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# Mind, Body, and the Criminal Law

Francis X. Shen

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## Article

# Mind, Body, and the Criminal Law

Francis X. Shen<sup>†</sup>

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## INTRODUCTION

When the United States Congress passed a new mental health parity law in 2008, then Speaker of the House Nancy Pelosi announced that henceforth, “illness of the brain must be treated just like illness anywhere else in the body.”<sup>1</sup> Such sentiment is becoming more common, as policymakers and the public increasingly recognize the biological basis for, and the gravity of, “mental” and “emotional” disabilities.<sup>2</sup>

In insurance and personal injury litigation, the definition of bodily injury is already being challenged.<sup>3</sup> For instance, a court in 2008 reasoned that because the brain is a part of the body, Post-Traumatic Stress Disorder (PTSD) alone, with no other physical manifestations, constituted bodily injury under a Michigan statute.<sup>4</sup> Similarly, in 2011, a court found that emotional injury sustained from witnessing a car accident constituted bodily injury under an insurance contract.<sup>5</sup> And in the United Kingdom, an increasing number of insurance claims “seek to stretch the boundaries of what constitutes bodily injury.”<sup>6</sup> These efforts to remove the mind-body distinction as a barrier to insurance coverage and tort recovery suggest that neuroscientific understandings of mental injury are already having legal effect.

Consider also efforts to hold governments accountable for mental as well as physical torture.<sup>7</sup> The definition of physical pain and suffering was a central issue in legal interpretations

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1. Robert Pear, *House Approves Bill on Mental Health Parity*, N.Y. TIMES, Mar. 6, 2008, at A14.

2. See *infra* Part II.

3. See *infra* Appendix A.

4. See *Allen v. Bloomfield Hills Sch. Dist.*, 760 N.W.2d 811 (2008). This case is discussed further in Francis X. Shen, *Monetizing Memory Science: Neuroscience and the Future of PTSD Litigation*, in MEMORY AND LAW 325 (Lynn Nadel & Walter P. Sinnott-Armstrong eds., 2012) [hereinafter Shen, *Monetizing Memory Science*].

5. See *Lipsky v. State Farm Mut. Auto. Ins. Co.*, 41 A.3d 1288 (Pa. 2012).

6. Phil Bell, *The Social Construction of Bodily Injury*, 31 GENEVA PAPERS ON RISK & INS.—ISSUES & PRAC. 340, 350 (2006).

7. See David Luban & Henry Shue, *Mental Torture: A Critique of Erasures in U.S. Law*, 100 GEO. L.J. 823 (2012).

of the now infamous torture memos.<sup>8</sup> And some scholars have argued that because the mind is enabled by the brain, and because the brain is physical matter, mental torture is physical torture as well.<sup>9</sup>

Developments such as these, which are revisiting the mind-brain-body distinction in legally relevant ways, provide motivation to carefully examine the fundamental role that the distinction between mind and body plays in the criminal law. Even a cursory glance at penal codes finds that “bodily injury” is an element for a vast number of offenses against the person.<sup>10</sup> For instance, simple assault, the most common crime against the person, is defined under the Model Penal Code in this way: “a person is guilty of [simple] assault if he attempts to cause or purposely, knowingly or recklessly causes bodily injury to another.”<sup>11</sup>

Infliction of bodily injury or serious bodily injury is typically an element in aggravated kidnapping, aggravated burglary, resisting arrest, unlawful arrest, and a good number of similar crimes. Moreover, the concept may also be invoked in civil commitment hearings when determining whether an individual is at risk of committing serious bodily injury. The categorization of a crime victim’s harms as bodily or not-bodily thus may have important consequences because it triggers culpability and may trigger stiffer criminal sanctions.

For instance, in a 1998 case alleging criminal maltreatment of boys in a group home (who later developed PTSD), the State of Washington argued that “PTSD is a psychological disorder that has measurable neurobiologic or chemical effects on the brain . . . [and] that because PTSD alters the sufferer’s brain chemistry, it is the impairment of a physical condition.”<sup>12</sup>

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8. *See id.*

9. *See id.* at 829 n.22 (“Thus, to think that psychological torture is *not* an assault on the body is a conceptual error from the outset. [W]hat all torture has in common, regardless of physical or mental appearances, is its assault on the brain. . . . Extreme fear and despair . . . are emotional states that are anchored in brain states.” (quoting Uwe Jacobs, *Documenting the Neurobiology of Psychological Torture: Conceptual and Neuropsychological Observations*, in *THE TRAUMA OF PSYCHOLOGICAL TORTURE* 163, 164–65 (Almerindo E. Ojeda ed., 2008))).

10. As seen in Table A2, the majority of states use the phrase “bodily injury,” but others use “physical injury.” For ease of exposition, I use “bodily injury” throughout this Article. *See infra* at Table A2 (explaining how bodily injury is typically defined as physical injury, thus conflating the two).

11. MODEL PENAL CODE § 211.1(1) (1981).

12. *State v. Van Woerden*, 967 P.2d 14, 19 (Wash. Ct. App. 1998).

The court in that case found against the State, and it is a rarity to see this argument made. But it may become less rare as our understanding of mental disorders such as PTSD continues to evolve.

