556.

22. *Thompson*, 487 U.S. at 835.

23. *Roper*, 543 U.S. at 565.

24. *Id.* at 567. Also relevant to societal consensus was that the U.S. had become a global outlier in its practice of executing those who were juveniles

The third categorical exemption is those who are incompetent to be executed, or what was historically called “insanity.” Admittedly, this category is not a clearly defined class like the classes in *Atkins* or *Roper*. But the Court recently refined the concept of competency in *Madison v. Alabama*, holding that an individual is incompetent to be executed when they cannot rationally understand why they are being executed.²⁵ Not being able to remember the crime is not enough, as one could plausibly still understand why they are facing execution even when lacking a memory of the crime.²⁶ For example, individuals experiencing debilitating mental illness or significant health conditions affecting cognition such as dementia might lack a rational understanding of the punishment they are facing.²⁷ This principle is grounded in English common law, tracing back to the idea that it is cruel to execute the insane.²⁸ While competency to be executed differs in its criteria from *Atkins* and *Roper*—there is no singular diagnosis or condition that establishes categorical exemption²⁹—it still establishes a theoretical class of persons who should be exempt: those who lack a rational understanding of why they are being executed. However, the rule as updated by *Madison* is somewhat analogous to *Atkins*; both exemptions are based on sub-average or abnormal brain functioning that significantly

when they committed a murder. *Id.* at 576 (“Our determination that the death penalty is disproportionate punishment for offenders under 18 finds confirmation in the stark reality that the United States is the only country in the world that continues to give official sanction to the juvenile death penalty.”).

25. *Madison v. Alabama*, 139 S. Ct. 718, 722 (2019); *see also* *Panetti v. Quarterman*, 551 U.S. 930, 959 (2007) (holding that execution is prohibited when a mental illness prevents the individual from “rational understanding” of why they are being executed); *Ford v. Wainwright*, 477 U.S. 399, 406 (1986) (ruling that the Eighth Amendment bars execution of an individual who has “lost his sanity” during imprisonment).

26. *E.g.*, *Madison*, 139 S. Ct. at 726.

27. *Id.* at 721.

28. SIR EDWARD COKE, 3 INSTITUTES OF THE LAWS OF ENGLAND 4 (6th ed. 1680) (stating that “when a mad man is executed” it is extreme “inhumanity and cruelty,” and provides no deterrence or purpose to society).

29. Marissa Stanziani et al., *Marking the Progress of a “Maturing” Society: Madison v. Alabama and Competency for Execution Evaluations*, 26 PSYCH. PUB. POL’Y L. 145, 151 (“[The *Madison* Court] clarified and expanded *Ford* and *Panetti* by specifying that the offender’s mental health diagnosis was not pertinent to his or her CFE status. Instead, the functional abilities associated with the diagnosis should be the court’s focus.”).

affects the perception of the individual, so much so that we believe execution would be cruel and unusual.

These cases importantly show how an emphasis on the brain, brain development, brain functioning, etc. has been adopted by the Supreme Court in modern categorical exemptions. No other categories of people are fully exempt from execution, and these classes are exempt because of notions about brain function diminishing one's moral blameworthiness for a murder. However, neuroscience alone does not carry the weight of these exemptions; as repeatedly highlighted by the Court, societal consensus must also be present to establish a class-based exemption.

C. NEUROSCIENCE LITERATURE REVIEW

This subsection provides background on both the practice of using neuroscience in criminal cases and neuroscience findings relevant to this Note's focus on the death penalty. Beginning broadly, this subsection describes the criminal law's use of neuroscience, then focuses on neuroscience topics relevant to punishment and proportionality, and lastly puts forth neuroscience research most narrowly relevant to the three categorical exemptions.

1. Neuroscience in the Courtroom

Criminal law necessarily invokes questions of how brains work by considering one's mental state at the time of the act.³⁰ Thus, it is unsurprising that courts have been increasingly using neuroscience over the past few decades.³¹ This began with a surge of utilizing forensic neuropsychology in personal injury cases in the 1990s, and usage in criminal cases followed.³² For purposes of criminal defense, the role of neuroscience still is continuing to evolve. Defense counsel might use neuroscience in

30. Owen D. Jones & Francis X. Shen, *Law & Neuroscience: What, Why, and Where to Begin*, THE MACARTHUR FOUND. RSCH. NETWORK ON L. AND NEUROSCIENCE (2017), <https://www.lawneuro.org/neurolawintro.pdf>.

31. *Id.* at 1–2. See generally Stephen J. Morse, *Actions Speak Louder Than Images: The Use of Neuroscientific Evidence in Criminal Cases*, 3(2) J. L. & BIOSCIENCES 336, 341 (2016); Jennifer Bard, "Ah Yes, I Remember It Well": Why the Inherent Unreliability of Human Memory Makes Brain Imaging Technology a Poor Measure of Truth-Telling in the Courtroom, 94 OR. L. REV. 295 (2016).

