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NOHWERE

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INTRODUCTION

Imagine the frustration of Samuel Butler's protagonist, Higgs, with the strange society he encounters in *Erewhon*:

> Was there nothing which I could say to make them feel that the constitution of a person's body was a thing over which he or she had had at any rate no initial control whatever, while the mind was a perfectly different thing, and capable of being created anew and directed according to the pleasure of its possessor? Could I never bring them to see that while habits of mind and character were entirely independent of initial mental force and early education, the body was so much a creature of parentage and circumstances, that no punishment for ill-health should be ever tolerated save as a protection from contagion, and that even where punishment was inevitable it should be attended with compassion?[1]

The Erewhonians had it all wrong, backward actually: they would criminally prosecute someone for the physical illnesses manifested, such as consumption, but would never prosecute those who made bad, immoral choices.[2] And it would not matter that your ill-health was the product of a genetic weakness or malformation:

> It is all very well for you to say that you came of unhealthy parents, and had a severe accident in your childhood which permanently undermined your constitution; excuses such as these are the ordinary refuge of the criminal; but they cannot for one moment be listened to by the ear of justice. I am not here to enter upon curious metaphysical questions as to the origin of this or that—questions to which there would be no end were their introduction once tolerated, and which would result in throwing the only guilt on the tissues of the primordial cell, or on the elementary gases.[3]

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1. SAMUEL BUTLER, EREWHON: OR OVER THE RANGE 142-43 (1917).
2. *Id.*
3. *Id.* at 113.

Are the Erewhonians wrong? Are we? Or are we both wrong to imagine "fault" in the case of mechanical entities, like human agents? Higgs was certain that the Erewhonians failed to understand the nature of human agency,[4] and we are compelled to wonder if they are right and it is we who are wrong.

That is the challenge to which contemporary neuroscientific insights expose accepted normative systems, similar to our legal system (and even our moral responsibility system). We think the Erewhonians were wrong to impose criminal responsibility on those who were the victims of illness.[5] The consumptive is not at fault in any way that could make sense if our object is to reduce the suffering illness causes. Indeed, criminalizing disease would actually exacerbate the problems illness presents.[6] The costs incurred by doing so would increase the burden that illness imposes on society and would undermine human thriving.[7] But we are also sure that contemporary legal and moral systems are *just as* wrong as the Erewhonian system. Extant legal doctrine and practices (civil as well as criminal) actually undermine human thriving: they are not merely a distraction; they are an impediment.

Our normative systems conceive of law and morality as the Erewhonians understood physical disease—a product of sufficient choice to attach blame, fault, and concepts of desert.[8] But on what basis do we draw the distinctions between physical and normative malady: Are not both just (generally) distinguishable manifestations of mechanical causes? If human agents are essentially mechanical entities, on what basis could we find a normative difference between, say, tuberculosis and selfishness or insufficient ability to feel compassion for others? In fact, if you are actually indifferent to the

4. *Id.* at 142-43.

5. *See id.* at 113.

6. *See* Leslie Pickering Francis & John G. Francis, *Criminalizing Health-Related Behaviors Dangerous to Others? Disease Transmission, Transmission-Facilitation, and the Importance of Trust*, 6 CRIM. L. & PHIL. 47, 53-54, 57-61 (2012) (laws criminalizing AIDS misguided from public health standpoint).

7. *See id.*

8. *See* PETER A. ALCES, THE MORAL CONFLICT OF LAW AND NEUROSCIENCE 21-23 (2018).

suffering of others, a typical psychopath,[9] what could be the nonphysical cause of that indifference?

Butler was prescient, and his *Erewhon* demonstrates an understanding of human agency that is precocious, anticipating what would only be revealed at the dawn of the Age of Realization: "Man, he said, was a machinate mammal."[10] All we are is mechanism, and that conclusion is not undermined in the least by the fact that we do not yet understand all that there is to understand about the mechanism.[11] While it may not be possible for us to predict the next instant even were we to know all there is to know about the past and current instants, that does not undermine a mechanical conception of human agency, or of the universe for that matter.[12] It is enough that we understand that mechanics capture well enough what we are at the level that matters to human thriving and the law, so we do not even need to know very much about quantum mechanics (though we need to know some relativity to understand GPS).[13] At the level of acuity the law requires, it is enough that we appreciate the mechanical nature of human agency, for that is the level at which we can appreciate the immorality of basing normative systems, such as law, on ephemeral noninstrumental theory.

Ours is an extreme position. Essentially, we are building on Francis Crick's *Astonishing Hypothesis*[14] and Bruce Waller's arguments in *Against Moral Responsibility*.[15] We are elaborating on Joshua

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9. Merriam-Webster defines psychopath as a mentally unstable person. These persons are usually identified by antisocial personalities marked by traits such as a lack of remorse and an absence of empathy for others. *See Psychopath*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/psychopath [https://perma.cc/N9EC-UNPU]. Psychopath is not clinically recognized by the Diagnostic and Statistical Manual of Mental Disorders (DSM-V); the traditional symptoms associated with psychopathy are included under antisocial personality disorder. *See* David Porter, *Antisocial Personality Disorder DSM-5 301.7 (F60.2)*, THERAVIVE, https://www.theravive.com/therapedia/antisocial-personality-disorder-dsm--5-301.7-(f60.2) [https://perma.cc/C6T5-MNEH].

10. BUTLER, *supra* note 1, at 267.

11. *See* ALCES, *supra* note 8, at 66-67, 76; FRANCIS CRICK, THE ASTONISHING HYPOTHESIS: THE SCIENTIFIC SEARCH FOR THE SOUL 81-84 (1994).

12. *See* ALCES, *supra* note 8, at 76.

13. *See id.*; *see also* Stephen J. Morse, *Psychopathy and Criminal Responsibility*, 1 NEUROETHICS 205, 210-11 (2008) (arguing that the law should be reformed to excuse those with severe psychopathy from blame because they lack empathy, but that such psychopaths should still be subject to civil confinement).

14. CRICK, *supra* note 11, at 3.

15. BRUCE N. WALLER, AGAINST MORAL RESPONSIBILITY 41 (2011).

Greene and Jonathan Cohen's conclusion that "For the Law, Neuroscience Changes Nothing and Everything."[16] While we have reservations about what can be concluded about free will from Benjamin Libet's science, we find much that makes good sense to us in Daniel Wegner's[17] and Leonard Mlodinow's[18] reservations about the substance of consciousness. Having located ourselves in the literature, starting with Butler, we explain what the law understands human agency to be and demonstrate why the law profoundly misunderstands matters.

Butler challenged us to understand the difference between disease and choice. Common wisdom (the irony is intentional) understands those two phenomena to be diametric opposites. As a normative matter, disease is foisted upon you, choice is your own creation, the product of an uncaused cause.[19] But if there are no uncaused causes, if, that is, we are not divine (because only the divine is an uncaused cause in a mechanical universe), there is no such thing as "choice."[20] And without choice there can be no moral responsibility—no blame, no desert, no retribution, and no punishment (strictly construed).[21] So, there is much at stake in understanding law's dependence on the insubstantial choice fiction and the mechanics that reveal that choice is a fiction.[22]

What we do in this Article is, first, demonstrate the law's reliance on an inauthentic conception of human agency. We trace that fundamental misapprehension through the three primary areas of the law: contract, tort, and criminal law. In each area, the law reaches

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16. Joshua Greene & Jonathan Cohen, *For the Law, Neuroscience Changes Nothing and Everything*, 359 PHIL. TRANSACTIONS ROYAL SOC'Y B 1775, 1784 (2004).

17. Chun Siong Soon et al., *Unconscious Determinants of Free Decisions in the Human Brain*, 11 NATURE NEUROSCIENCE 543, 545 (2008); DANIEL M. WEGNER, THE ILLUSION OF CONSCIOUS WILL 2 (2002).

18. LEONARD MLODINOW, SUBLIMINAL: HOW YOUR UNCONSCIOUS MIND RULES YOUR BEHAVIOR 16-18 (2012).

19. BUTLER, *supra* note 1, at 142-43.

20. *See* ALCES, *supra* note 8, at 12-13.

21. *See id.* at 19-20; *see also* Robert M. Sapolsky, *The Frontal Cortex and the Criminal Justice System*, 359 PHIL. TRANSACTIONS ROYAL SOC'Y B 1787, 1787-88 (2004) (explaining that epileptic seizures are not punished but historically were).

22. ALCES, *supra* note 8, at 41-42; DERK PEREBOOM, LIVING WITHOUT FREE WILL 158 (2001).

conclusions that actually undermine human thriving by relying on a misconception of what it means to be human.[23] "Consent" does not mean what it needs to mean for the contract law to be coherent; "fault" is a distraction if the object of the tort law is, as it should be, to reduce the cost of accidents; and the criminal law, most obviously, fails if it is based, albeit obliquely, on conceptions of moral responsibility that lack a reality referent.

The second part of the Article demonstrates why and how there is no room for choice for uncaused causes in the human saga. Any decision or event you can imagine has premises that trace from the instant before the apparent choice and the time immemorial leading up to that choice.[24] We can no more choose to do something unconstrained by the forces that formed the current moment, including us and our place in the current moment, than we could choose to be ten feet tall or be a member of a different species.[25] We are the culmination of forces over which we have nothing but the most ostensible "control."[26] That control is wholly ostensible because it only seems to be real.[27] Now we recognize that "seeming" is quite convincing; it is all we know, really.[28] The illusion is convincing because it is adaptive; it is much of the story of our social evolution.[29] Proof of that is your inability to even imagine that you do not have free will, that your consciousness does not reveal to you all you need to know to make free choices.[30] You may be able, at some level, to conceive of yourself as a wholly determined creature, but you could not maintain that mental posture for very long.[31] You would slip back into a sense of willingness.

While we assert that free will is a fiction and that choice is an illusion, we do not doubt that they are useful. Free will supports a moral responsibility system that has served our species well

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23. *See* Francis & Francis, *supra* note 6, at 53-54, 57-61; *see also* Soon et al., *supra* note 17, at 543-44 (experiment demonstrating that timing of decision could be predicted as early as five seconds before the physical decision manifested).

24. Soon et al., *supra* note 17, at 543-44.

25. ALCES, *supra* note 8, at 35-36; Soon et al., *supra* note 17, at 543-44.

26. Soon et al., *supra* note 17, at 543-44.

27. WEGNER, *supra* note 17, at 2.

28. *Id.* at 3, 11.

29. *Id.* at 2, 146.

30. *Id.* at 2, 11.

31. *Id.* at 99, 151.

(enough) for quite some time.[32] And it is helpful to be able to rely on the imposition of guilt and reward of praise to teach others (including one's children, perhaps unwittingly) to behave in ways that will promote social success, social cohesion, and human thriving.[33] Free will is helpful until it is not helpful. At some point, a point revealed in much of the extant law, conceptions of free will, conclusions premised on the reality of unfettered choice, will actually undermine human thriving, even though it might "feel good" in the instant.[34]

This Article is neither optimistic nor pessimistic. It is realistic. We imagine that as the science matures, the law's incoherence will be manifest, and so will the incoherence of many of the institutions that are founded on an inauthentic understanding of human agency.[35] When neuroscience tells us, more and more eloquently, what it means to be human, we shall appreciate, more and more fully, that the law errs in its assumptions about human agency and errs in ways that not only frustrate, but undermine, law's object.[36] Just as witch trials seem absurd to us today, many of contemporary law's dictates will seem barbaric in the not-too-distant future. Prosecute those addicted to controlled substances on account of their consumption of the controlled substance? Wouldn't that be like punishing someone for having a disease? Are we in Erewhon? Or our own Nohwere?