Taken to its logical extreme, parity between mental injury and physical injury in criminal law could lead to a tremendous expansion of criminal liability because a large number of (sufficiently severe) emotional injuries could be deemed “bodily” injury given that bodily injury is defined as physical injury, and emotional distress is produced by physical changes in the cells of the brain.<sup>13</sup>

What is the criminal law’s backstop to prevent such a slippery slope? One solution would be for the criminal law to sufficiently define the concept, as it does with other legal terms of art, in such a way as to clearly delineate what does and does not count as bodily injury. But, as the first part of this Article will show, the criminal law does not at present take this path.

When courts have confronted the question, there is an implicit assumption that the definition of bodily injury is intuitive—a matter of common sense, and clear on its face to the lay juror. Conventional wisdom thus seems to be that the concept of “bodily injury” is uncontroversial. One court has asserted that “[c]learly the term ‘bodily injury’ is not a phrase which requires an elaborate explanation in order to be understood.”<sup>14</sup> And another writes that “[w]e can think of no phenomenon of more common experience and understanding than the concepts of ‘bodily injury’ and ‘physical pain.’”<sup>15</sup> Bodily injury, say the courts, is not a legal term of art but an everyday term of common understanding.

In light of these assumptions, and the challenge that a neuroscientific perspective on mental injuries presents, this Article revisits bodily injury through a series of original experiments designed to answer three questions. First, do lay citizens share a common understanding of the term “bodily injury”? More specifically, is there a common understanding about whether “mental” injuries are clearly excluded from the bodily

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13. Of course a distinction could still be drawn based on the word “injury,” such as distinguishing injury from “offense.” See *infra* Part IV.

14. *Messer v. Kemp*, 760 F.2d 1080, 1093 (11th Cir. 1985).

15. *Rogers v. State*, 396 N.E.2d 348, 352 (Ind. 1979); see also *Payne v. State*, 484 N.E.2d 16, 18 (Ind. 1985) (citing the conclusion in *Rogers* and writing that “[d]efendant presents no persuasive reason for us to change these conclusions in this case”).

injury category as the criminal law implicitly assumes there is? Second, if lay understandings of bodily injury are indeed fluid, can jury instructions (containing different definitions) reliably demarcate the contours of the bodily injury category? Third, how might the introduction of neuroscientific evidence affect lay judgments about what is and is not bodily injury?

The empirical results reported in this Article suggest that the concept of bodily injury is more malleable than at least some courts have posited. First, the analysis finds that lay people share a common understanding of bodily injury only when the injury is akin to a broken leg or cracked ribs. When asked to categorize injuries such as recurring headaches, memory loss, PTSD, and depression, lay people exhibit much confusion and disagreement about whether these are “bodily” injuries.

For example, I find that although 98% of lay subjects agree that a broken leg probably or definitely constitutes bodily injury, in the case of PTSD, subjects are split: 27% think that PTSD is probably or definitely bodily injury; 25% choose maybe; 25% say probably not; and 22% choose definitely not.

Second, the analysis suggests that there is a simple, effective tool at the legislature’s disposal for communicating the bodily injury concept: jury instructions.<sup>16</sup> Variance in bodily injury determination is sensitive to the jury instructions provided, and to the brain-based arguments and evidence presented.<sup>17</sup> For instance, jury instructions that include the 1990 Black’s Law Dictionary definition of bodily injury—“pertaining to or concerning the body; of or belonging to the body or the physical constitution; not mental, but corporeal”—generate different subject behavior than do jury instructions that include one of the definitions utilized in the federal criminal code: “(A) a cut, abrasion, bruise, burn, or disfigurement; (B) physical pain; (C) illness; (D) impairment of the function of a bodily member, organ, or mental faculty; or (E) any other injury to the body, no matter how temporary.”<sup>18</sup>

When asked whether a crime victim’s mental injuries were “bodily,” those who had been exposed to the Black’s definition

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16. These results run counter to some literature on evidentiary instructions which tends to find that such instructions are ineffective. *See, e.g.*, David Alan Sklansky, *Evidentiary Instructions and the Jury as Other*, 65 STAN. L. REV. (forthcoming 2013). My instructions are of a different type and were not employed in actual trial settings.

17. I use “subject determination” in this Article to mean whether experimental subjects determined the crime victim’s injuries to be “bodily” or not.

18. 18 U.S.C. § 1365(h)(4) (2006).

generally were more likely to say no; those exposed to the federal definitions were generally more likely to say yes.

Third, the analysis finds that the effect of neuroscientific evidence on lay determination of bodily injury is potentially powerful—but can also readily be restricted by jury instructions that explicitly exclude mental injury. In experimental conditions where prosecutors made explicitly brain-based arguments and presented brain evidence (to argue that mental injury is brain injury and thus bodily injury), subjects were more likely to assess a mental injury as “bodily” when they did not have the restrictive Black’s Law Dictionary definition.