32. Francis X. Shen, *The Overlooked History of Neurolaw*, 85 FORDHAM L. REV. 667, 668 (2016).

explaining the factors affecting a defendant's mental state such as substance abuse addiction or mental illness.³³ Research has also recently indicated that neuroimaging can measure and differentiate between mens rea states, an important element of establishing the moral culpability of defendants.³⁴

Ultimately, scholars argue that neuroscience ought to provide us with a more informed approach to sentencing, especially when the factors that neuroscientists have discovered most impact human behavior are currently "irrelevant to the analysis [judges are] supposed to conduct."³⁵ With neuroscience as a tool in the courtroom, we can be empowered to nuance retributivist approaches to capital cases, entering the sentencing phase with a closer focus on defendants' brain functioning.³⁶

In capital cases, neuroscience is very frequently used in the sentencing phase;³⁷ defense counsel can use neuroscientific evidence to argue mitigating factors, establishing that defendants are less blameworthy and thus deserve life

33. Elizabeth Bennett, *Neuroscience and Criminal Law: Have We Been Getting It Wrong for Centuries and Where Do We Go from Here?*, 85 FORDHAM L. REV. 437, 437 (2016).

34. Owen D. Jones et al., *Detecting Mens Rea in the Brain*, 169 U. PA. L. REV. 1, 21 (2020) (describing the results of an experimental paradigm that elicited mental states like "knowingly" or "recklessly" and measured the activity with a combination of fMRI brain imaging and algorithmic artificial intelligence).

35. Nancy Gertner, *Neuroscience and Sentencing*, 85 FORDHAM L. REV. 533, 533 (2016).

36. *Id.* at 544. To be sure, retributivism has been a theory of punishment for as long as punishment itself has existed. Some would argue that the mere purpose of revenge is a worthy enough reason to enact the death penalty on its own. *See, e.g.*, Robert Blecker, *If Not the Parkland Shooter, Who is the Death Penalty For?*, N.Y. TIMES (Oct. 27, 2022), <https://www.nytimes.com/2022/10/27/opinion/parkland-death-penalty-justice.html?searchResultPosition=1> (arguing that retribution restores moral balance to society). Yet the fundamental problem with retributivism, when used as the singular rationale for the death penalty, is that retributivism promotes punishment for its own sake, and can seldom be perfectly proportional, as determinations of proportionality are often subjective and arbitrary. It is difficult to properly ensure that punishment is proportionate to the crime, and when the punishment is irreversible, retributivism cannot and should not be the only underlying theory.

37. Between 2004 and 2012, Professor Nita Farahany tracked about 2,000 examples of neuroscientific evidence introduced at trial, with the most common utilization being in capital mitigation. Kevin Davis, *Brain Trials: Neuroscience Is Taking a Stand in the Courtroom*, 98 A.B.A. J. 37, 41 (2012).

imprisonment instead of the death penalty.³⁸ This evidence can help prove aspects of the defendant's character, history, or factors regarding the convicted offense "that the defendant proffers as a basis for a sentence less than death."³⁹ Indeed, neuroscience evidence could be critical during sentencing for those who have lived traumatic lives before committing crimes.⁴⁰ Defense counsel can use "cutting-edge brain imaging research on the neurobiological roots of criminal violence" within the brains of defendants to make their mitigation arguments.⁴¹

A salient example of how this can work in practice is post-traumatic stress disorder as a mitigating factor. More than just having an obvious relationship to one's behavior, PTSD has been known to change the amygdala, which governs emotion, and such changes can heighten an individual's levels of aggression.⁴² Thus, a demonstration by defense counsel of visualized changes to the brain, with a demonstration that such changes came from PTSD, can be a compelling narrative to present for mitigation. While some defense attorneys have successfully used PTSD to argue mitigating factors, courts have often only been willing to accept this as a basis for criminal behavior in certain cases, such as when defendants are veterans or battered women.⁴³ There are likely some skeptical judges who are not yet willing to buy into certain brain-based mitigation arguments, even when defense counsel can present clear evidence of changes with neuroimaging.

A niche of the neuroscientific field that is philosophically called into question in discussions of punishment is the emergent concept of neuroplasticity, "that the brain is constantly

38. Deborah W. Denno, *The Myth of the Double-Edged Sword: An Empirical Study of Neuroscience Evidence in Criminal Cases*, 56 B.C. L. REV. 493, 501–04 (2015).

39. *Kansas v. Marsh*, 548 U.S. 163, 174 (2006) (quoting *Lockett v. Ohio*, 438 U.S. 586, 604 (1978)).

40. Bernice B. Donald & Erica Bakies, *A Glimpse Inside the Brain's Black Box: Understanding the Role of Neuroscience in Criminal Sentencing*, 85 FORDHAM L. REV. 481, 502 (2016).

41. O. Carter Snead, *Neuroimaging and the "Complexity" of Capital Punishment*, 82 N.Y.U. L. REV. 1265, 1269 (2007).

42. Jacob C. Nordman et al., *Potentiation of Divergent Medial Amygdala Pathways Drives Experience-Dependent Aggression Escalation*, 40 J. NEUROSCI. 4858, 4874 (2020).