I. INTIMATION OF UNDERSTANDING

The law need not commit to any particular conception of human agency. It could, for example, impose liability on anyone for doing or not doing anything that frustrates human thriving, as did the Erewhonian courts in the prosecution of those who became ill through no "fault" of their own.[37] But there is something about law

32. Stephen J. Morse, *Brain and Blame*, 84 GEO. L.J. 527, 529-32 (1996).

33. *Id.* at 529.

34. *See* WALLER, *supra* note 15, at 135-37; Francis & Francis, *supra* note 6, at 53-54, 57-61.

35. *See* PEREBOOM, *supra* note 22, at 158.

36. *See id.*; Soon et al., *supra* note 17, at 543-44; Francis & Francis, *supra* note 6, at 53-54, 57-61.

37. *See* WALLER, *supra* note 15, at 167.

that at least seems to resonate with a felt sense of morality.[38] Whether law consistently tracks a conception of morality (secular or divine), it would be easier to discern the immanent sense of laws that recognize, take account of, and even indulge human frailty.[39] Such sensitivity is, arguably, basic to law in its three primary compartments: contract, tort, and criminal liability.[40] In this Part, we shall demonstrate that sensitivity and endorse, even applaud, law that takes into account the more complete conception of human agency when determining the assignment of liability or the means to mitigate or avoid liability altogether.

This Part shall draw on illustrations from each of the three primary areas of law to show what the law has done to accommodate the realities of human agency. Initially, we would be favorably impressed by the law's acuity, and there is good reason to applaud the law's successes. But upon closer examination there is also something akin to a foreboding negative precedent. For present purposes, we begin with the good news.

A. Contract: The "Intent to Be Bound"

Contract law concerns the consensual assumption of liability. My ability to make an enforceable promise to you is of great value to me—it enables me to exchange something I do not yet have (say, a stream of income) for something I want from you now.[41] That is what a mortgagor does when she grants an encumbrance on real property to facilitate acquisition of that property.[42] Were that not possible, she would have to wait until she had saved the full purchase price of a home before she could buy it and enjoy the very material benefits of home ownership (which inure as well to all of those in her society as they are enriched by her bounty too—for example, sellers of appliances and lawncare service). Contract law

38. *See* Morse, *supra* note 32, at 530-32.

39. *See, e.g.*, Roper v. Simmons, 543 U.S. 551, 566-69 (2005); RESTATEMENT (SECOND) OF CONTRACTS §§ 14-15 (AM. L. INST. 1981).

40. *See* ALCES, *supra* note 8, at 21-24.

41. *See* ROBERT A. HILLMAN, PRINCIPLES OF CONTRACT LAW 1-2 (3d ed. 2014).

42. *See id.*

turns the future promise to pay into present value.[43] Contract, then, *done right*, creates value.

In order to do contract "right," we need a check on the assumption of contract liability. That is the way we assure that exchanges accommodated by contract will create welfare—we each gain something more from the exchange than we surrender—rather than rents (non-welfare producing exploitation of market position that benefits only the rent seeker). The consent criterion is the "guarantor," so to speak, of that welfare creation consistent with human thriving.[44] While I may make an objectively bad deal (for example, hire someone to paint my home a color that will in fact impair its market value), so long as I actually consent to the assumption of contract liability, so long as I intend to contract, that is all we need to assure that the legal machinery at contract's disposal will create value, no matter how idiosyncratic.[45] The contract law need not account for taste to create welfare, but it does rely on actual consent to sufficiently assure that the exchange will be welfare creating.[46]

Contract law is clear that "infants" (those under the age of eighteen) and those suffering from intellectual impairments do not have capacity to contract.[47] While minors may enter into contracts for necessities, that exception is designed to protect minors, lest they not be able to buy things such as food and medications.[48] Protection of those with intellectual limitations is not so easily discerned, insofar as the mental incompetence may not be so clearly manifest.[49] The law, then, focuses on the state of mind of the party who attempts to enforce a contract with the mentally infirm.[50] That approach serves a certain sense of rough justice and would seem to

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43. *See* HILLMAN, *supra* note 41, at 2.

44. ALCES, *supra* note 8, at 215.

45. *See* Groves v. John Wunder Co., 286 N.W. 235, 237 (Minn. 1939) (demonstrating that one can contract for a service to be done to his property even though the service may decrease the property's value).

46. *Id.*; *see also* Chunlin Leonhard, *Dangerous or Benign Legal Fictions, Cognitive Biases, and Consent in Contract Law*, 91 ST. JOHN'S L. REV. 385, 405 (2017).

47. *See* RESTATEMENT (SECOND) OF CONTRACTS §§ 14-15 (AM. L. INST. 1981).

48. *See id.* § 12.

49. *See, e.g.*, Ryan v. Weiner, 610 A.2d 1377, 1378, 1385-86 (Del. Ch. 1992) (considering the disparity in the parties' intellectual abilities in determining unconscionability).

50. *Id.*

punish those who have tried to take unconscientious advantage of the vulnerable.

Neuroscience can inform inquiry into a putative contracting party's intellectual capacity and confirm what the behavioral evidence suggests. *Van Middlesworth v. Century Bank & Trust Co.* illustrated such complementary use of neuroscientific insights.[51] "The second witness, a neurologist, examined the results of Piper's magnetic resonance imaging (MRI), found evidence of brain shrinkage and hardening of the arteries, and opined that the MRI was consistent with dementia both at the time of the MRI and [at the time Piper entered into the contract]."[52] The MRI indicated "a combination of Alzheimer's disease and multi-infarct dementia" that would have rendered Piper mentally incompetent both in law and fact.[53] It is important to note that the court used the neuroscientific evidence to corroborate what the available behavioral evidence suggested: Piper had seemed disoriented in conversation and had also filed a curious police report.[54]

So far, so good. We need not yet, at the veritable dawn of law and neuroscience, rely on neuroscience alone to reach legal conclusions. It is enough that neuroscience helps, that it affords us more confidence. Now we may imagine that, over time, we will gain increased confidence in the power of neuroscience to support legal conclusions. But until we can certainly diagnose Alzheimer's-type dementia from a brain scan, we cannot expect a brain scan to confirm that a subject does not have legal capacity *because* she suffers from Alzheimer's-type dementia.[55] There may be good reason to believe that as science

51. No. 215512, 2000 WL 33421451, at *2 (Mich. Ct. App. May 5, 2000).

52. *Id.*

53. *Id.*

54. *Id.*

55. Until recently, researchers believed that amyloid plaques and tau tangles were correlative, if not the cause, of Alzheimer's disease. However, recent studies of brain scans revealed high levels of plaques and tangles in the brains of subjects who showed no extraordinary signs of dementia, memory loss, or Alzheimer's. Scientists believe this is attributable to genetic resiliencies and greater cognitive reserve, which help compensate for damage caused by plaques and tangles. As a result, however, brain scans alone cannot conclusively determine whether an individual with a plaque-riddled brain has Alzheimer's. Sharon Begley, *They Have 'Alzheimer's Brains' but No Symptoms. A New Wave of Drug Developers Wants to Know Why*, STAT (Feb. 27, 2020), https://www.statnews.com/2020/02/27/alzheimers-brains-but-no-symptoms/ [https://perma.cc/BRA3-Y4KH] ("You can have abundant plaques and tangles without having Alzheimer's disease.").

advances and billions of dollars in grant money are devoted to the many challenges presented by Alzheimer's disease, we will be able to discover certain markers for the condition and even be able to determine the extent of impairment resulting from a particular constellation of those markers.[56]

A somewhat more prosaic example of contract law's neuroscientific acuity is revealed in portions of the law that do not seem to engage neuroscientific insights at all. Consider the "problem" of form contracts and legally mandated contract disclosures.[57] It is clear, crystal clear, that people do not read forms and do not heed boilerplate disclosures.[58]

Karl Llewellyn realized, or at least acknowledged, that fact well before mainstream contracts jurisprudence took into account the consequences for doctrine.[59] If the very terms of a contract do not certainly indicate the parties' intent, the foundation of consensual undertaking, then what are we to do with a writing that purports to denote agreement when it is certainly not the measure of agreement? We may ignore such terms to the extent that they are not reasonably indicative of the deal that the circumstances suggest the parties actually intended. That was Llewellyn's innovation, at least in the context of sophisticated commercial transactions, well before anyone imagined there was such a thing as "brain law."[60] Article 2 of Llewellyn's Uniform Commercial Code, the uniform law of the land,[61] provides that when the writings of the parties' conflicting forms diverge, the terms of their contract are those terms upon which the forms do, in fact, agree as well as additional terms to which we may reasonably expect the parties would agree.[62]

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56. *Alzheimer's and Dementia Research*, ALZHEIMER'S IMPACT MOVEMENT, https://alzimpact.org/issues/research#:~:text=Today%2C%20funding%20for%20Alzheimer's%20and,(NIH)%20is%20%243.2%20billion [https://perma.cc/UB6D-YCSH].

57. Tess Wilkinson-Ryan, *A Psychological Account of Consent to Fine Print*, 99 IOWA L. REV. 1745, 1748-50 (2014).

58. Leonhard, *supra* note 46, at 413.

59. ALCES, *supra* note 8, at 182.

60. One may wonder what the opposite of "brain law" might be: "brainless law"? Well, to the extent that legal doctrine is inconsistent with neuroscientific reality it would, in perhaps every sense, be "brainless."

61. Article 2 of the U.C.C. has not been adopted by Louisiana. *Commercial Law Research Guide: Uniform Commercial Code*, GEO. L. LIBR., https://guides.ll.georgetown.edu/commerciallaw/ucc [https://perma.cc/SV54-3F55].

62. *See* U.C.C. § 2-207 (AM. L. INST. & UNIF. L. COMM'N 1978); *see, e.g.*, Northrop Corp. v.

Later commentators have recognized the limited extent to which a complex writing accurately captures the parties' intent, particularly in the context of transactions in which the boilerplate overwhelms the deal.[63] Why would you read pages of legalisms to be sure that all of your rights incident to a contract valued at less than, say, ten dollars, are vindicated?[64]

Most of us, virtually all of us, assume that some, perhaps even all, of the contracts terms to which we agree will never really matter, at least beyond terms such as quantity, price, and delivery. So, ignorance of the fine print, even when it may not be so fine, is quite rational.[65] Contract terms, then, are most often redolent of the parties' intent without being definitive of that intent.[66] The realization that humans are situationally rather than dispositionally "wired"[67] reflects the neuroscientific acuity of much of the extant contract doctrine. The contract law, then, at least insofar as the foundational intent requirement is concerned, passes neuroscientific muster in at least some contexts.

But what does the extant law of nonconsensual relations reveal about the law's appreciation of neuroscientific reality? Here, too, there may be reason for optimism.