Taken together, the findings in this Article suggest that if the criminal law were to one day recognize the biological (and thus physical) basis for mental injury, then the bodily injury concept will need to be better defined. How should this be done? The Article suggests that legislatures have six primary options. Legislatures can: (1) do nothing (which would then require difficult statutory interpretation by courts); (2) explicitly include mental injuries within the bodily injury category (as they often already do in the case of child and elder abuse); (3) explicitly exclude mental injuries from the bodily injury category (as many insurance policies now do); (4) eliminate the “bodily” category altogether and focus solely on severity of injury (as the Iowa criminal code does); (5) develop crime-specific criteria for bodily injury (as the federal sentencing guidelines do in the case of forcible rape); or (6) eliminate the bodily injury element from particular crimes against the person to focus solely on offender conduct (as in stalking or harassment).

Whether and how legislatures choose to criminalize behavior that inflicts purely non-physical injury is a policy question requiring state-specific and crime-specific analyses beyond the scope of this paper. Perhaps some legislatures will opt not to have parity of injuries in the criminal context, and maybe others will choose to carve out exceptions for extremely bad mental injuries. But whatever a legislature’s intention about the meaning of bodily injury, that intention should be clearly communicated. If society increasingly comes to see mental injuries as real, biological-based physical injuries, then the criminal law will have to explain why it differentiates between injuries to the body and injuries to the mind. There are good reasons to maintain such dualism within this area of law, but so too are there good reasons to eliminate it. Now is the moment to have



that debate, before courts are forced to reconcile old definitions with new science and societal norms.

The Article proceeds in five parts. Part I discusses the history and scope of the bodily injury element in criminal law. Part II provides a short summary of the recent and rapid growth of neurolaw, and also discusses recent civil litigation concerning the issue of PTSD as a “bodily” injury. Part III describes the design of and results from new experiments on lay persons’ understanding of bodily injury. Part IV discusses the implications of these results. Part V concludes.

### I. “BODILY INJURY” IN CRIMINAL LAW

In this Part, I discuss the importance of the concept of bodily injury in criminal law.<sup>19</sup> This Part offers a brief history of the origins of the bodily injury element; illustrates the pervasiveness of the bodily injury element in contemporary offenses against the person; discusses standard dictionary definitions of the term; presents a fifty-state review of how state codes define bodily injury and use it as an element in assault; and reviews case law in which the definition of bodily injury has been challenged in criminal contexts. I argue that, when faced with the issue, courts have relied on ad hoc generalizations about a shared common understanding of what constitutes bodily injury. Subsequent Parts of the Article test these generalizations.<sup>20</sup>

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19. Although this Article focuses on criminal law, the bodily injury issue is pervasive across law. Appendix A discusses the issue in the tort context. Mind-body dualism even comes up in the U.S. Tax Code. See 26 U.S.C. § 104(A)(2) (2006) (excluding from gross income compensatory damages that a taxpayer received for physical injuries). Prior to 1996, the word “physical” was not included, and the allowed injuries “[included] ‘affecting the emotions,’ ‘emotional distress,’ ‘mental pain and suffering,’ ‘distress, humiliation, and mental anguish,’ [and] ‘intentional infliction of emotional distress.’” G. Christopher Wright, *Taxation of Personal Injury Awards: Addressing the Mind/Body Dualism that Plagues § 104(A)(2) of the Tax Code*, 60 CATH. U. L. REV. 211, 212, 220 (2011). In 1996, the Code was amended to include the word “physical” and to expressly exclude emotional distress from the definition. However, the terms “physical” and “emotional distress” are not defined, which often leads to litigation.

20. The empirical approach is a complement to, nor a substitute for, the philosophical debate over dualism. This Article does not endeavor to engage the extensive philosophy of mind literature surrounding the “mind-body problem.” Indeed, one of the reasons that the criminal law might abandon the bodily/non-bodily distinction is in part because the ongoing philosophical debates suggest that it is a seemingly intractable, conceptual problem. For discussion of different viewpoints on the mind-body problem, see generally WILLIAM BECHTEL, *PHILOSOPHY OF MIND: AN OVERVIEW FOR COGNITIVE SCIENCE* (1988); *MIND AND COGNITION: AN ANTHOLOGY* (William G. Lycan & Jesse J.

## A. Pervasiveness of Bodily Injury in Criminal Law

Criminal law draws lines between conduct that can be punished by the state, and conduct that (while perhaps frowned upon) will not incur criminal sanction.<sup>21</sup> In a variety of criminal and quasi-criminal contexts, this legislative line drawing between criminal and non-criminal behavior invokes the concept of “bodily” (or “physical”) injury.

The historical roots for this conceptualization can be found in early English common law, in which the crime of mayhem required that victim be disfigured or disabled to the extent that it made him less useful in combat.<sup>22</sup> The rationale for criminal-