43. Betsy J. Grey, *Neuroscience, PTSD, and Sentencing Mitigation*, 34 CARDOZO L. REV. 53, 54 (2012).

generating new neurons and therefore is constantly changing.”⁴⁴ Generally, the human brain is composed of a vast network of neurons that communicate with each other through synapses.⁴⁵ When we learn new information, our brain forms new connections between these neurons.⁴⁶ These connections can be strengthened or weakened based on the frequency of use, and strengthened connections are what allow learning to occur.⁴⁷ However, neuroplasticity can go beyond strengthening connections and involve the ability of the brain to reorganize its networks, create new pathways, and adapt to changes in the environment. A strong example of neuroplasticity is the brain’s ability to recover from a stroke.⁴⁸ After a stroke, the brain can reorganize its networks, form new connections, and activate new regions to compensate for the damage.⁴⁹ This process of rewiring can lead to functional recovery, with individuals regaining some or all of their lost motor or cognitive abilities.⁵⁰

Research has shown that various interventions can enhance neuroplasticity, such as physical exercise, cognitive training, and non-invasive brain stimulation.⁵¹ These interventions promote the formation of new connections, improve cognitive function, and increase the density of gray matter even in individuals with neurological disorders.⁵² Gray matter, also called the cerebral cortex, is the outermost layer of the brain involved in many high-level functions such as problem-solving, behavioral control, conscious thought, intelligence, etc.⁵³ In other words, certain interventions can have a truly positive

44. Deborah W. Denno, *The Place for Neuroscience in Criminal Law*, in PHIL. FOUNDS. OF L. & NEUROSCI. 69, 81 (Dennis Patterson & Michael S. Pardo eds., 2016).

45. Kayt Sukel, *What Happens at The Synapse?*, DANA FOUND. (Aug. 1, 2019), <https://dana.org/article/qa-neurotransmission-the-synapse/>.

46. *Brain Anatomy and How the Brain Works*, JOHNS HOPKINS MED., <http://www.hopkinsmedicine.org/health/conditions-and-diseases/anatomy-of-the-brain> (last visited Mar. 2, 2023).

47. Sukel, *supra* note 45.

48. Steven C. Cramer, *Repairing the Human Brain After Stroke: I. Mechanisms of Spontaneous Recovery*, 63 ANNALS NEUROLOGY 272, 277 (2008).

49. *Id.*

50. *Id.* at 273.

51. B. Draganski & A. May, *Training-Induced Structural Changes in the Adult Human Brain*, 192 BEHAV. BRAIN RSCH. 137, 139 (2008).

52. *Id.*

53. *Cerebral Cortex*, CLEVELAND CLINIC, <https://my.clevelandclinic.org/health/articles/23073-cerebral-cortex> (last visited Mar. 21, 2023).

impact on the brain, our thoughts, and our behavior, even when serious disorders or health conditions like stroke are present in the brain.

Neuroplasticity is relevant in considering not only the effect of punishments but also the permanence of them—how might a brain change many decades after a crime? Will the individual still be likely to commit murder? How do many years in prison change an individual neurologically? Most crucially, taken alongside the death penalty, neuroplasticity has colossal implications. Execution is an irreversible penalty, so an individual's demonstrable ability for change is something we are expressly eliminating through enacting the punishment. When we sentence an individual to death, we are philosophically deciding that his ability for change should be erased.

2. Neuroscience Relevant to Categorical Exemptions

The previously discussed categorical exemptions developed by *Roper v. Simmons*, *Atkins v. Virginia*, and *Madison v. Alabama* are in existence because of notions of brain function, development, and maturation. We think about how the brain works when we contemplate moral blameworthiness as it relates to the death penalty.

Roper relied on findings about the development of the brain in adolescence.⁵⁴ What many would recognize intuitively, that adolescents engage in “risky behavior” like criminal acts “to a greater extent than older adults,” has been backed up by neuroscience.⁵⁵ It is also clear that those with still-developing brains are more impulsive, more likely to focus on potential rewards instead of potential costs, and more likely to be short-sighted regarding consequences.⁵⁶ These attributes are even more salient in “the heat of the moment” and the presence of peers.⁵⁷ However, in the years since 2005, recent studies have displayed that brain development extends past the late teens and into one's early twenties; the brain simply does not conclude

54. *Roper*, 543 U.S. at 567.

55. Elizabeth S. Scott et al., *Young Adulthood as a Transitional Legal Category: Science, Social Change, and Justice Policy*, 85 *FORDHAM L. REV.* 641, 642 (2016).

56. Kathryn Monahan et al., *Juvenile Justice Policy and Practice: A Developmental Perspective*, 44 *CRIME & JUST.* 577, 586 (2015).