Litronic Indus., 29 F.3d 1173, 1174-75 (7th Cir. 1994); Step-Saver Data Sys., Inc. v. Wyse Tech., 939 F.2d 91, 98-100 (3d Cir. 1991); Commc'ns Supply Corp. v. Iron Bow Techs., LLC, No. 18-1374, 2021 WL 1176070, at *6 (W.D. Pa. Mar. 29, 2021).

63. *See, e.g.*, Leonhard, *supra* note 46, at 413; Wilkinson-Ryan, *supra* note 57, at 1748-50; *see also* Carnival Cruise Lines, Inc. v. Shute, 499 U.S. 585, 600 (1991) (Stevens, J., dissenting).

64. For that matter, even if you are signing the closing documents for your $350,000 mortgage refinance, you might rationally decide not to peruse the terms to which you are ostensibly agreeing once you realize that the terms are not negotiable anyway and you, rationally, assume that nothing is going to go wrong. *See* ALCES, *supra* note 8, at 187 (listing four reasons reading consumer form contracts is not worth consumer's time). You may also take some solace in the fact that many others have signed essentially identical documents with no ill effect and that surely some regulator somewhere has assured that you will not be taken advantage of. Right?

65. *Id.*

66. That is certainly true of recurring consumer contracts, which may account for the greatest number of contracts. But, as section 2-207 (Llewellyn's innovation) demonstrated, that is also true of many very sophisticated commercial contracts. *See* U.C.C. § 2-207 cmt. 1 (AM. L. INST. & UNIF. L. COMM'N 1978).

67. Jon Hanson & David Yosifon, *The Situational Character: A Critical Realist Perspective on the Human Animal*, 93 GEO. L.J. 1, 24 n.77 (2004); *see also* Jon Hanson & David Yosifon, *The Situation: An Introduction to the Situational Character, Critical Realism, Power Economics, and Deep Capture*, 152 U. PA. L. REV. 129, 139, 155 (2003).

B. Tort: What It Means to "Hurt Someone"

Most of tort law is concerned with negligent actions that result in harm, most generally personal injury. To the extent that tort law imposes liability for intentional wrongdoing, it overlaps with the criminal law, considered in the next Section. Plaintiffs may have reason to bring intentional tort actions against defendants, particularly well-heeled (or, at least, well-insured) defendants. It is significant too that the standard of proof in tort cases, "preponderance of the evidence," will support plaintiffs' recovery in cases even though the state could not prevail in a criminal prosecution, where the standard of proof is "beyond a reasonable doubt."[68]

Intent in the tort law is sensitive to neuroscientific realities, even those that are easily and traditionally confirmed by behavioral evidence. The cases demonstrate an understanding of the intellectual difference between a young child and a mature adult. For example, one of the canonical cases, *Garratt v. Dailey*, concerned the intentional tort liability of a child five years and nine months old.[69] Little Brian was visiting an adult, Naomi, when he pulled a chair out from under Naomi's sister Ruth Garratt as Ruth was about to sit down on it.[70] Ruth fell, fracturing her hip and suffering other injuries.[71] The Washington Supreme Court reasoned that it was not necessary for the plaintiff to prove that Brian *intended* to harm Ruth; rather, showing that Brian knew the necessary consequences of his actions was sufficient to establish Brian's tort liability.[72] The court explained that "[t]he only circumstance where Brian's age is of any consequence is in determining what he knew, and there his experience, capacity, and understanding are of course material."[73]

There is some difference of opinion among courts concerning the imposition of intentional tort liability on children of a particularly tender age. The Ohio Supreme Court refused to recognize the intentional tort liability of a child under the age of seven: "Our laws

68. KENNETH S. BROWN ET AL., MCCORMICK ON EVIDENCE § 339 (Robert P. Mosteller ed., 8th ed. 2020).

69. 279 P.2d 1091, 1092 (Wash. 1955).

70. *Id.*

71. *Id.*

72. *Id.* at 1094.

73. *Id.*

and our moral concepts assume actors capable of legal and moral choices, of which a young child is incapable."[74] Colorado reached the opposite conclusion in a case in which three- and four-year-old defendants caused the death of a five-week-old infant.[75]

There is nothing particularly striking about the results in cases involving conceptions of children's intent in battery cases. And it is only, for the briefest of moments, mildly surprising that mental deficiency of the defendant is not pertinent in tort cases generally: imposing liability based on the reasonable person standard when the defendant does not have the intellectual capacity to be reasonable does incentivize those who are in the best position to monitor such putative defendant's behavior to do so.[76]

What is striking—in a good way—about intentional tort law's understanding of the reasons for insulating some children from intentional tort liability is captured in the language of the Ohio Supreme Court and its focus on mental "capacity" and "moral choice[ ]."[77] We may conclude, at this juncture at least, that the law has it right: mental capacity is, as it should be, the measure of legal liability. There is no more reason to believe that little Brian's parents would be any less able or inclined to attend to his behavior because of his age-related mental capacity than they would were he mentally impaired for reasons unrelated to his youth.[78] For now, though, acknowledge that the tort law does take into account aspects of mental capacity that neuroscience may reveal, and to some extent is already competent to reveal.[79] While such neural characteristics have been most salient in criminal contexts,[80] they would be equally apposite in the civil tort setting.

It is, though, in criminal settings that the power of neuoroscientific insights on law is most salient.

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74. *See* DeLuca v. Bowden, 329 N.E.2d 109, 111 (Ohio 1975).

75. *See* Horton v. Reaves, 526 P.2d 304, 307-08 (Colo. 1974).

76. *See* RESTATEMENT (SECOND) OF TORTS § 283(B) cmt. b (AM. L. INST. 1965).

77. *DeLuca*, 329 N.E.2d at 111.

78. *See Garratt*, 279 P.2d at 1092.

79. *See* Brief for the American Psychological Ass'n & the Missouri Psychological Ass'n as Amici Curiae Supporting Respondent at 11-12, Roper v. Simmons, 543 U.S. 551 (2005) (No. 03-633); Brief for the American Psychological Ass'n et al. as Amici Curiae Supporting Petitioners at 25-26, Graham v. Florida, 560 U.S. 48 (2010) (No. 08-7412).

80. *See, e.g.*, *Roper*, 543 U.S. at 569; *Graham*, 560 U.S. at 68.

C. Criminal Intent and Emotion

The facts are familiar, the stuff of so-called "bodice-rippers": Frankie and Johnny were sweethearts, and after several years of a devoted, if torrid, relationship, Johnny's affections are "alienated" by Brenda (perhaps after her break-up with Eddie, of Brenda and Eddie fame).[81] True to Hollywood form, Frankie walks in on Johnny and Brenda and "Frankie took aim with her forty-four/Five times with a rooty-toot-toot."[82] It is, of course, ironic, that the once-popular song identified the wronged woman as the murderer while the decided cases have generally involved cuckolded men. The question though remains clear: Is a homicide committed "in the heat of passion" murder? If it is not murder, but some lesser degree of homicide, the criminal penalty would be much diminished; query whether there should be a penalty at all.

The doctrine and cases are clear that first degree, premeditated murder is "worse" from the perspective of the law, if not from the perspective of the victim. It may be necessary to wonder why that is so, but first consider some illustrative cases.

James Clark Thornton was convicted of murder in the first degree for the homicide of his estranged wife's paramour, Mark McConkey.[83] While the defendant and his wife were separated, but before Mrs. Thornton's attorney filed her divorce petition, the deceased had begun an amorous relationship with the soon-to-be ex-Mrs. Thornton with her husband's knowledge.[84] Aware of that relationship, Thornton showed up at the home of his wife, discovered her and McConkey *in medias* sexual relations, and shot McConkey.[85]

Now whether there was evidence of the type of premeditation that would support a first degree murder conviction is, for present purposes, beside the point.[86] The case is pertinent here for the court's observations regarding the defendant's "heat of passion":

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81. LEIGHTON BROS. & REN SHIELDS, *Frankie & Johnny* (Tell Taylor Music Publisher 1912).

82. *Id.*

83. State v. Thornton, 730 S.W.2d 309, 309 (Tenn. 1987).

84. *Id.* at 309-11.

85. *Id.* at 311-12.

86. Though, indeed, it would seem that the defendant had time for reflection: he left and came back with a gun and camera. *Id.* at 311.

> [I]t has long been a well-settled legal principle that the commission of unlawful sexual intercourse with a female relative is an act *obviously* calculated to arouse ungovernable passion, and that the killing of the seducer or adulterer under the influence or in the heat of that passion constitutes voluntary manslaughter, and not murder, in the absence of evidence of actual malice.[87]

The court relied on precedent in the jurisdiction.[88]

Indeed, it did not even matter whether defendant Thornton actually was experiencing the emotional upset the court attributed to him. What matters is the doctrine's recognition that intent may be vitiated by emotional reaction, that there is a legally significant difference between mental states pertinent to punishment. That difference must matter, in either noninstrumental (probably deontological[89]) or instrumental terms. So the defendant acting in response to particularly salient emotional provocation is either less culpable or presents less of a threat going forward than the contracted "hitman," who kills in a more "cold-blooded" way.

That distinction could make some sense. And if you believe that noninstrumentalism is anything more than the rationalization of emotional reaction (rather than just a more saliently visceral reaction to phenomena), the deontological "tug" of that rationalization may convince you that the distinction the doctrine discovers makes some kind of sense. You could also come to terms with the posited distinction in wholly instrumental terms: someone who catches his recently estranged romantic partner *in pare delicto* with another *might* pose less of a threat to others whom he does not discover in such circumstances. Either way, the difference seems to rely on a basis of justification unavailable when the killing is premeditated. Perhaps there is some sense that the defendant is less guilty if we can more easily appreciate, if not empathize with, the defendant's neural (in the event, "emotional") state. You get the sense that

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87. *Id.* at 312 (emphasis added).

88. *Id.* at 312-13 (quoting Toler v. State, 260 S.W.134, 137 (Tenn. 1924)).

89. *See generally* IMMANUEL KANT, GROUNDWORK OF THE METAPHYSICS OF MORALS (Mary Gregor ed. & trans., 1998) (providing Kant's deontological argument for the categorical imperative, which advocates for moral behavior out of a sense of duty rather than utilitarian interests).

somehow the provocation undermined the defendant's self-control, which, of course, posits a "self" somehow "in control."[90]

In similar regard, consider the now infamous case of "Spyder Cystkopf."[91] Herbert Weinstein strangled his wife and threw her body out of the window of their twelfth-floor Manhattan apartment.[92] The marriage had been troubled for some time: Weinstein researched how to kill by poisoning and had incurred significant gambling debts.[93] He also made an effort to make it appear as though his wife had taken her own life by jumping out of the apartment window.[94] So, there was evidence of the kind of premeditation that would undermine a defense based on impaired neural capacity.[95] And that was significant because Mr. Weinstein's defense counsel wanted to introduce neuroscientific evidence of an arachnoid cyst that had formed on Mr. Weinstein's frontal lobe, an area associated with so-called "executive function"—the ability to exert control over, and so avoid, impulsive actions.[96]

The issue in the case was whether the defense could introduce particular neuroscientific evidence: position emission tomography (PET)[97] and skin conductance response (SCR)[98] test results. The court reasoned:

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90. ALCES, *supra* note 8, at 10.