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Prinz eds., 3d ed. 1999); Howard Robinson, *Dualism*, in THE BLACKWELL GUIDE TO PHILOSOPHY OF MIND 85 (Stephen S. Stich & Ted A. Warfield eds., 2003). It is also important to note that the argument I advance here does not rest on a *conflation* of mind and brain (and indeed, I have argued elsewhere that such a conflation is problematic), but it does rely on the presumption that brain enables mind. In this sense, mind is “physical” (even if we do not know with precision exactly how). The mind-brain approach of most neuroscientists is captured in this explanation from the introduction to a popular neuroscience text: “In neuroscience, there is no need to separate mind from brain; once we fully understand the individual and concerted actions of brain cells, we will understand the origins of our mental abilities. The organization of this book reflects this ‘neuropsychology.’” MARK F. BEAR ET AL., NEUROSCIENCE: EXPLORING THE BRAIN 23 (2d ed. 2001). For a discussion of the dangers of conflating mind and brain for purposes of law, see Michael S. Pardo & Dennis Patterson, *Philosophical Foundations of Law and Neuroscience*, 2010 U. ILL. L. REV. 1211 (2010). I agree with Luban and Shue, who write in the context of distinguishing mental from physical torture that “[t]hat A causes B, or even that A invariably causes B, does not imply that A and B are indistinguishable.” Luban & Shue, *supra* note 7, at 831. But to make the distinction requires, as they suggest, “intellectual rigor,” and to date such rigor has not been applied to this question in the context of defining bodily injury in the criminal law. *See id.*

21. Scholars debate whether harm must actually occur in order to justify punishment. *See* Paul H. Robinson, *A Functional Analysis of Criminal Law*, 88 NW. U. L. REV. 857, 857 (1994). In this Article, I focus purely on those instances in which a victim has experienced a setback to interest. For more on the debate over attempts, see Sanford H. Kadish, *The Criminal Law and the Luck of the Draw*, 84 J. CRIM. L. & CRIMINOLOGY 679, 679 (1994) (“Whether the harm doctrine can be justified is, as George Fletcher has said, a ‘deep, unresolved issue in the theory of criminal liability.’”). For a classic statement of the case for the irrelevance of resultant harm for culpability, see Michael S. Moore, *The Independent Moral Significance of Wrongdoing*, 5 J. CONTEMP. LEGAL ISSUES 237 (1994).

22. *See* Louis A. Ambrose, Darrell F. Cook & Van C. Durrer, II, *Survey: Developments in Maryland Law, 1990–91*, 51 MD. L. REV. 612, 643 n.270 (“The punishment of this crime was designed to preserve the King’s right to the usefulness of his subjects in battle. Any injury that rendered a subject of the King less valuable in battle was considered an offense against the King. The earliest punishment for this crime was therefore severe; the perpetrator was sub-

izing mayhem was to preserve the usefulness of the King's soldiers in battle.<sup>23</sup> English statutes began to change in 1403 with the inclusion of some permanent injuries that did not affect the usefulness of subjects in battle (e.g., severing of the ear, cutting out of the tongue).<sup>24</sup>

Mayhem (maiming) as a distinct crime survives today primarily in the Uniform Code of Military Justice.<sup>25</sup> Outside of the military, however, few jurisdictions recognize mayhem as a crime.<sup>26</sup> But the requirement of physical injury to the victim has carried down to contemporary statutes.

Bodily injury is a part of many aspects of the criminal and quasi-criminal code, including simple assault;<sup>27</sup> aggravated assault;<sup>28</sup> unlawful arrest;<sup>29</sup> aggravated robbery;<sup>30</sup> menacing;<sup>31</sup> civ-

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jected to the same harm he inflicted upon his victim." (citations omitted)).

23. *See id.*

24. An assault upon Lord Coventry in the 1660s (in which several people attacked the Lord for statements made in Parliament) provided the impetus for disfigurement to be included within the scope of the charge, as well. The new disfigurement element required that the injury be permanent and created limits on what injuries would qualify: the loss of a front tooth would qualify as mayhem because of the effect on appearance, though the loss of a tooth on the back of the lower jaw would not qualify. *See* 3 WILLIAM BLACKSTONE, COMMENTARIES ON THE LAWS OF ENGLAND: IN FOUR BOOKS 121 ("Among these defensive members are reckoned not only arms and legs, but a finger, an eye, and a fore-tooth and also some others. But the loss of one of the jaw teeth, the ear or the nose, is no mayhem at common law, as they can be of no use in fighting.").

25. *See* Uniform Code of Military Justice Art. 124, 10 U.S.C. § 924 (2006). The injury required by the UCMJ is set forth as "an injury which—(1) seriously disfigures his person by any mutilation thereof; (2) destroys or disables any member or organ of his body; or (3) seriously diminishes his physical vigor by the injury of any member or organ."

26. In those jurisdictions that do recognize mayhem, emphasis is placed on preservation of normal appearance and completeness. In keeping with the history of the offense, the Court of Appeals in D.C. has specifically stated that "what is important now is not the victim's capacity for attack or defense, but the integrity of his person." *United States v. Cook*, 462 F.2d 301, 303 (D.C. Cir. 1972); *see also* *State v. Quintana*, 748 N.W.2d 447, 463 (Wis. 2008).

27. "A person is guilty of assault if he: (a) attempts to cause or purposely, knowingly or recklessly causes *bodily injury* to another; or (b) negligently causes *bodily injury* to another with a deadly weapon; or (c) attempts by physical menace to put another in fear of imminent serious *bodily injury*." MODEL PENAL CODE § 211.1(1) (1981) (emphasis added).

28. In the Model Penal Code and in many state codes, aggravated assault is defined as an assault in which the defendant causes, or attempts to cause, "serious *bodily injury*." *See id.* § 211.1(2) (emphasis added).