57. *Id.* at 587.

its maturation at age eighteen.⁵⁸ Some studies have imaged the brain from the juvenile period into young adulthood, and show demonstrably that there is “continued regional development of the prefrontal cortex,” into the early twenties.⁵⁹ This is key, as the prefrontal cortex is “implicated in judgment and self-control,” mental processes that are directly invoked when individuals are approaching dangerous situations.⁶⁰

The *Atkins* Court did not grapple with the underlying science and only considered the idea of sub-average intellectual functioning by superficially referencing IQ scores.⁶¹ Any brain-based inquiry was left for states to consider as they created their statutory schemes for who has an ID.⁶² Yet neuroscience can help us understand how brains with ID differ, an important concept for considering why we might categorically exempt the class from execution. Neuroscience research has revealed that individuals with ID have distinct differences in brain structure and function compared to typically developing individuals. Individuals with ID have differences in white matter pathways, particularly in the frontal and temporal lobes, which are important for cognitive functions such as attention and memory.⁶³ This may contribute to the difficulties individuals with ID have in learning and retaining new information.⁶⁴ One neuroimaging study found that people with down syndrome have cognitive alterations in regions critical to learning like the prefrontal cortex and the hippocampus.⁶⁵ Similar abnormal connectivity between the prefrontal cortex and hippocampus is found in people with schizophrenia, autism, Parkinson’s disease, and Alzheimer’s disease.⁶⁶

While not as grounded in science as *Roper*, *Madison* considered a common-sense understanding of how brain function

58. Scott et al., *supra* note 55, at 642.

59. Alexandra O. Cohen et al., *When Does a Juvenile Become an Adult? Implications for Law and Policy*, 88 TEMP. L. REV. 769, 783 (2016).

60. *Id.*

61. *Atkins*, 536 U.S. at 316–17.

62. *Id.* at 317.

63. W. E. Brown et al., *Preliminary Evidence of Widespread Morphological Variations of the Brain in Dyslexia*, 56 NEUROLOGY 781 (2001).

64. *Id.*

65. Maria Alemany-González et al., *Prefrontal-Hippocampal Functional Connectivity Encodes Recognition Memory and Is Impaired in Intellectual Disability*, 117 PROC. NAT’L ACAD. SCI. U.S.A. 11788 (2020).

66. *Id.*

might play into exempting those who are incompetent to be executed, especially in light of previous holdings in *Panetti* and *Ford*.⁶⁷ The category developed by these cases is those who cannot rationally understand that they face execution.⁶⁸ Yet considering that this rule hinges upon an individual's perception and aberrant functioning in his brain, it is wholly surprising that neuroscience has been underutilized in competency evaluations.⁶⁹ Little to no research has been done empirically on what incompetency for execution looks like on an individual basis—most likely because so few people succeed in bringing this defense. Perhaps one reason for the lack of neuroscience in competency considerations is that we still have a long way to go before we can look at neuroimaging and translate that into a clear psychiatric diagnosis.⁷⁰ Regardless, neuroimaging has the capability “to examine the neurocognitive components of mental disorders.”⁷¹ Counsel could plausibly supplement arguments on aberrant functioning or lack of rational understanding with neuroimaging that shows subnormal connectivity or activity.

III. DISCUSSION

In developing categorical exemptions from the death penalty, the Supreme Court has turned to ideas about the brain and how it works. Some of these ideas involve neuroscience, while others are seemingly based on common-sense notions of how people think or perceive the world around them. In the following discussion, this Note will tackle each categorical exemption, critique the Court's building of exemptions without a more rigorous understanding of the relevant science, and consider proposed solutions.

67. *Madison*, 139 S. Ct. at 726.

68. *Ford*, 477 U.S. at 417; *Panetti*, 551 U.S. at 954.

69. Michael L. Perlin & Alison J. Lynch, *My Brain is so Wired; Neuroimaging's Role in Competency Cases Involving Persons with Mental Disabilities*, 27 B.U. PUB. INT. L.J. 73, 75 (2018).

70. See Bess Connolly, *Can Neuroimaging Reveal the Roots of Psychiatric Disorders? Not Just Yet*, NEUROSCI. NEWS (Jan. 11, 2023), <https://neuroscience.news.com/mental-health-neuroimaging-22228/>.

71. Philip K. McGuire & Kazunori Matsumoto, *Functional Neuroimaging in Mental Disorders*, 3 WORLD PSYCH. 6, 7 (2004).

A. NEUROSCIENCE & CATEGORICAL EXEMPTIONS FROM THE DEATH PENALTY

1. Misapplication of Neuroscience to the Exemption of Juveniles

Roper established that the still-maturing brains of juveniles make them a less blameworthy class of persons, and therefore they are exempt from execution. This class abruptly cuts off at age eighteen so that a murder committed by someone the day before his eighteenth birthday is exempt. While the *Roper* Court strongly relied upon neuroscience, drawing a line at eighteen was a misapplication of the science. Indeed, the Court tempered their bright line rule with an acknowledgment of the logical flaw inherent in such line drawing:

Drawing the line at 18 years of age is subject, of course, to the objections always raised against categorical rules. The qualities that distinguish juveniles from adults do not disappear when an individual turns 18. By the same token, some under 18 have already attained a level of maturity some adults will never reach. For the reasons we have discussed, however, a line must be drawn . . . The age of 18 is the point where society draws the line for many purposes between childhood and adulthood. It is, we conclude, the age at which the line for death eligibility ought to rest.