91. "Spyder Cystkopf" is the pseudonym given to defendant Herbert Weinstein in the real case, *People v. Weinstein*. 591 N.Y.S.2d 715 (Crim. Ct. 1992). The pseudonyms of the defendant and his victim were given by Dr. Daniel Martell in his analysis of the case and used in Morse's analysis. Morse, *supra* note 32, at 527 n.1.

92. *Weinstein*, 591 N.Y.S.2d at 717; *see also* KEVIN DAVIS, THE BRAIN DEFENSE: MURDER IN MANHATTAN AND THE DAWN OF NEUROSCIENCE IN AMERICA'S COURTROOMS 10 (2017).

93. DAVIS, *supra* note 92, at 120-121.

94. *Weinstein*, 591 N.Y.S.2d at 717; Morse, *supra* note 32, at 537; DAVIS, *supra* note 92, at 10.

95. *See Weinstein*, 591 N.Y.S.2d at 717.

96. *Id.* at 722-23; Morse, *supra* note 32, at 539-41.

97. *Weinstein*, 591 N.Y.S.2d at 717-18; *see also* Susan E. Rushing, *The Admissibility of Brain Scans in Criminal Trials: The Case of Positron Emission Tomography*, 50 CT. REV. 62, 62-64 (2014) (discussing PET scans and the *Weinstein* court's decision to admit them); J. Rojas-Burke, *PET Scans Advance as Tool in Insanity Defense*, 34 J. NUCLEAR MED. 13N, 25N, 26N (1993) (discussing the debate surrounding the *Weinstein* court's admittance of PET scans and its implications for future litigation).

98. *Weinstein*, 591 N.Y.S.2d at 717-18; *see* Antonio R. Damasio et al., *Individuals with Sociopathic Behavior Caused by Frontal Damage Fail to Respond Autonomically to Social Stimuli*, 41 BEHAV. BRAIN RSCH. 81, 90-92 (1990).

> [T]he admissibility of the results of these tests depends upon whether it would be reasonable for the psychiatrist to consider these results with other available information in forming a diagnosis that Weinstein's cognitive ability was so impaired at the time he allegedly killed his wife that he was not *responsible* for his conduct.[99]

The court found that it would be reasonable for the expert psychiatrist to consider the tests' results.[100] While the ruling did not ultimately lead to Mr. Weinstein's exoneration (and there is good reason to believe that it should not have),[101] it is important—for the law and neuroscience story—that the court's unwillingness to exclude the neuroscientific evidence may well have encouraged the prosecution to enter into a plea agreement that it otherwise would have been disinclined to entertain,[102] saving Mr. Weinstein perhaps fifteen years of incarceration.

Most significant is the court's casting its inquiry in terms of Mr. Weinstein's "responsibility": the neuroscientific evidence could be probative of Mr. Weinstein's criminal responsibility.[103] But in what sense? Surely there was no factual question regarding Mr. Weinstein's causal responsibility for his wife's death. What remained at issue, then, was a normative measure of responsibility. For the perspective urged in this Article, that is encouraging: the recognition that neural state may be probative of normative responsibility in a way that could determine application and operation of legal doctrine.

One final case study focuses the thought experiment. Mr. Oft (pseudonym) was a forty-year-old school teacher who was married and had a stepdaughter.[104] Though he had, since adolescence, maintained an interest in pornography, he had no history of sexual predation or violence.[105] But then, somewhat suddenly, he developed

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99. *Weinstein*, 591 N.Y.S.2d at 723 (emphasis added).

100. *Id.* at 724.

101. *See* Morse, *supra* note 32, at 540-41; DAVIS, *supra* note 92, at 120-21, 152, 183-84.

102. Kevin Davis, *Brain Trials: Neuroscience Is Taking a Stand in the Courtroom*, A.B.A. J., Nov. 2012, at 40-41.

103. *Weinstein*, 591 N.Y.S.2d at 717, 724-25.

104. Stephen J. Morse, *Lost in Translation? An Essay on Law and Neuroscience*, 13 LAW & NEUROSCIENCE 529, 559-60 (2010).

105. *Id.* at 559.

an interest in child pornography and started visiting child pornography websites.[106] Then he began to solicit prostitutes.[107] When he made sexual advances toward his stepdaughter, she told her mother and Oft was convicted of child molestation.[108] He was sentenced to an inpatient rehabilitation program instead of prison, but was expelled from that program when his inappropriate sexual behavior continued.[109]

The evening before he was to be sentenced to prison, Oft was admitted to the hospital after complaining of a severe headache.[110] While in the hospital that evening, he continued his inappropriate behavior.[111] Further behavioral anomalies caused the attending doctor to order an MRI, which revealed a large orbitofrontal tumor.[112] Following surgical removal of the tumor, Oft returned to normal, engaging in no inappropriate sexual behavior.[113] But about a year later, the inappropriate sexual behavior began again.[114] An MRI indicated that the tumor had regrown.[115] The new tumor was successfully removed, with the same favorable results that followed the first excision.[116]

Well, what do you want to do? Should Oft be incarcerated? Was he "responsible" for what the tumor made him do? Perhaps we could "incarcerate" the tumor by leaving it in a jar on a shelf. In order to appreciate the power of the thought experiment, you must assume that after the second surgery, Oft's predatory inclinations expired with the tumor. He presents no risk going forward and the efficient cause of the crimes he perpetrated before the second surgery no longer exists. If we now punish Oft, who or what, exactly, are we punishing? And, most pertinently here, how do conceptions of intent function to inform application of the criminal law?

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106. *Id.*
107. *Id.*
108. *Id.*
109. *Id.*
110. *Id.*
111. *Id.*
112. *Id.* at 559-60.
113. *Id.* at 560.
114. *Id.*
115. *Id.*
116. *Id.*; *see also* ALCES, *supra* note 8, at 15-21 (reviewing Morse's analysis of the Oft case to illustrate how empirical breakthroughs may reshape conceptual legal challenges).

II. THE FOLK PSYCHOLOGY OF "INTENT" IN LAW

To be clear, describing psychology as "folk" is not to disparage it: we all function by assuming the essential reality of folk psychology. Indeed, we would be unable to function without it. Folk psychology at least assumes, if it does not posit, the reality of beliefs, desires, and motives (BDM). I do not have to inquire into the neural incidents of your belief in order to come to terms with it for purposes of everyday social intercourse. We can define "belief" if we like, but that would rarely be necessary. What matters is that by your claiming to believe something, or my attributing a belief to you, we are establishing certain parameters of communication and social engagement. So, too, I know what you mean when you describe a desire or attribute a motive to someone. Folk psychology acknowledges that such abstractions perform important social coordination objects by facilitating communication.

But folk psychology is an abstraction made generally efficacious only by reference to its object. We could not imagine saying to the neurosurgeon "remove Oft's preoccupation with sexual predation." But we could say, "remove the tumor (that is, alter his brain structure) that is causing Oft to be a sexual predator." Neuroscience does not undermine folk psychology; it limits folk psychological conceptions to their appropriate domain: social settings in which BDM serve useful but not confounding purposes, in which BDM operate at the right level of abstraction.

"Intent" in law is such a folk psychological conception. It *can* tell us when and how the law should intervene. For example, it can tell us when an exchange will be welfare-creating (contract), when victim compensation and perpetrator disincentive meet in just the right way to justify civil relief (tort), and when the social interest has been compromised sufficiently to enlist the punitive power of the state (criminal law).[117] That is quite a lot to ask a folk psychological concept to do. We should not be surprised that it does not do it well.

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117. *See supra* Part I.

Further, intent only can work to vindicate any social object if we first agree on the normative character of that object. To oversimplify without sacrificing any necessary acuity, we need to divide the normative universe into two components: the instrumental and the noninstrumental. The incidents of both are accessible: instrumental responses are forward-looking, like general and specific deterrence; noninstrumental responses are backward-looking, like retribution and revenge.[118] Before we can have any sense of whether "intent" is a helpful marker on our normative path, we need to know where the path is headed. Even then, at some point we must come to terms with the constituents of intent. But fixing our normative object is fundamental.

For exemplary purposes, consider again the case of Oft.[119] Though his intent was resectioned, the other incidents of "Oft-ness" remain. Does "enough" of Oft remain to support a noninstrumental response to his presurgery actions? From the instrumental perspective, what object would be served by "post-surgery Oft's" incarceration? Keep in mind, there will be costs to imprisoning him—some easily and others not-so-easily quantifiable. Will those costs outweigh the general and specific benefits derived from his incarceration? For instance, what message, if any, would be sent to others considering sexual predation were we to return Oft to his pre-tumor life? And if that is the "math" we would have to perform to realize a normative object, how do folk-psychological conceptions of intent accommodate the calculation?

Further, cognitive neuroscience provides means to dig deeper than folk psychology would let us go. In fact, cognitive neuroscience could correct mistakes that would frustrate our normative object if we were to stop instead at the folk-psychological level of abstraction when that level would be impotent to realize (rather than frustrate) our normative object. Our argument is that the barrier to law's vindicating its normative objects is the law's reliance on the historically more accessible folk psychology shadows when appreciation of cognitive neuroscience can now provide better light. We can understand

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118. It is not clear that there really is a difference between the two, though we can say individuals exact revenge and states impose retributionary punishment. It probably feels the same from the perspective of the object of the punishment.

119. *See supra* text accompanying notes 104-16.

why legal doctrine, the product of less enlightened times, speaks the language of folk psychology; we cannot understand why it settles for that (potentially misleading) level of acuity and inquiry when a paradigm more aligned with every conceivable normative object is available.[120] And that paradigm more accurately depicts what it means to be human.[121]

Yet we are encouraged by law's engagement with neuroscientific realities when such realities are manifest. The contract, tort, and criminal law contexts in the first part of our story are success stories; we applaud them.[122] But it is just as important to recognize that the law's deference to neuroscience realties stops (abruptly) and that the impediment to the law's engagement with neuroscientific insights is a matter of empirical limitation, *not* conceptual confusion.[123] The law goes as far as it can with cognitive neuroscience, dismissing folk psychological conceptions, but then regresses to folk psychology's look through the glass darkly when the science has not yet taken us far enough.[124] It is as though secular thinking can take us only so far, and then we must fall back on superstition when we cannot understand the phenomena empirically.[125] Human agents are, then, in the eyes of the law, mechanistically determined entities, so far as we understand the mechanism.[126] Then, when our *current* empirical understanding runs into an empirical wall, we reconstitute human agency in divine or pseudoscientific terms, as an uncaused cause.[127] That is a grave error, as the science reveals.[128]

III. THE NON-VOLITIONAL BIOLOGICAL ROOTS OF INTENT

The process of adjudicating criminal law seems appropriately concerned with intent and all of the potential subtleties attached to

120. *See* ALCES, *supra* note 8, at 2.
121. *See id.*
122. *See generally supra* Part I (discussing states of mind in relation to contract, tort, and criminal law).
123. *See* ALCES, *supra* note 8, at 14-21.
124. *See id.* at 7-10, 14-21.
125. *See id.*
126. *See id.* at 19.
127. *See id.* at 32-34.
128. *See id.*

it[129]: Did the defendant intend to break the law? Was the breaking unintentional, but nevertheless occurred while the person was intent on breaking a different law? Or as some Frankfurt counterfactual,[130] did the defendant break the law, unaware that if they had decided to do otherwise, they would have been coerced to do so? The legal system's appropriate interest in intent is more than offset by its relative indifference to a crucial follow-up question: Where did that intent come from?[131] It is our contention that this indifference is a myopia that leaves the legal system fatally flawed.[132] As neuroscience and its related disciplines show, this is because we are not the authors of our intentions.[133]

This indifference can be appreciated with the example of Mr. Oft.[134] There is no question that he intended to molest his stepdaughter, in that it was not an accident, nor was he coerced to do so by an external force.[135] Where did that intent come from? The case's starkness reflects how clear the improbable answer is, which is that the orbitofrontal brain tumor caused it.[136] One can get lost in neurological minutia about causal determinism—was the criminal intent caused by the oncogene whose activation prompted the tumor growth, by the tumor which compressed Oft's cerebral blood vessels, or by the death of neurons due to the lack of oxygen from those blood vessels?[137] Regardless, Oft's criminal intent was caused by the tumor, not by Oft, with the causality flagrantly shown by the

129. *See id.* at 23-24.