29. "Whoever, under color of any law, statute, ordinance, regulation, or custom, willfully subjects any person in any State, Territory, Commonwealth, Possession, or District to the deprivation of any rights, privileges, or immuni-

il commitment;<sup>32</sup> and the burden of proof for release from civil commitment after finding of not guilty by reason of insanity.<sup>33</sup> This list could go on for some length, and is illustrative of the many ways in which bodily injury is an element in defining crimes.<sup>34</sup>

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ties secured or protected by the Constitution or laws of the United States, or to different punishments, pains, or penalties, on account of such person being an alien, or by reason of his color, or race, than are prescribed for the punishment of citizens, shall be fined under this title or imprisoned not more than one year, or both; *and if bodily injury results* from the acts committed in violation of this section . . . shall be fined under this title or imprisoned not more than ten years, or both.” 18 U.S.C. § 242 (2006) (emphasis added).

30. In many states, a defendant is guilty of aggravated robbery if, during the course of robbery, the defendant inflicts or intends to inflict death or serious *physical injury*. As cited in *Jones v. United States*, 526 U.S. 227, 236–37 (1999), see ALA. CODE § 13A-8-41(a)(2) (1994) (robbery in the first degree defined in part by the causing of “serious physical injury”); ALASKA STAT. § 11.41.500(a)(3) (1996) (same); ARK. CODE ANN. § 5-12-103 (1997) (aggravated robbery; “[i]nfllicts or attempts to inflict death or serious physical injury”); CONN. GEN. STAT. § 53a-134(a)(1) (1994) (robbery in the first degree; “[c]auses serious physical injury”); IOWA CODE § 711.2 (1993) (robbery in the first degree; “purposely inflicts or attempts to inflict serious injury”); KY. REV. STAT. ANN. § 515.020(1)(a) (LexisNexis 1990) (robbery in the first degree; “causes physical injury”); N.H. REV. STAT. ANN. § 636:1(III)(c) (1996) (class A felony of robbery; “[i]nfllicted or attempted to inflict death or serious injury”); N.Y. PENAL LAW § 160.15 (1988) (robbery in the first degree; “[c]auses serious physical injury”); OR. REV. STAT. § 164.415(1)(c) (1990) (robbery in the first degree; “[c]auses or attempts to cause serious physical injury”); TEX. PENAL CODE ANN. § 29.03(a)(1) (West 1994) (aggravated robbery; “causes serious bodily injury”); UTAH CODE ANN. § 76-6-302(1)(b) (West 1995) (aggravated robbery; “causes serious bodily injury”); WASH. REV. CODE § 9A.56.200(1)(a)(iii) (1994) (robbery in the first degree, “[i]nfllicts bodily injury”).

31. “A person is guilty of menacing in the third degree when, by physical menace, he or she intentionally places or attempts to place another person in fear of death, imminent serious physical injury or *physical injury*.” N.Y. PENAL LAW § 120.15 (2012). In Alabama, too, one is guilty of menacing “if, by physical action, he intentionally places or attempts to place another person in fear of imminent serious physical injury.” ALA. CODE § 13A-6-23(A) (2012).

32. Courts can commit a person if “the court finds by clear and convincing evidence that the person is presently suffering from a mental disease or defect as a result of which his release would create a substantial risk of *bodily injury* to another person or serious damage to property of another.” 18 U.S.C. § 4246(d) (2006) (emphasis added).

33. If the offense is one “involving *bodily injury* to, or serious danger to the property of, another person, or involving a substantial risk of such injury or damage,” then the person found not guilty by reason of insanity has the burden of proof of “by clear and convincing evidence” (instead of “by a preponderance of the evidence”). 18 U.S.C. § 4243(d) (2006) (emphasis added).

34. The bodily injury distinction also arises in federal statutes in other, related ways. For instance, the Prison Litigation Reform Act holds that prisoners cannot make claims for mental or emotional injury during their incarceration unless they also suffer physical injury. 42 U.S.C. § 1997(e) (2006) (“No

## B. STATUTORY DEFINITIONS

Having established that bodily injury is central to defining many crimes, how is the concept defined in U.S. criminal codes? I look first at two instances within the federal code, and then turn my attention to the states.

In federal sentencing guidelines, bodily injury “means any significant injury; e.g., an injury that is painful and obvious, or is of a type for which medical attention ordinarily would be sought.”<sup>35</sup> On the other hand, the provision of the United States Code that criminalizes tampering with consumer products defines bodily injury as including “illness,” “impairment of the function of a bodily member, organ, or mental faculty,” and “any other injury to the body no matter how temporary.”<sup>36</sup>

We see variation as well in the definition of bodily injury in state statutes. This data is presented in Table A2.<sup>37</sup> The most common definition of bodily injury, employed by over ten states, is “physical pain, illness, or any impairment of physical condition.”<sup>38</sup> Several states also include the word pain in their definition: “physical injury’ means a physical pain or an impairment of physical condition.”<sup>39</sup> Arizona is the only state to define physical injury simply as “impairment of physical condition.”<sup>40</sup>

Several states insert severity language into the definition when they define bodily injury to mean “substantial physical

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Federal civil action may be brought by a prisoner confined in a jail, prison, or other correctional facility, for mental or emotional injury suffered while in custody without a prior showing of physical injury.”)