Roper, 543 U.S. at 574. Regardless, the line has rested at age eighteen for the almost twenty years that have elapsed since.

To be sure, assigning value to the age of eighteen is necessarily artificial, as the only reason eighteen is significant is tradition.⁷² It is certainly difficult to assert that there is a tipping point from adolescence to adulthood that justifies the creation of a bright line, so courts have often pointed to the practical need for line drawing as the rationale for its existence.⁷³ Yet, in the case of deciding who is eligible for execution and who is not, practical concerns are perhaps dwarfed by the severity of the state executing members of its citizenry based upon an arbitrarily-decided cutoff. Regardless, setting a bright line at age eighteen conflicts with the underlying

72. See generally ELIZABETH S. SCOTT & LAURENCE STEINBERG, RETHINKING JUVENILE JUSTICE 70–81 (2008) (discussing the societal consensus of age eighteen being the cut-off for juvenile status, even though it is an artificial line).

73. Larry Cunningham, *A Question of Capacity: Towards a Comprehensive and Consistent Vision of Children and Their Status Under Law*, 10 U.C. DAVIS J. JUV. L. & POL'Y 275, 277–78 (2006).

neuroscience, when the brain at seventeen is not so different from the brain at twenty. Subjecting this class of young adults to execution is not only inequitable when their similarly mature juvenile counterparts are exempt, but further, allowing their execution is not reflective of what we know about the brain.

While executions or new death sentences of those who were young adults at the time of committing an alleged murder are arguably in decline,⁷⁴ there are still individuals sitting on death row who were young adults during their crimes. One stark example is Nebraska: of the eleven individuals on Nebraska's row, five were young adults during their crimes, i.e., 45.5% of the row.⁷⁵

It is a correct appraisal by the Court that continued development of the brain ought to bear some weight on moral blameworthiness. But to reach a conclusion that such research findings create a line of demarcation at age eighteen is a misstep. Since neuroscience findings in the years since 2005 show that brain development continues past the age of eighteen and that maturation does not have a clear tipping point, this rule is not congruent with the science it props itself up on.

2. Failure to Apply Neuroscience to Categorical Exemptions of Those with Sub-Average Brain Functioning (Intellectual Disability and Competency)

In both *Atkins* and *Madison*, the Supreme Court established exemptions for classes of persons with sub-average brain functioning. Yet the Court failed to apply neuroscience and created rules that are mistakenly based on common-sense ideas of the brain instead of true signifiers of functioning.

When implementing the rule that those with ID cannot be executed, the Court was reluctant to specify how states might determine who falls into that class of people.⁷⁶ Only through the later rule in *Hall v. Florida* did the Court establish that borderline defendants should have an opportunity to prove ID,

74. HOLLIS A. WHITSON & ERIC A. SAMLER, EXECUTION OF YOUTH UNDER AGE 21 ON THE DATE OF OFFENSE: ENDING WITH A BANG OR A WHIMPER? 1 (2019).

75. As of Jan. 27, 2022. Information retrieved using incarceration record database was found at https://dcs-inmatesearch.ne.gov/Corrections/COR_input.html. John Lotter was 22; Jose Sandoval was 23; Eric Vela was 21; Jorge Galindo was 21; Jeffrey Hessler was 24.

76. *Atkins*, 536 U.S. at 317.

even if they do not fall below the threshold of IQ 70.⁷⁷ For the same reasons that the *Roper* bright line is troubling, setting a bright line at IQ 70 is also problematic, but the Court arguably addressed those issues with their rule in *Hall*. Unlike *Roper*, the *Atkins* rule presents issues by refusing to define what qualities individuals with ID possess that make them unfit for execution. Taken alongside *Madison*, it becomes vastly unclear what aspects of sub-average or aberrant brain functioning make individuals unfit for execution.

While sub-70 IQ (*Atkins*) and lack of rational understanding of pending execution (*Madison*) are not the same, they both hinge upon an individual's perception and cognition. Yet these rules are not at all based on neuroscience findings about brain function. IQ testing is a flawed measurement of cognitive function,⁷⁸ and competency evaluations are based on abstract ideas about perception. The lack of clarity on what qualities individuals who are unfit for execution should have is particularly problematic when "poor legal representation and onerous evidentiary requirements" might still result in the executions of defendants with ID or severe psychiatric impairment.⁷⁹ There are even instances of ID or mental incapacitation being treated as a visibly obvious status instead of anything based on science.⁸⁰ Additionally, an individual with an IQ that falls slightly above 70 might be more severely impaired than someone with a sub-70 score when paired with severe adaptive behavioral problems.⁸¹ It becomes clear that neuroscientists and psychologists need to be consulted when contemplating which criteria put someone in the ID or incompetent class.

As mentioned, there is no clear standard laid out by the Court on either ID or competency to be executed; they leave it to

77. *Hall*, 572 U.S. at 704.

78. Michelle Castillo, *IQ Scores Not Accurate Marker of Intelligence, Study Shows*, CBS NEWS (Dec. 21, 2012), <https://www.cbsnews.com/news/iq-scores-not-accurate-marker-of-intelligence-study-shows/>.