130. *See* Dana K. Nelkin, *Irrelevant Alternatives and Frankfurt Counterfactuals*, 121 PHIL. STUD. 1, 1-2 (2004) (describing a Frankfurt counterfactual as a scenario in which a person deliberates between actions X and Y and voluntarily decides to perform X, but there is a "counterfactual intervener" who would have caused the person to perform X if the person chose not to do so voluntarily).

131. *See* ALCES, *supra* note 8, at 97 (discussing how one cannot know precisely why another acted the way he or she did).

132. *See id.* at 4.

133. *See id.* at 43.

134. *See* Jeffrey M. Burns & Russell H. Swerdlow, *Right Orbitofrontal Tumor with Pedophilia Symptom and Constructional Apraxia Sign*, 60 ARCHIVES NEUROLOGY 437, 437-40 (2003); Morse, *supra* note 104, at 559-62.

135. *See* Morse, *supra* note 104, at 537-40, 559-62.

136. *See id.*

137. *See id.*; Subramoniam Madhusoodanan et al., *Psychiatric Aspects of Brain Tumors: A Review*, 5 WORLD J. PSYCHIATRY 273, 282 (2015).

behavior repeatedly waxing and waning as the tumor grew, was removed, regrew, and was removed yet again.[138]

It is easy to see how Oft's tumor challenges a legal system equating intent with responsibility or volition.[139] But it is not the sort of case that can be generalized easily enough to revolutionize legal thinking. This is because of the uniqueness of its clarity, where massively abnormal behavior is caused by the singular and massive abnormality of a brain tumor, literally demonstrable at the scene of the crime. What contemporary science shows is that the intent behind our best and worst behaviors, and all those ambiguously in between, is as much the end product of factors outside our control as was Oft's intentional criminality.[140] However, it is far harder to appreciate this than the case of Oft for at least three reasons: (1) unlike the singularity of his tumor, our behavior mostly arises from a multitude of biological factors that subtly interact, (2) no single factor has remotely the overt sledgehammer causality of a tumor, and (3) many of the factors were set into action long before the behavior occurred (with some even long before the individual in question was born).[141] One can appreciate this with the following tour of the varied biological roots of intent that drive our behavior.

Consider an individual who unexpectedly finds himself interacting with a stranger, a member of an out-group with which our protagonist and his in-group have had a long history of animosity.[142] That stranger's appearance—clothing, style of facial hair or head covering, an armband, pendant, or tattoo—reifies that animosity.[143] The two interact, tensely, and at some point, the stranger says something fraught with ambiguity. An outside observer might readily perceive the stranger's words as relatively neutral.[144] In contrast, the protagonist views them as threatening and provocative,

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138. *See* Morse, *supra* note 104, at 559-62.

139. *See id.*; ALCES, *supra* note 8, at 43.

140. *See* Morse, *supra* note 104, at 559-62; Nelkin, *supra* note 130, at 1-2 (providing an example of how a factor outside one's control can lead one to behave in a certain manner).

141. *See* Morse, *supra* note 104, at 559-62; ALCES, *supra* note 8, at 49-63.

142. *See generally* Chad E. Forbes et al., *Negative Stereotype Activation Alters Interaction Between Neural Correlates of Arousal, Inhibition & Cognitive Control*, 7 SOC. COGNITIVE & AFFECTIVE NEUROSCIENCE 771, 771-72 (2012) (discussing stereotype activation when encountering out-group members).

143. *See id.* at 777-78.

144. *See generally id.*

as offensive to values that the protagonist and his group find sacred.[145] The protagonist reaches for a gun, and has a brief swirl of conflicting thoughts and feelings about whether to shoot: a knowledge that he is likely to be caught; a memory of a loved one whom this out-group victimized; a fear that the stranger is also armed and would shoot without hesitation; a consideration that he should just walk away; a flash of a hateful, dehumanizing trope about this out-group; a millisecond's thought that maybe he misinterpreted what the guy had said; a flashing pleasure at the prospects of being strong, decisive, and dangerous. The protagonist pulls out the gun, and intentionally pulls the trigger.

This is where, in many ways, the legal system stops,[146] but instead, it is where the legal system should ask: Where did that intent come from?[147]

The weighing and balancing of those conflicting thoughts is the purview of the frontal cortex, receiving inputs from throughout the brain concerning emotions, memories, thoughts, and habits.[148] It is the brain region that makes executive decisions as to what counts as the right thing to do under the circumstances and helps supply the emotional regulation and impulse control that one might need to actually do the right thing.[149]

A variety of events in the preceding seconds to minutes, none of which the protagonist would have been consciously aware of, tilt that frontal cortex in the direction of intentionally pulling the trigger.[150] That tilting would be facilitated by a variety of sensory information—for example, if music was playing in the background that the protagonist associates with that hated out-group, he would be more likely to find the stranger to be more threatening.[151] If there was a bad smell in the room or a bad taste in his mouth, he would

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145. *See generally id.*

146. *See* ALCES, *supra* note 8, at 14-21.

147. *See id.* at 97.

148. *See* CHARLES R. NOBACK ET AL., THE HUMAN NERVOUS SYSTEM: STRUCTURE & FUNCTION 390-99 (6th ed. 2005).

149. *Id.*

150. *See* Forbes et al., *supra* note 142, at 772, 777-78; Katie Liljenquist et al., *The Smell of Virtue: Clean Scents Promote Reciprocity & Charity*, 21 PSYCH. SCI. 381, 381-82 (2010); Kenneth L. Dion, *Intergroup Conflict and Intragroup Cohesiveness*, *in* THE SOCIAL PSYCHOLOGY OF INTERGROUP RELATIONS 219 (William G. Austin & Stephen Worchel eds., 1979).

151. *See* Forbes et al., *supra* note 142, at 772, 779.

be more likely to judge the stranger more harshly.[152] If he had just walked past a place of symbolic significance to his in-group (for example, a place of worship), he would be more likely to shoot.[153] If the protagonist is heterosexual, he would be more likely to shoot if a woman were present, but only if he considered her to be attractive.[154] The protagonist's internal state shapes the frontal cortex's executive decision.[155] If he had been performing a difficult, frontally dependent task or is sleep-deprived, the metabolism of the very costly frontal cortex would be blunted, weakening its capacity to control impulses.[156] He would be more likely to pull the trigger if he is in pain.[157] Likewise, if he is hungry; his frontal function would be strengthened if he had recently consumed a sugary drink, but not if the drink contained a noncaloric artificial sweetener.[158] And none of these factors would be in his conscious awareness as he deliberates whether to shoot.[159]

Factors outside his control or awareness were also in play in the hours to days before he formed the intent to shoot. If, because of daily or seasonal fluctuations, the levels of testosterone in his bloodstream had been rising, he would be more likely to perceive a neutral facial expression as a threatening one.[160] The hormone would have lessened the excitability of neurons in the frontal cortex, while doing the opposite in the amygdala, a brain region central to fear and aggression; as a result, amygdaloid activity would be more likely to dominate that of the frontal cortex, rather than the reverse.[161] Moreover, testosterone would also have made him more

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152. *See id.*; Liljenquist et al., *supra* note 150, at 381-82.

153. *See* Dion, *supra* note 150, at 219.

154. *See* Karen Dion et al., *What Is Beautiful Is Good*, 24 J. PERSONALITY & SOC. PSYCH. 285, 288 (1972).

155. *See* Ashley Acheson et al., *Effects of Sleep Deprivation on Impulsive Behaviors in Men and Women*, 91 PHYSIOLOGY & BEHAV. 579, 579-80 (2007).

156. *See id.*

157. *See* Nina Attridge et al., *People in Pain Make Poorer Decisions*, 160 PAIN 1662, 1668-69 (2019).

158. *See* Matthew T. Gailliot & Roy F. Baumeister, *The Physiology of Willpower: Linking Blood Glucose to Self-Control*, 92 PERSONALITY & SOC. PSYCH. REV. 303, 319-22 (2007).

159. *See* Forbes et al., *supra* note 142, at 772, 777-78; Liljenquist et al., *supra* note 150, at 381-82; Dion, *supra* note 150, at 219.

160. *See* Flávia L. Osório et al., *Sex Hormones and Processing of Facial Expressions of Emotion: A Systematic Literature Review*, 9 FRONTIERS PSYCH., Apr. 2018, at 2, 10-11.

161. *See* Birgit Derntl et al., *Amygdala Activity to Fear and Anger in Healthy Young Males*

likely to inaccurately overestimate the likelihood of a successful outcome to his actions.[162] On another endocrine front, if levels of the hormone oxytocin had been rising in his bloodstream, he would manifest an increased sense of in-group favoritism; in a game, he would be more likely to cheat or be preemptively aggressive to an out-group member, would feel more envy of an out-group success, more gloating schadenfreude at their failure.[163] If he experienced rising levels of stress hormones—such as cortisol—in those preceding hours, his amygdala neurons would become more excitable, frontal neurons less so.[164] As a result, pathways in the brain mediating habitual, preservative actions would strengthen, whereas risk aversion and empathy would decrease.[165] All of these effects are understood down to the level of individual cells, molecules, and genes, and all would be outside our protagonist's conscious awareness.[166]

Events in the prior weeks, months, and even recent years would also have helped create his intent to pull the trigger, a reflection of the ability of the brain to change in response to experience.[167] To begin, different brain regions increase or decrease their number of

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Is Associated with Testosterone, 34 PSYCHONEUROENDOCRINOLOGY 687, 688 (2009).

162. *See* Nicholas D. Wright et al., *Testosterone Disrupts Human Collaboration by Increasing Egocentric Choices*, 279 PROC. ROYAL SOC'Y B 2275, 2278 (2012).

163. For more information on how oxytocin impacts behavior, see generally Carsten K. W. De Dreu et al., *Oxytocin Promotes Human Ethnocentrism*, 108 PROC. NAT'L ACAD. SCIS. 1262, 1264 (2011) (explaining oxytocin's effects on group bias); Thomas Baumgartner et al., *Oxytocin Shapes the Neural Circuitry of Trust and Trust Adaptation in Humans*, 58 NEURON 639, 644 (2008); Carolyn H. Declerck et al., *Oxytocin and Cooperation Under Conditions of Uncertainty: The Modulating Role of Incentives and Social Information*, 57 HORMONES & BEHAV. 368, 372 (2010); Simone G. Shamay-Tsoory et al., *Intranasal Administration of Oxytocin Increases Envy and Schadenfreude (Gloating)*, 66 BIOLOGICAL PSYCHIATRY 864 (2009) (explaining oxytocin's effects on feelings of envy and gloating toward out-groups).