35. U.S. SENTENCING GUIDELINES MANUAL § 2B1.1 cmt. n.1(B) (Nov. 1, 2010).

36. 18 U.S.C. § 1365(h)(4) (2006).

37. A number of states provide no definition in their criminal statutes for bodily injury.

38. COLO. REV. STAT. § 18-1-901(c) (2012); HAW. REV. STAT. § 707-700 (2012); MINN. STAT. § 609.02(7) (2012); NEB. REV. ST. § 28-109(4) (2012); N.J. REV. STAT. 2C:11-1(a) (2012); TEX. PENAL CODE § 1.07(8) (2012); UTAH CODE § 76-1-601 (3) (2012); VT. STAT. ANN. § 3251(5) (2012); WASH. REV. CODE 9A.04.110(4)(a) (2012); WISC. STAT. 939.22(4) (2012); WYO. STAT. ANN. § 6-1-104(a)(i) (2012). Maine slightly modifies this language, inserting the word “physical” in front of “illness.” *See* ME. REV. STAT. tit. 17-A, § 2 (2012).

39. ALASKA STAT. § 11.81.220 (2012); *see also* CONN. GEN. STAT. § 53a-3(3) (2012); IND. CODE § 35-41-1-4 (2012); N.D. CENT. CODE § 12.1-01-04 (2012). Even when pain is not explicitly included in the definition, it may be allowed as part of a jury instruction. *See* *State v. Coleman*, 709 A.2d 590, 595 (Conn. 1998) (rejecting the defendant’s argument “that the concept of ‘pain’ is separate and distinct from the concept of bodily ‘injury’”).

40. ARIZ. REV. STAT. § 13-105(33) (2012).

pain, illness or any impairment of physical condition.”<sup>41</sup> In Maryland, physical injury “means any impairment of physical condition, excluding minor injuries.”<sup>42</sup> Arkansas includes “infliction of bruising, swelling, or a visible mark associated with physical trauma.”<sup>43</sup> Ohio also varies the standard definition somewhat, defining bodily injury as “physical harm to persons,” and “any injury, illness, or other physiological impairment, regardless of its gravity or duration.”<sup>44</sup>

Several states recognize some type of “mental” harm within their definition of bodily or physical injury. In Tennessee, bodily injury “includes a cut, abrasion, bruise, burn or disfigurement, and physical pain or temporary illness or impairment of the function of a bodily member, organ, or mental faculty.”<sup>45</sup> Montana defines bodily injury to mean “physical pain, illness, or an impairment of physical condition and includes mental illness or impairment.”<sup>46</sup>

Taken together, this review of bodily injury definitions suggests that there is variation across the states, and with only a few exceptions, mental injury is not explicitly included under the bodily injury umbrella.<sup>47</sup>

### C. DICTIONARY DEFINITIONS

To better understand the language used in various statutes, it is useful to consider dictionary definitions.<sup>48</sup> Looking

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41. W. VA. CODE § 61-2-9a (2012); N.Y. PENAL LAW § 10.00(9) (2012); 18 PA. CONS. STAT. § 2301 (2012).

42. MD. CODE ANN., CRIM. LAW § 3-203(c)(1) (West 2012).

43. ARK. CODE § 5-1-102 (14) (2010).

44. OHIO REV. CODE ANN. § 2901.01(3) (West 2012).

45. TENN. CODE ANN. § 39-11-106 (2) (2010).

46. MONT. CODE ANN. § 45-2-101(5) (2011).

47. The variation in definitions also raises a question about the effects of language used to describe similar harms. For instance, does using the word “injury” as opposed to an “illness” affect our categorization of harm? Similarly, how do the words “disease” versus “disorder” affect public (and potentially juror) views? Such questions are ripe for additional analysis in future research.

48. Courts increasingly turn to dictionaries for assistance in statutory interpretation. See generally Ellen P. Aprill, *The Law of the Word: Dictionary Shopping in the Supreme Court*, 30 ARIZ. ST. L.J. 275, 277 (1998); A. Raymond Randolph, *Dictionaries, Plain Meaning, and Context in Statutory Interpretation*, 17 HARV. J. L. & PUB. POL’Y 71 (1994); Samuel A. Thumma & Jeffrey L. Kirchmeier, *The Lexicon Has Become A Fortress: The United States Supreme Court’s Use of Dictionaries*, 47 BUFF. L. REV. 227, 228–29 (1999); Note, *Looking It Up: Dictionaries and Statutory Interpretation*, 107 HARV. L. REV. 1437 (1994). Though as legal scholar William Popkin notes, today’s dictionaries are better described as “descriptive word-books that do not deal adequately with

first at the current version of Black's Law Dictionary, bodily injury is defined simply as "physical damage to a person's body."<sup>49</sup> Webster's Third New International Dictionary is similar in defining the term "bodily" as "having a body or a material form: physical, corporeal." In both cases, these definitions simply change the question from "What constitutes bodily injury?" to "What constitutes physical injury?" Webster's includes the following definitions for "physical":<sup>50</sup>

2a: of or belonging to all created existences in nature: relating to or in accordance with the laws of nature