79. *Intellectual Disability*, DEATH PENALTY INFO. CTR., <https://deathpenaltyinfo.org/policy-issues/intellectual-disability> (last visited Mar. 6, 2023).

80. Elizabeth Bruenig, *When an I.Q. Score Is a Death Sentence*, N.Y. TIMES (Jan. 11, 2021), ("People tend to think they know what intellectual disability looks like, and feel erroneously certain that they would recognize it if they saw it.").

81. Jonathan Taylor et al., *Revisiting Intellectual Disability and the Death Penalty*, 45 MONITOR ON PSYCH. 26, 27 (2014).

the states to create rules. After *Atkins*, some states created highly narrow criteria, allowing the execution of people that would have otherwise met clinical criteria for ID.⁸² Moreover, even after *Hall v. Florida*, some states still impose too-high bars for proving ID. For example, Georgia requires proof beyond a reasonable doubt of ID, and in 2015, a Georgia man was executed “despite unanimous agreement by state mental health experts that he was intellectually disabled.”⁸³ Proving ID or incompetency is not only difficult for borderline defendants. In some rare cases when an individual sustains a traumatic brain injury that severely impacts cognition, proving either ID or incompetence can be extremely difficult.⁸⁴ A prevailing standard in clinically diagnosing ID is that it manifests before adulthood, so brain abnormalities brought about later in life will not meet that criterion.⁸⁵

One other major difficulty is the ethical dilemma that forensic psychiatrists face in evaluating competence for execution. Akin to the prohibition on taking part in an execution, medical professionals can struggle with making a competency recommendation that is likely to result in execution.⁸⁶ Also of vital importance is when in the proceedings the competency or ID determination is made, and who makes the determination, as different decision-makers operating at certain moments in the procedure might be predisposed to not reach a finding of ID or incompetency.⁸⁷

In recent petitions for certiorari before the Supreme Court, claims of ID or incompetency in capital cases have been given increasingly short shrift. The Court denied certiorari in *Brown v. Texas*, despite the “strong evidence” that Brown has an intellectual disability though he faces execution.⁸⁸ The Court

82. *Continuing Issues: Determining Intellectual Disability After Atkins*, DEATH PENALTY INFO. CTR., <https://deathpenaltyinfo.org/policy-issues/intellectual-disability/continuing-issues-determining-intellectual-disability-after-atkins> (last visited Mar. 6, 2023).

83. *Id.*

84. Davis, *supra* note 37.

85. *Intellectual Disability and the Death Penalty*, ACLU, <https://www.aclu.org/other/intellectual-disability-and-death-penalty> (last visited Mar. 7, 2023).

86. Robert Weinstock et al., *Competence to Be Executed: An Ethical Analysis Post Panetti*, 28 BEHAV. SCI. L. 690, 693 (2010).

87. ACLU, *supra* note 85.

88. Amy Howe, *Justices Decline to Halt Execution of Texas Man with Intellectual Disability Claim*, SCOTUSBLOG (Mar. 9, 2023), <https://www.scotus>

also denied certiorari in *Dillbeck v. Florida*, even though Dillbeck has an incompetency claim based on a neurobehavioral disorder resulting from prenatal alcohol exposure.⁸⁹ This is in spite of the fact that neurodevelopmental disorder associated with prenatal alcohol exposure is an “intellectual disability-equivalent condition,” and testing of Dillbeck’s brain has revealed “widespread and profound neurological damage” as well as “abnormality in the portions of the brain most responsible for regulating planning, mood, judgment, behavior, impulse control, and intentionality.”⁹⁰

It serves the aims of justice to ensure that we do not execute individuals with sub-average brain functioning. Yet we cannot effectively protect these classes of people when it is very easy for a court to decide someone does not fulfill the criteria for the class. Especially when there are no diagnostic criteria for incompetency, and IQ is a flawed measurement for ID, these categorical exemptions are in great danger of not being applied to the people who need them.

B. PROPOSED REFORM

Because of *Roper*’s flawed bright line rule, many have advocated for raising the age threshold.⁹¹ These arguments often rely upon the previously cited neuroscience research related to the maturation of the brain.⁹² Certain scholars argue the Court

blog.com/2023/03/justices-decline-to-halt-execution-of-texas-man-with-intellectual-disability-claim/. See also *Brown v. Texas*, No. 22-6964, 2023 WL 2419329, at *1 (U.S. Mar. 9, 2023).

89. Ellena Erskine, *Court Declines to Stay Execution of Florida Man Whose Jury Did Not Unanimously Vote for the Death Penalty*, SCOTUSBLOG (Feb. 23, 2023), <https://www.scotusblog.com/2023/02/court-declines-to-stay-execution-of-florida-man-whose-jury-did-not-unanimously-vote-for-death-penalty/>; see also *Dillbeck v. Florida*, No. 22-6819, 2023 WL 2153301, at *1 (U.S. Feb. 22, 2023).