164. *See* Bruce S. McEwen et al., *Stress Effects on Neuronal Structure: Hippocampus, Amygdala, and Prefrontal Cortex*, 41 NEUROPSYCHOPHARMACOLOGY 3, 14-16 (2016).

165. *See* Samuel Bendahan et al., *Acute Stress Alters Individual Risk Taking in a Time-Dependent Manner and Leads to Anti-Social Risk*, 45 EUR. J. NEUROSCIENCE 877, 878 (2017).

166. *See* Osório et al., *supra* note 160, at 2, 10-11; De Dreu et al., *supra* note 163, at 1264; McEwen et al., *supra* note 164, at 14-16.

167. *See* Anthony Holtmaat & Karel Svoboda, *Experience-Dependent Structural Synaptic Plasticity in the Mammalian Brain*, 10 NATURE REVS. NEUROSCIENCE 647, 652-53 (2009); Catherine S. Woolley et al., *Naturally Occurring Fluctuation in Dendritic Spine Density on Adult Hippocampal Pyramidal Neurons*, 10 J. NEUROSCIENCE 4035, 4038 (1990); Wolfgang Kelsch et al., *Watching Synaptogenesis in the Adult Brain*, 33 ANN. REV. NEUROSCIENCE 131, 143 (2010).

synapses, depending on the experience.[168] Moreover, experience changes the complexity and targeting of neuronal cables linking one brain region to another, altering how effectively the two integrate their function.[169] Furthermore, varying experiences will differentially affect the numbers of different types of brain cells as some are born and others die.[170] Collectively, these cellular and subcellular changes are impactful enough so that the actual *size* of different brain regions will change.[171] If the protagonist suffered post-traumatic stress disorder (PTSD) due to an unspeakable trauma in his past, his amygdala would likely have slowly grown larger and more reactive; if he had been enduring months of the major stress of, say, unemployment, his frontal cortex would likely

168. *See* Holtmaat & Svoboda, *supra* note 167, at 651; Catherine Lord et al., *Hippocampal Volumes Are Larger in Postmenopausal Women Using Estrogen Therapy Compared to Past Users, Never Users and Men: A Possible Window of Opportunity Effect*, 29 NEUROBIOLOGY AGING 95, 96 (2008); Robert M. Sapolsky, *Glucocorticoids & Hippocampal Atrophy in Neuropsychiatric Disorders*, 57 ARCHIVES GEN. PSYCHIATRY 925, 926 (2000); Amelia A. Mutso et al., *Abnormalities in Hippocampal Functioning with Persistent Pain*, 32 J. NEUROSCIENCE 5747, 5753 (2012); Jens C. Pruessner et al., *Stress Regulation in the Central Nervous System: Evidence from Structural and Functional Neuroimaging Studies in Human Populations*, 35 PSYCHONEUROENDOCRINOLOGY 179, 179-80 (2010); Janice R. Kuo et al., *Amygdala Volume in Combat-Exposed Veterans with and Without Posttraumatic Stress Disorder: A Cross-Sectional Study*, 69 ARCHIVES GEN. PSYCHIATRY 1080, 1082-83 (2012).

169. *See* Eduardo Dias-Ferreira et al., *Chronic Stress Causes Frontostriatal Reorganization and Affects Decision-Making*, 325 SCI. 621, 625 (2009); Manabu Fuchikami et al., *Epigenetic Regulation of* BDNF *Gene in Response to Stress*, 7 PSYCHIATRY INVESTIGATION 251, 251 (2010).

170. *See* A. M. Magariños & B. S. McEwen, *Stress-Induced Atrophy of Apical Dendrites of Hippocampal CA3c Neurons: Involvement of Glucocorticoid Secretion and Excitatory Amino Acid Receptors*, 69 NEUROSCIENCE 89 (1995); Ana María Magariños et al., *Chronic Psychosocial Stress Causes Apical Dendritic Atrophy of Hippocampal CA3 Pyramidal Neurons in Subordinate Tree Shrews*, 16 J. NEUROSCIENCE 3534, 3539 (1996); Brennan D. Eadie et al., *Voluntary Exercise Alters the Cytoarchitecture of the Adult Dentate Gyrus by Increasing Cellular Proliferation, Dendritic Complexity, and Spine Density*, 486 J. COMPAR. NEUROLOGY 39, 43 (2005); *see also* Mohammad M. Khan et al., *Estrogen Regulation of Spine Density and Excitatory Synapses in Rat Prefrontal and Somatosensory Cerebral Cortex*, 78 STEROIDS 614, 615 (2013); Bruce McEwen, *Estrogen Actions Throughout the Brain*, 57 RECENT PROGRESS HORMONE RSCH. 357, 362 (2002); Benedetta Leuner & Elizabeth Gould, *Structural Plasticity and Hippocampal Function*, 61 ANN. REV. PSYCH. 111, 113 (2010).

171. *See* Eleanor A. Maguire et al., *Navigation-Related Structural Change in the Hippocampi of Taxi Drivers*, 97 PROC. NAT'L ACAD. SCIS. 4398, 4402 (2000); Katherine Woollett & Eleanor A. Maguire, *Acquiring "the Knowledge" of London's Layout Drives Structural Brain Changes*, 21 CURRENT BIOLOGY 2109, 2112 (2011).

have atrophied and become less effective.[172] These events are all outside his control.[173]

We now consider the construction of the protagonist's brain in the first place, during childhood. Here are some of the factors early in life that would have been detrimental to the development of his frontal cortex and its capacity to regulate his emotions: if he had witnessed or been subject to physical, psychological, or sexual abuse or to emotional or physical neglect;[174] if he had a family member who was mentally ill, incarcerated, or a substance abuser;[175] or if he had been chronically exposed to environmental neurotoxins such as lead.[176] As another factor, if the protagonist had been born poor, by age five, he would have already been more likely than chance to have an underdeveloped and less effective frontal cortex.[177] Moreover,

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172. *See* ERIC R. KANDEL, THE DISORDERED MIND: WHAT UNUSUAL BRAINS TELL US ABOUT OURSELVES 185-86 (2018).

173. *See* Osório et al., *supra* note 160, at 2, 10-11.

174. *See* Constance Hammen et al., *Depression and Sensitization to Stressors Among Young Women as a Function of Childhood Adversity*, 68 J. CONSULTING & CLINICAL PSYCH. 782, 786 (2000); Eamon McCrory et al., *The Link Between Child Abuse and Psychopathology: A Review of Neurobiological and Genetic Research*, 105 J. ROYAL SOC'Y MED. 151, 151-52 (2012); Kevin Lalor & Rosaleen McElvaney, *Child Sexual Abuse, Links to Later Sexual Exploitation / High-Risk Sexual Behavior, and Prevention / Treatment Programs*, 11 TRAUMA, VIOLENCE & ABUSE 159, 163 (2010); Yael Dvir et al., *Childhood Maltreatment, Emotional Dysregulation, and Psychiatric Comorbidities*, 22 HARV. REV. PSYCHIATRY 149, 151 (2014); Enrico Mezzacappa et al., *Child Abuse and Performance Task Assessments of Executive Functions in Boys*, 42 J. CHILD PSYCH. & PSYCHIATRY 1041, 1041 (2001); Marieke Wichers et al., *Transition from Stress Sensitivity to a Depressive State: Longitudinal Twin Study*, 195 BRIT. J. PSYCHIATRY 498, 501 (2009).

175. *See* Lalor & McElvaney, *supra* note 174, at 163.

176. *See* Rick Nevin, *Understanding International Crime Trends: The Legacy of Preschool Lead Exposure*, 104 ENV'T RSCH. 315, 317-19 (2007).

177. *See* Sonia J. Lupien et al., *Effects of Stress Throughout the Lifespan on the Brain, Behaviour and Cognition*, 10 NATURE REVS. NEUROSCIENCE 434, 438 (2009); Daniel A. Hackman et al., *Socioeconomic Status and the Brain: Mechanistic Insights from Human and Animal Research*, 11 NATURE REVS. NEUROSCIENCE 651, 654 (2010); Margaret A. Sheridan et al., *The Impact of Social Disparity on Prefrontal Function in Childhood*, 7 PLOS ONE, Apr. 2012, at 1, 2-3; Jamie L. Hanson et al., *Structural Variations in Prefrontal Cortex Mediate the Relationship Between Early Childhood Stress and Spatial Working Memory*, 32 J. NEUROSCIENCE 7917, 7918 (2012); Maggie M. Sweitzer et al., *Polymorphic Variation in the Dopamine D4 Receptor Predicts Delay Discounting as a Function of Childhood Socioeconomic Status: Evidence for Differential Susceptibility*, 9 SOC. COGNITIVE & AFFECTIVE NEUROSCIENCE 499, 502-03 (2013); Elliot M. Tucker-Drob et al., *Emergence of a Gene X Socioeconomic Status Interaction on Infant Mental Ability Between 10 Months and 2 Years*, 22 PSYCH. SCI. 125, 125 (2011); Israel Liberzon et al., *Childhood Poverty and Recruitment of Adult Emotion Regulatory Neurocircuitry*, 10 SOC. COGNITIVE & AFFECTIVE NEUROSCIENCE 1596, 1596 (2015); Kimberly

these adverse childhood experiences would have caused epigenetic changes in gene regulation in his brain that are potentially lifelong.[178] Commensurate with that, a developmental history would not only have increased the likelihood of his pulling that trigger, but of other forms of antisocial behavior as well, along with low educational and occupational attainment and poor health.[179]

Separate from these examples of adversity, early life cultural influences would have shaped the development of the protagonist's brain.[180] For example, if he had been raised in the rural American South with its culture of honor, he would be more likely than other

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G. Noble et al., *Family Income, Parental Education, and Brain Structure in Children and Adolescents*, 18 NATURE NEUROSCIENCE 773, 773 (2015).