2b: of or relating to natural or material things as opposed to things mental, moral, spiritual, or imaginary

3a: of, relating to, concerned with, or devoted to natural science

3b: of or relating to physics: characterized or produced by the forces and operations of physics: employed in the processes of physics

4a: of or relating to the body—often opposed to mental

4b: concerned or preoccupied with the body and its needs<sup>51</sup>

As can be seen in the Webster's entry, one way to define bodily/physical is through an exclusionary route—describing what bodily is not. To the extent that physical is defined as that which is not mental, it would suggest that "mental" injuries are not physical injuries. But to the extent that physical is not spiritual, mental injuries might be included. The sixth edition of Black's Law Dictionary used a "not mental" approach when it defined "bodily" as "pertaining to or concerning the body; of or belonging to the body or the physical constitution; not mental, but corporeal."<sup>52</sup> Similarly, the Random House Dictionary of the English Language defines bodily as "1. of or per-

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statutory interpretation." WILLIAM D. POPKIN, *A DICTIONARY OF STATUTORY INTERPRETATION* xv (2007).

49. BLACK'S LAW DICTIONARY 856 (9th ed. 2009). The entry for "serious bodily injury" reads: "Serious physical impairment of the human body; esp., bodily injury that creates a substantial risk of death or that causes serious, permanent disfigurement or protracted loss or impairment of the function of any body part or organ. MODEL PENAL CODE § 210.0(3) (1981). Typically, the fact-finder must decide in any given case whether the injury meets this general standard. Generally, an injury meets this standard if it creates a substantial risk of fatal consequences or, when inflicted, constitutes mayhem. This can be compared with *mayhem*, which is also termed *serious bodily harm*; *grievous bodily harm*; *great bodily injury*. BLACK'S LAW DICTIONARY at 857.

50. See WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY (archaic definitions omitted).

51. *Id.*

52. BLACK'S LAW DICTIONARY 175 (6th ed. 1990).

taining to the body. 2. corporeal or material, as contrasted with spiritual or mental.”<sup>53</sup>

The first, now obsolete, definition of “bodily” in the Oxford English Dictionary (OED) provides a different sort of contrast: “Of the nature of body, corporeal, material, physical; as opposed to *spiritual*.”<sup>54</sup> Here, “physical” has more a sense of non-spiritual as opposed to non-mental. If we then read the OED entry for “body” we find that body refers, in the first instance, to “the complete physical form of a person or animal; the assemblage of parts, organs, and tissues that constitutes the whole material organism.”<sup>55</sup> While one way to contrast the body is with the soul, an alternative is to contrast the body with the head, as seen in a later OED entry defining the body as “the main portion of the animal frame, to which the head, neck, extremities, etc., are attached; the trunk. Freq. opposed to the limbs or to the head.”<sup>56</sup>

These definitions are a useful starting point, and suggest that the body may be contrasted with the soul or with the mind. But the definitions give little guidance in the way of definitely resolving whether, if recognized as brain-based, mental injuries should be considered bodily injury in criminal law.<sup>57</sup> Appendix A provides additional discussion, and additional definitions, of bodily injury as the term arises in the insurance and tort contexts. In those other legal contexts, too, the term is sometimes ambiguous. Unlike in criminal law, however, there is now a growing body of civil case law litigating the bodily injury term.

#### D. CHALLENGES TO BODILY INJURY DEFINITIONS IN CRIMINAL LAW CASES

We have now seen that bodily injury is pervasive in law, and that bodily injury is defined in different, and often ambigu-

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53. RANDOM HOUSE WEBSTER'S UNABRIDGED DICTIONARY 232 (2d ed. 2001).

54. OXFORD ENGLISH DICTIONARY 962 (1st ed. 1933). The second definition in the OED, “of or belonging to the body or physical nature of man,” is akin to the entry in Black's.

55. *Id.*

56. *Id.*

57. To be sure, the problem of ambiguity is a general one. As William Eskridge, the leading proponent of dynamic statutory interpretation, has argued, “for any statute of consequence, the legislative drafting process ensures textual ambiguities, which only multiply over time.” WILLIAM N. ESKRIDGE, JR., DYNAMIC STATUTORY INTERPRETATION 38 (1994).



ous, ways. In this sub-Part, I examine cases in which the bodily injury definition has been challenged. Analysis of the cases finds first that existing definitions of bodily injury can be difficult to interpret in borderline cases, and second that judicial fiat about the clarity of the term has not been empirically tested.<sup>58</sup>

The inadequacy of traditional bodily injury definitions was evident in the 1997 Iowa Supreme Court case *State v. Gordon*.<sup>59</sup> In *Gordon*, the defendant was convicted by a jury of assault causing bodily injury.<sup>60</sup> The case arose when, with several people present, the defendant Thomas Gordon kicked the victim Jeremiah Fry unprovoked, leaving “a red mark to the right of Fry’s sternum.”<sup>61</sup> The Iowa Supreme Court considered the issue of whether “a red mark or bruise constitute[s] a per se impairment of physical condition.”<sup>62</sup>

During the trial, prosecution and defense counsel argued over the proper jury instruction on the bodily injury question.