90. Jim Saunders, *Florida Supreme Court Refuses to Block Execution of Death Row Inmate Donald Dillbeck*, TAMPA BAY TIMES (Feb. 16, 2023), <https://www.tampabay.com/news/crime/2023/02/16/florida-supreme-court-execution-death-row-desantis-dillbeck/>.

91. See, e.g., Karen A. Steele, *The Law, the Science, and the Logic of Ending the Teenage Death Penalty*, 7 J. PEDIATR. NEUROPSYCHOL. 9, 9 (2021) (“The current article reviews the legal foundation and analytical framework applicable to extending the categorical exemption from the death penalty from 17 through the age of 20 years . . .”).

92. More recent findings are also relied upon by scholars in making arguments about a higher age line. See, e.g., Francis X. Shen et al., *Justice for Emerging Adults After Jones: The Rapidly Developing Use of Neuroscience to Extend Eighth Amendment Miller Protections to Defendants Ages 18 and Older*,

should raise the threshold to twenty-one,⁹³ and others argue that it should be twenty-five.⁹⁴ Organizations like the American Bar Association and the American Psychological Association have even added their voices to the conversation.⁹⁵

In this overall discourse, the typical rationale is that if the ongoing development of the brain at seventeen is not too different from the brain at twenty, then we should not be subjecting a separate class of people to the death penalty based on a capricious cut off. This is especially salient when the Supreme Court has expressed that arbitrariness is a sure marker of an unconstitutional application of the death penalty.⁹⁶ To apply this proposed solution, the Supreme Court would have to pass down a holding akin to *Roper* that protects the class of young adults from execution, requiring all states to comply. Alternatively, state legislatures in death penalty states could codify this, mandating that anyone who was eighteen to twenty-one or twenty-five at the time of committing an alleged murder is not eligible for execution.

On the other hand, raising the age threshold is problematic because even in raising the line, there is still a line, and “there is no simple answer to the question of when an adolescent brain

97 NYU L. REV. ONLINE 101, 104 (2022) (“In light of a recent growing evidence base in developmental neuroscience about the still-maturing brains of emerging adults, should youth ages 18 to early 20s receive the same constitutional protections as those under the age of 18?”).

93. See generally John H. Blume et al., *Death by Numbers: Why Evolving Standards Compel Extending Roper’s Categorical Ban Against Executing Juveniles from Eighteen to Twenty-One*, 98 TEX. L. REV. 921 (2020); Andrew Michaels, *A Decent Proposal: Exempting Eighteen- to Twenty-Year-Olds from the Death Penalty*, 40 N.Y.U. REV. L. & SOC. CHANGE 139 (2016).

94. See generally Talia Stewart, Note, *Capital Punishment of Young Adults in Light of Evolving Standards of Science and Decency: Why Ohio Should Raise the Minimum Age for Death Penalty Eligibility to Twenty-Five*, 70 CLEV. ST. L. REV. 91 (2021).

95. Without taking a position on the death penalty, the ABA’s Due Process Review Project released a report urging the raising of the age threshold. SETH MILLER & ROBERT WEINER, REPORT TO THE HOUSE OF DELEGATES (Feb. 2018). See also AMERICAN PSYCHOLOGICAL ASSOCIATION, APA RESOLUTION ON THE IMPOSITION OF DEATH AS A PENALTY FOR PERSONS AGED 18 THROUGH 20, ALSO KNOWN AS THE LATE ADOLESCENT CLASS (2022) (recommending a ban on the application of the death penalty for those who were under twenty-one at the time of the crime).

96. *Gregg*, 428 U.S. at 189 (explaining that the death penalty is constitutionally implemented so long as a sentencing body takes steps to “minimize the risk of wholly arbitrary and capricious action.”).

becomes an adult brain.”⁹⁷ Neuroscience itself does not support the existence of a bright line, because of the slow nature of development and imprecise pacing of development from person to person. Certainly, it is logically flawed for so-called solutions to the age threshold to undermine the scientific premise by which these legal questions are tackled. It is undeniable from the neuroscience evidence that the brain develops gradually over years, and that there is no precise tipping point from being a juvenile to an adult.

A solution less popularly discussed is to establish young adulthood as a mitigating factor in individualized sentencing determinations.⁹⁸ The age line would remain the same, and individuals who committed an alleged murder from ages eighteen to twenty-five could argue their youth deserves to be weighed against any aggravating factors in the sentencing calculus. Yet capital sentencing has a murky calculus, such that a sentencing panel could decide that, for example, one aggravator outweighs two mitigators. There is no guarantee that adding young adulthood as a mitigator would make any difference at all in many cases when paired up against aggravators that describe the horror of crimes. Another issue is that young adulthood as a mitigator would possibly require significant relitigating in some states that have many individuals who were in this age range at the time of their crime. It would be a major upheaval of a death row to have Nebraska re-try or re-sentence nearly half of its death row after a change in the law on age eligibility.⁹⁹ This is a strong example of why some states would resist codifying young adulthood as a mitigator of their own volition.