178. *See* Nadine Provencal et al., *The Signature of Maternal Rearing in the Methylome in Rhesus Macaque Prefrontal Cortex and T Cells*, 32 J. NEUROSCIENCE 15626, 15626 (2012); Tania L. Roth et al., *Lasting Epigenetic Influence of Early-Life Adversity on the* BDNF *Gene*, 65 BIOLOGICAL PSYCHIATRY 760, 760 (2009); E.C. Braithwaite et al., *Maternal Prenatal Depressive Symptoms Predict Infant* NR3C1 *1F and* BDNF *IV DNA Methylation*, 10 EPIGENETICS 408, 408 (2015); Chris Murgatroyd et al., *Dynamic DNA Methylation Programs Persistent Adverse Effects of Early-Life Stress*, 12 NATURE NEUROSCIENCE 1559, 1559 (2009); Michael J. Meaney & Moshe Szyf, *Environmental Programming of Stress Responses Through DNA Methylation: Life at the Interface Between a Dynamic Environment and a Fixed Genome*, 7 DIALOGUES CLINICAL NEUROSCIENCE 103, 103 (2005); Patrick O. McGowan et al., *Broad Epigenetic Signature of Maternal Care in the Brain of Adult Rats*, 6 PLOS ONE, Feb. 2011, at 1, 6; Dong Liu et al., *Maternal Care, Hippocampal Glucocorticoid Receptors, and Hypothalamic-Pituitary-Adrenal Responses to Stress*, 277 SCI. 1659, 1660 (1997); Tim F. Oberlander et al., *Prenatal Exposure to Maternal Depression, Neonatal Methylation of Human Glucocorticoid Receptor Gene* (*NR3C1*) *and Infant Cortisol Stress Responses*, 3 EPIGENETICS 97, 97 (2008); James P. Curley et al., *Social Enrichment During Postnatal Development Induces Transgenerational Effects on Emotional and Reproductive Behavior in Mice*, 3 FRONTIERS BEHAV. NEUROSCIENCE 1, 1 (2009); Frances A. Champagne, *Maternal Imprints and the Origins of Variation*, 60 HORMONES & BEHAV. 4, 4 (2011); Frances A. Champagne & James P. Curley, *Epigenetic Mechanisms Mediating the Long-Term Effects of Maternal Care on Development*, 33 NEUROSCIENCE & BIOBEHAVIORAL REVS. 593, 593 (2009); Frances A. Champagne et al., *Maternal Care Associated with Methylation of the Estrogen Receptor-a1b Promoter and Estrogen Receptor-a Expression in the Medial Preoptic Area of Female Offspring*, 147 ENDOCRINOLOGY 2909, 2909 (2006); Frances A. Champagne & James P. Curley, *How Social Experiences Influence the Brain*, 15 CURRENT OP. NEUROBIOLOGY 704, 704 (2005); *see also* DAVID S. MOORE, THE DEVELOPING GENOME: AN INTRODUCTION TO BEHAVIORAL EPIGENETICS 60 (2015) (explaining that epigenetic changes caused by environmental factors can have permanent impacts on a genome).

179. *See* Karen Hughes et al., *The Effect of Multiple Adverse Childhood Experiences on Health: A Systematic Review and Meta-Analysis*, 2 LANCET PUB. HEALTH e356, e356 (2017); Karen A. Kalmakis & Genevieve E. Chandler, *Health Consequences of Adverse Childhood Experiences: A Systematic Review*, 27 J. AM. ASS'N NURSE PRACS. 457 (2015).

180. *See* RICHARD E. NISBETT & DOV COHEN, CULTURE OF HONOR: THE PSYCHOLOGY OF VIOLENCE IN THE SOUTH 47-48 (1996).

American males to elevate testosterone and cortisol levels in response to a perceived affront, and he is more likely to advocate a violent response in such circumstances.[181] Pulling the trigger would be more likely if he had been raised with a cultural legacy of his in-group being historically victimized coupled with an ethos of revenge.[182]

Thus, the construction of the protagonist's brain would have been sculpted by the collectivity of early life experience, including the parenting style of those who raised him, his peer influences, and the cultural values that surrounded him.[183] But environment does not begin at birth, and that adult moment of intent will have been shaped by the protagonist's fetal life as well.[184] If he had been exposed to high levels of alcohol as a fetus, thanks to elevated blood alcohol levels in his mother, his frontocortical maturation would have been impaired.[185] If it was high levels of stress hormones, derived from the mother's circulation and the adversity that she experienced, lifelong epigenetic changes would have resulted in a larger, more reactive amygdala at that moment of reaching for the gun.[186] And higher levels of exposure to testosterone and related

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181. *See id.*

182. For examples of how a victimized in-group combined with an ethos of revenge increases the likelihood of violence, see WALTER R. BORNEMAN, POLK: THE MAN WHO TRANSFORMED THE PRESIDENCY AND AMERICA (2008); BERTRAM WYATT-BROWN, SOUTHERN HONOR: ETHICS AND BEHAVIOR IN THE OLD SOUTH (1982).

183. *See* Diana Baumrind, *Child Care Practices Anteceding Three Patterns of Preschool Behavior*, 75 GENETIC PSYCH. MONOGRAPHS 43, 45, 83 (1967) (parenting style); JUDITH RICH HARRIS, THE NURTURE ASSUMPTION: WHY CHILDREN TURN OUT THE WAY THEY DO 33-34 (1998) (peer influences).

184. *See* Carmen Rasmussen, *Executive Functioning and Working Memory in Fetal Alcohol Spectrum Disorder*, 29 ALCOHOLISM: CLINICAL & EXPERIMENTAL RSCH. 1359, 1362 (2005).

185. *Id.*

186. *See* J. Amiel Rosenkranz et al., *Chronic Stress Causes Amygdala Hyperexcitability in Rodents*, 67 BIOLOGICAL PSYCHIATRY 1128 (2010); Sevil Duvarci & Denis Paré, *Glucocorticoids Enhance the Excitability of Principal Basolateral Amygdala Neurons*, 27 J. NEUROSCIENCE 4482, 4489 (2007); Alexandra Kavushansky & Gal Richter-Levin, *Effects of Stress and Corticosterone on Activity and Plasticity in the Amygdala*, 84 J. NEUROSCIENCE RSCH. 1580, 1580 (2006); Alexandra Kavushansky et al., *Activity and Plasticity in the CA1, the Dentate Gyrus, and the Amygdala Following Controllable vs. Uncontrollable Water Stress*, 16 HIPPOCAMPUS 35, 35, 40 (2006); Pablo A. Rodriguez Manzanares et al., *Previous Stress Facilitates Fear Memory, Attenuates GABAergic Inhibition, and Increases Synaptic Plasticity in the Rat Basolateral Amygdala*, 25 J. NEUROSCIENCE 8725, 8731-32 (2005); Harini Lakshminarasimhan & Sumantra Chattarji, *Stress Leads to Contrasting Effects on the Levels of Brain Derived Neurotrophic Factor in the Hippocampus and Amygdala*, 7 PLOS ONE, Jan.

androgens during fetal life would have increased the likelihood of reactive aggression in adulthood.[187]

If the protagonist had no control over which parents raised him or which womb he was in when construction of his brain commenced, he certainly had no control over the genes he inherited. As a caveat that always bears repeating because of well-entrenched folk beliefs, very little about the effects of genes on the brain and behavior are deterministic and inevitable.[188] Instead, genes are about vulnerabilities and potentials, interacting with different environments in different ways.[189] For example, if the protagonist's genetic legacy included variants of a gene related to the neurotransmitter serotonin, it would have increased the likelihood of antisocial violence, but only if he had been abused as a child.[190] As another example, if he had inherited a gene variant related to oxytocin, it would have increased his likelihood of reactive aggression, but only when coupled with alcohol consumption.[191]

And remarkably, the building blocks of the protagonist "intentionally" pulling the trigger also come from events years, even centuries before his birth.[192] If the protagonist's ancestors were pastoralists

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2012, at 1, 1-2; Supriya Ghosh et al., *Functional Connectivity from the Amygdala to the Hippocampus Grows Stronger After Stress*, 33 J. NEUROSCIENCE 7234, 7234, 7243 (2013).

187. *See* C.W. Joyce et al., *Second to Fourth Digit Ratio Confirms Aggressive Tendencies in Patients with Boxers Fractures*, 44 INJURY 1636, 1636-37 (2013); Marina Butovskaya et al., *Digit Ratio (2D:4D), Aggression, and Dominance in the Hazda and the Datoga of Tanzania*, 27 AM. J. HUM. BIOLOGY 620, 620-21, 624 (2015); Johannes Hönekopp & Steven Watson, *Meta-Analysis of the Relationship Between Digit-Ratio 2D:4D and Aggression*, 51 PERSONALITY & INDIVIDUAL DIFFERENCES 381, 381 (2011).

188. *See* Avshalom Caspi et al., *Influence of Life Stress on Depression: Moderation by a Polymorphism in the 5-HTT Gene*, 301 SCI. 386, 386, 389 (2003).

189. *See id.*

190. *See id.*

191. *See* Brad J. Bushman, *Human Aggression While Under the Influence of Alcohol and Other Drugs: An Integrative Research Review*, 2 CURRENT DIRECTIONS PSYCH. SCI. 148, 150-52 (1993); Lening Zhang et al., *The Nexus Between Alcohol and Violent Crime*, 21 ALCOHOLISM: CLINICAL & EXPERIMENTAL RSCH. 1264, 1265 (1997); Kathryn Graham & Paulette West, *Alcohol and Crime: Examining the Link*, *in* INTERNATIONAL HANDBOOK OF ALCOHOL DEPENDENCE AND PROBLEMS 439, 453 (Nick Heather et al. eds., 2001); S. Chiavegatto et al., *Individual Vulnerability to Escalated Aggressive Behavior by a Low Dose of Alcohol: Decreased Serotonin Receptor mRNA in the Prefrontal Cortex of Male Mice*, 9 GENES, BRAIN & BEHAV. 110, 110 (2010); A. Johansson et al., *Alcohol and Aggressive Behavior in Men—Moderating Effects of Oxytocin Receptor Gene (OXTR) Polymorphisms*, 11 GENES, BRAIN & BEHAV. 214, 214, 219 (2012).

192. *See* Damian R. Murray & Mark Schaller, *Historical Prevalence of Infectious Diseases*

(as opposed to farmers or hunter-gatherers), he would have been more likely to have been raised in a culture of honor.[193] If his ancestors lived in desert, rather than rain forest, he would have been more likely to have been raised in a culture that is monotheistic, hierarchical, with warrior-classes and a belief that if you die in battle, you are assured a paradisiacal afterlife.[194] If his ancestors half a millennium ago lived in an environment with a particularly heavy infectious disease load, he would have been more likely to have been raised in a xenophobic culture.[195]

And finally, pushing causal roots back tens of millions of years, humans could have evolved to be one of the relatively rare primate species that always form stable pair-bonds featuring extensive amounts of male parental behavior (for example, numerous South American monkeys).[196] Humans did not, and that fact not only makes it more likely that the protagonist would have fired the gun, but that our species would have invented guns in the first place.[197]

Virtually all the behavioral biological findings reviewed in this Part were discovered only in recent decades, with the majority only in recent years. What they show is that who we are in the present is nothing more or less than the randomness of our biology and its interactions with our environment.[198] "Intent" as used in the sense to imply agency or responsibility is meaningless. Our intentions, along with our desires, values, aversions, proclivities, vulnerabilities, tastes, quirks, and so on, are the end products of factors over which we had no control in the past and of which we have little

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Within 230 Geopolitical Regions: A Tool for Investigating Origins of Culture, 41 J. CROSS-CULTURAL PSYCH. 99, 100 (2010).

193. *See* Carol R. Ember & Melvin Ember, *Warfare, Aggression, and Resource Problems: Cross-Cultural Codes*, 26 BEHAV. SCI. RSCH. 169 (1992); Hervey C. Peoples & Frank W. Marlowe, *Subsistence and the Evolution of Religion*, 23 HUM. NATURE 253, 253, 255, 263 (2012).

194. *See* Ember & Ember, *supra* note 193; Peoples & Marlowe, *supra* note 193, at 264.

195. *See* Murray & Schaller, *supra* note 192, at 100.

196. *See* Jason C. Buchan et al., *True Paternal Care in a Multi-Male Primate Society*, 425 NATURE 179, 179 (2003).

197. For explanations of how the human species has evolved somewhere between a pair-bonding and tournament species, see generally DAVID P. BARASH & JUDITH EVE LIPTON, THE MYTH OF MONOGAMY: FIDELITY AND INFIDELITY IN ANIMALS AND PEOPLE (2001); BERNARD CHAPAIS, PRIMEVAL KINSHIP: HOW PAIR-BONDING GAVE BIRTH TO HUMAN SOCIETY (2008).

198. *See* Caspi et al., *supra* note 188.

awareness in the present.[199] One classic finding could serve as the poster child for this worldview (even if it concerns issues far afield from the pulling of a trigger): Ask subjects their favorite detergent. If they have just read a paragraph containing the word "ocean," they are more likely to choose Tide—and to then confidently explain the reasoning and intentionality behind their choice.[200]

CONCLUSION

Here's the problem: We have developed an understanding of human agency that conflicts with popular conceptions and prevailing societal (including legal) norms. And there is not merely discontinuity between the two models, the popular (law's) and the veridical (ours); there is conflict. If we are right (and we are sure we are) the law is wrong—persistently and consistently wrong in ways that actually undermine human welfare (and threaten human thriving). Moreover, the problem is fundamental; the fiction on which the popular model (and extant legal doctrine) is primarily based is a fiction to which human agents are predisposed, for reasons that must have made more sense on the savanna about 250,000 years ago. Indeed, it is a fiction to which the authors of this Article are predisposed. We recognize the difficulty of peeking behind the curtain that hides what we are in fact: a mechanical marvel, marvelous certainly, but most importantly, mechanical.[201]

What the popular model relies upon is the stuff of noninstrumental philosophy, a divine or secular natural law that imagines there is more to heaven and earth than is dreamt of in our philosophy.[202] Morality—the morality that would govern nonmechanical actors—depends on the inscrutable and affords what we sense (albeit, through a glass, darkly) as more fundamental than what we can see (and have reason to believe we will see better as the promise of neuroscience is fulfilled).[203] The mechanical human agent revealed by neuroscientific insights rejects the conclusion that there

199. *See* Kari Edwards, *The Interplay of Affect and Cognition in Attitude Formation and Change*, 59 J. PERSONALITY & SOC. PSYCH. 202, 212 (1990).

200. *See id.*

201. *See supra* note 10 and accompanying text.

202. *See supra* Part II.

203. *See supra* Part II.

is something inscrutable, though it accepts that we do not understand everything yet that we will, in time, come to understand.[204]

Perhaps nothing demonstrates the conflict between the popular model and the mechanical model better than determinism's rejection of libertarian free will as well as its adjunct compatibilism.[205] If we are nothing but the coordination of mechanical processes, then there is no such thing as free will, not even the little bit of free will that less absolutist compatibilists might settle for. And if there is no such thing as free will, then there is no such thing as moral responsibility, blame, desert, praise, or any other measure of human virtue. We do not see that as problematic: when our car becomes so in need of repair that it is dangerous, we consult a mechanic, not a moral philosopher. So when the law decides how to respond to behavior that undermines human thriving, it would be enough for the law to look forward, to consider only instrumental objects. Nothing would be gained by looking backward and punishing the criminal any more than we would punish the car for its engine problems. We might invest resources fixing the car (modifying the behavior of the criminal), but we would not shame it.

While we are not sanguine, we are hopeful. We do not imagine that the law will change very dramatically any time soon. We do not imagine that human agents' affection for the moral responsibility system (with the self-satisfying glow it can impart, for some) is going anywhere for the foreseeable future. The law will seem to be stuck, and there is little doubt that challenges such as those this Article throws at the law would avoid politicization. But there may be signs of hope.

Every time a judge takes into account the nascent moral agency of a juvenile, the law recognizes the mechanistic conception of human agency implicit in the fact that the brain matures gradually over time.[206] Every time the law rejects purely formal indicia of consent that undermine true agreement, the "meeting of the minds" upon which welfare creation depends, and insists upon genuine understanding, the law vindicates a conception of human agency that

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204. *See supra* Part III.

205. *See* Luis E. Chiesa, *Selective Incompatibilism, Free Will, and the (Limited) Role of Retribution in Punishment Theory*, 71 RUTGERS U. L. REV. 977, 981-87 (2019).

206. *See supra* note 74 and accompanying text.

will accommodate human thriving.[207] And every time the law moves toward an allocation of loss based on the way the brain actually works rather than on the way a moral responsibility system may conceive of its working, the law moves closer to understanding what it means to be human.[208]

Perhaps there is no more hopeful sign than the law's understanding the disease that is addiction. For most of law's history, there has been a tension between the moral and disease models of addiction. The dominant model has understood addiction to be a moral failing: the product of improvident choice.[209] Those addicted to substances that would ultimately harm them (and even destroy the lives of those around them) are understood to have made bad choices, which they were, of course, free not to have made; the fallacy of volition is shown when it becomes clear that coercive cravings strong enough to produce addiction are the product of the likes of dopamine receptor abnormalities in brain regions related to anticipation.[210] Historically, so many have claimed further proof for moral interpretations of addiction from the circumstances common to many addicted persons: they are irresponsible, perhaps lesser- or uneducated, they do not share our values; indeed, they do not even look like us!

Well, then the opioid nightmare emerged.[211] The high school cheerleader, who lives right next door and whose parents drive such nice cars, sprained her ankle badly and became addicted to painkillers, and then, when she could not get the painkillers by prescription anymore she found a way to buy them from "those people" in those other neighborhoods, the ones we always avoided. When that was not enough, she turned to those harder drugs, the ones we only heard about famous musicians taking. And what was a problem for some other community, what was proof-positive of the moral

207. *See supra* Part I.A.

208. *See, e.g.*, *supra* notes 51-52 and accompanying text.

209. *See, e.g.*, 8 U.S.C. § 1101(f) ("No person shall be regarded as, or found to be, a person of good moral character who ... is, or was ... a habitual drunkard.").

210. *See* Christian A. Heidbreder et al., *The Role of Central Dopamine D3 Receptors in Drug Addiction: A Review of Pharmacological Evidence*, 49 BRAIN RSCH. REVS. 77, 94-96 (2005).

211. *See generally Opioid Overdose Crisis*, NAT'L INST. ON DRUG ABUSE (Mar. 11, 2021), https://www.drugabuse.gov/drug-topics/opioids/opioid-overdose-crisis [https://perma.cc/W42M-TVFV].

deficiency of those people, became a problem for us. So we decided that the problem was a disease, maybe not a moral failing after all. That is not a bad thing; indeed, it is a very good thing.

Recently, an innovative therapy for those suffering from profound substance addiction came to the notice of the popular press.[212] So-called "deep brain stimulation" has been used for some time to treat a range of neural conditions including Parkinson's disease, epilepsy, and obsessive-compulsive disorder.[213] In fact, by 2020 about 200,000 people around the world had such implants.[214] Insofar as addiction is a brain disease, there might be reason to believe that neural implants could respond to the cravings that support addiction.[215] If impulses from a collateral device, inserted subcutaneously near the collar bone, "fire" to counteract the impulses, then the cycle of addiction might be interrupted.[216] The therapy is, of course, experimental and designed only as a last or near-last resort for those whose addictions have become life threatening.[217] But given the fact that substance addiction is the leading cause of death for those under the age of fifty,[218] and given the great—perhaps even incalculable—societal costs of addiction, there may be good reason to explore this response.[219] Just imagine a world with just half the rate of substance abuse to which society is now subject. What impact would that reduction have on our criminal justice system? If we were to empty our jails and prisons of just half the people who are there because of drug crimes or crimes perpetrated while under the influence of drugs, the criminal justice and correctional resources saved would be dramatic. And, we could imagine those saved resources could be diverted to more constructive purposes,

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212. *See* Lenny Bernstein, *Addiction Treatment Had Failed. Could Brain Surgery Save Him?*, WASH. POST (June 18, 2021, 7:00 AM), https://www.washingtonpost.com/health/2021/06/18/deep-brain-stimulation-addiction/ [https://perma.cc/8H2H-2LHP].

213. *See id.*

214. *See id.*

215. *See id.*

216. *See id.*

217. *See id.*

218. *See* Dean Reynolds, *Overdoses Now Leading Cause of Death of Americans Under 50*, CBS NEWS (June 6, 2017, 8:00 PM), https://www.cbsnews.com/news/overdoses-are-leading-cause-of-death-americans-under-50/ [https://perma.cc/WY99-RJBC].

219. *See, e.g.*, *Opioid Overdose Crisis*, *supra* note 211.

rather than the removal from society of those subject to impulses they cannot control.

So we need not indulge science fiction in order to see how neuroscientific insights might impact the law within the next decade. While the use of neural implants to control addiction is not likely to become the norm anytime soon,[220] the fact that we are approaching brain implant therapies to adjust behaviors that law has, for some time, considered a matter of "choice," is crucial. It is one thing to use brain implants to respond to disease, such as Parkinson's or epilepsy. No one, not even the most libertarian believer in free will, would suggest that the victim of those neural conditions chose them. But much of our law of addiction, to this day, is based on the "moral choice" rather than "disease" model of addiction.[221] That is clearly "Erewhonian."[222] And it is significant that neural implants, direct physical intervention into brain operation, may be used to respond to addiction, because addiction is a compelling topic for those who write and think about the relationship between law and neuroscience. It is clear that the criminal law's prosecution of those addicted to controlled substances on account of their possession and use of those substances gets dangerously close to criminalizing status, which would violate the Eighth Amendment to the United States Constitution (as well as undermine the sanctity of self).[223]

Perhaps most provocatively, the *Washington Post* reported that "[t]he device, known as a deep brain stimulator, also is recording the electrical activity in [the patient's] brain—another innovation that researchers hope will help locate a biomarker for addiction and allow earlier intervention with other people."[224] We can, then, imagine not just therapies that reduce suffering and enhance human thriving after the fact but potential prophylactic measures that could anticipate destructive behaviors (criminal behaviors generally?) and prevent thoughts and actions that avoid suffering *ab initio*. That would certainly change what we understand it means to be human, and may go too far?

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220. *See* Bernstein, *supra* note 212.
221. *See supra* note 74 and accompanying text.
222. *See supra* notes 1-12 and accompanying text.
223. *See* Robinson v. California, 370 U.S. 660, 666-67 (1962).
224. *See* Bernstein, *supra* note 212.

We end where we began: The title of this Article makes clear that there is no moral failing; there is only disease, if by "disease" we mean a malfunctioning mechanism. And, what's more, the disease is no one's "fault"; it has been hard-wired from the time our ancestors first ventured onto solid land—if not well before.[225] Legal conclusions and consequences based on fault, then, fail. They undermine rather than serve human thriving. We imagine that that conclusion will not seem so extreme in ten years or so, and we believe that the science has already provided us much of what we need (though not all) to have confidence that the arc of neuroscience's reconceptualization of human agency in terms that will change what we understand it means to be human will bend toward a more humane legal system, one that is consonant with human thriving.

225. *See supra* Part III.