It is difficult to enumerate possible solutions for the problems with ID and competency, particularly because the rules are so divorced from the relevant science, that the only solution is neuroscience simply must be involved. It is critical for the legal community to assess what aspects of connectivity or functioning are present in the brains of people with ID or severe mental illness, instead of common-sense ideas or suppositions

97. Monahan, *supra* note 56, at 585.

98. See, e.g., Kelsey B. Shust, *Extending Sentencing Mitigation for Deserving Young Adults*, 104 J. CRIM. L. & CRIMINOLOGY 667 (2014).

99. This is subject to potential findings on the retroactivity of such a measure. New constitutional rules are not presumptively retroactive. *Teague v. Lane*, 489 U.S. 288, 300–301 (1989).

about sub-average functioning. This will help us to establish the markers of classes of people with ID or incompetency. The Supreme Court should re-address these categorical exemptions by considering these classes anew with updated neuroscience as a guide. Alternatively, states can set expansive and specific guidelines for these classes. For example, Ohio and Kentucky recently passed laws that exempt the “severely mentally ill” from execution.¹⁰⁰

In general, neuroscience as applied to death penalty categorical exemptions is solely backward-looking. We think about what individuals have been through or have done in the past. We think about the development and maturation of brains up until the point of a crime. Yet the ability for change seems to be a resounding *not possible* when we consider those on death row. A theme present in the *Roper* exemption is that permanent incapacitation through death “is not warranted because children change as they mature,” and it is thus unjust to “permanently exclude them from society.”¹⁰¹ A punishment that is permanent and irrevocable conflicts with one’s ability to change. Society may believe that hardened criminals deserve incapacitation because they will never change. But neuroplasticity tells a different story. Research has shown that the brain still is capable of change throughout the lifespan, albeit that plasticity is greater in childhood and adolescence.¹⁰² This has significant implications for criminal justice, particularly concerning the application of the death penalty. Neuroplasticity is not necessarily the answer to the flawed implementation of neuroscience, but it is another important piece of the puzzle, especially alongside backward-looking analyses.

Going forward, the Court must thoroughly review pertinent neuroscience when crafting death penalty rules that involve perception, learning, memory, and the brain. The severity of the

100. *Kentucky Legislature Passes Bill Prohibiting Death Penalty for People with Serious Mental Illness*, DEATH PENALTY INFO. CTR. (Mar. 29, 2022), <https://deathpenaltyinfo.org/news/kentucky-legislature-passes-bill-prohibiting-execution-of-people-with-serious-mental-illness>; *Ohio Bars Death Penalty for People with Severe Mental Illness*, DEATH PENALTY INFO. CTR. (Jan. 11, 2021), <https://deathpenaltyinfo.org/news/ohio-passes-bill-to-bar-death-penalty-for-people-with-severe-mental-illness>.

101. M. Eve Hanan, *Incapacitating Errors: Sentencing and the Science of Change*, 97 DENV. L. REV. 151, 160 (2019).

102. See Jay N. Giedd et al., *Brain Development During Childhood and Adolescence: A Longitudinal MRI Study*, 2 NATURE NEUROSCI. 861, 862 (1999).

punishment necessitates a full analysis of neuroscience in these cases. Common sense ideals can help start the process, but concrete science of the brain should refine the rules and application. *Roper* does this better than *Atkins* and *Madison*, but *Roper* falls victim to sacrificing what neuroscience tells us about brains continuing to mature past eighteen so that the practical need for drawing a bright line can be met. Other solutions, while imperfect, are more closely aligned with the science, such as having a higher age threshold or setting up a statutory mitigator for a certain period of young adulthood. *Atkins* and *Madison* fail to even meet a low bar of adequacy in using science, as they rely on overblown measurements like IQ and vague societal ideas of what constitutes incompetency.

IV. CONCLUSION

Neuroscience has developed rapidly since the early 2000s. Yet as the Supreme Court has created categorical exemptions from the death penalty, ideas about the brain have not been well-implemented. While *Roper*, *Atkins*, and *Madison* all set out to achieve the aims of justice and prevent cruel and unusual punishment, each of these rules has been inextricably flawed. *Roper* is contrary to the science underpinning it, establishing a bright-line rule that does not protect the class it sets out to—those with still-developing brains—as young adults from 18–25 are entirely left out of any application of this exemption. *Atkins* creates a rule based on IQ and leaves it to the states to find the right criteria in applying it, although the Court never fully engages with the science underlying why those with ID should be exempt. *Madison* gives a murky upholding of *Ford* and *Panetti*, refusing to dive into why the brains of individuals with dementia and those with severe mental illness are both unfit for execution.

Future judicial opinions must put neuroscience front and center when considering categorical exemptions based on the brain. While fully using science to create rules is one important element, courts should also seek to expand backward-looking analyses by incorporating neuroplasticity. Perhaps compelling findings on neuroplasticity ought to make a case for the abolition of the death penalty since the proven ability for change undermines a philosophical ideal that some offenders can never be rehabilitated. In any case, ideas of neuroplasticity must be

used alongside relevant neuroscientific research to establish more precise rules involving the death penalty and the brain.