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58. I focus here on the issue of bodily versus non-bodily injury, and do not reach the related issue of what constitutes “serious” in “serious bodily injury.” But to be sure, the issue of determining how “serious” a bodily injury has been is of enormous interest, given that serious bodily injury is very often an aggravating factor in modern criminal codes. See, e.g., Tracy A. Bateman, Annotation, *Sufficiency of Bodily Injury to Support Charge of Aggravated Assault*, 5 A.L.R.5th 243 (1992) (consisting of a nearly 300-page compendium of cases relating to the question of how much injury is required to constitute serious bodily injury). Where to draw the line between serious and non-serious, or substantial and non-substantial, is a matter for the jury. *People v. Cross*, 45 Cal.4th 58, 64 (Cal. 2008) (“This court has long held that determining whether a victim has suffered physical harm amounting to great bodily injury is not a question of law for the court but a factual inquiry to be resolved by the jury. A fine line can divide an injury from being significant or substantial from an injury that does not quite meet the description. Where to draw that line is for the jury to decide.” (citations omitted) (internal quotation marks omitted)).

59. 560 N.W.2d 4 (Iowa 1997).

60. *Id.* The issue has arisen in other criminal contexts in Iowa as well. See, e.g., *State v. Taylor*, 689 N.W.2d 116, 136 (Iowa 2004) (finding that evidence was sufficient to support finding that defendant’s conduct of breaking into vehicle and pulling victim out of vehicle caused victim, who was defendant’s wife, bodily injury); *State v. Canas*, 597 N.W.2d 488, 494–95 (Iowa 1999) (holding evidence that victim, who was struck in the chest with defendant’s fist, had the wind knocked out of him and momentarily felt pain was sufficient proof of bodily injury notwithstanding that victim had no visible injuries and did not require medical treatment), *vacated*, 630 N.W.2d 601 (Iowa 2001).

61. *Gordon*, 560 N.W.2d at 5.

62. *Id.* at 4. The Iowa Supreme Court, in a later decision, found that a basis for bodily injury can be found when a victim suffered a sprained jaw, minor concussion, and a probable broken nose. *State v. Reynolds*, 765 N.W.2d 283, 287–88 (Iowa 2009).

The following exchange occurred between defense counsel and the judge:

THE COURT: Are you going to argue to the jury that a red mark on the skin is not a bodily injury?

DEFENSE COUNSEL: I may.

THE COURT: All right. Then I'll tell the jury that a red mark on the skin is a bodily injury because they have a right to know that, and if there's a dispute, then I'll clear it up.<sup>63</sup>

Then, with defense objecting, the court gave the following instruction to the jury:

A "bodily" injury means a bodily or physical pain, illness, or any impairment of physical condition. A red mark or bruise on the skin would constitute an impairment of physical condition, and therefore an injury.<sup>64</sup>

The first part of the *Gordon* jury instruction is the definition of bodily injury as used in the Model Penal Code (MPC). The court's use of the MPC definition was upheld as constitutional because the Iowa Supreme Court had previously adopted the MPC definition.<sup>65</sup> But the second sentence of the jury instruction gave the Iowa Supreme Court pause.

At issue here is the ambiguity of the definition of bodily injury in the MPC. As the court observed, "[n]either the Model Penal Code nor the Iowa Code defines impairment of physical condition."<sup>66</sup> Because of this, judges cannot give instructions as to what, specifically, constitutes impairment of physical condition. Rather, as the court held, these are questions of fact "peculiarly within the jury's common experience and for them to decide."<sup>67</sup>

Even though jurors' common experience may not actually lead to a shared understanding of the term, still some courts refuse to offer instruction as to the definition of "bodily injury." For instance, when asked whether he would define "serious bodily injury," a Virginia judge said to the attorneys in the case that:

I believe that Virginia is a state . . . [in which] words that don't need defining we don't define, words like preponderance of the evidence we do because it's not an ordinary parlance meaning word. But constantly the jury comes back and asks about the meaning of words in our instructions and we constantly tell them to their everlasting distress,

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63. *Gordon*, 560 N.W.2d at 5.

64. *Id.*

65. *State v. McKee*, 312 N.W.2d 907, 913 (Iowa 1981) (citing MODEL PENAL CODE commentary § 210.0(2) (1980)).

66. *Gordon*, 560 N.W.2d at 6 (emphasis added).

67. *Id.*

words are given their ordinary meaning in [E]nglish and we don't define them.<sup>68</sup>

The judge's phrase—that we don't define “words that don't need defining”—is indicative of other courts' rulings as well. For instance, more than one Pennsylvania court has found that a failure to provide a bodily injury instruction is not prejudicial because “while ‘bodily injury’ is a legal term, its meaning is comprehensible to laymen without judicial guidance.”<sup>69</sup>

Consider too the case of an inmate charged with third-degree assault against a deputy jailer.<sup>70</sup> At trial, the court did not include a definition of physical injury in the jury instructions, and the defendant argued on appeal that “without the statutory definition of ‘physical injury,’ the jury was unaware of the proper standard to apply to the facts of the case.”<sup>71</sup> The court found that this was in error, and then moved to an analysis of whether the error was prejudicial.

The court's analysis hinged on the court's assessment of juror ability to understand and apply the physical injury element. The government and defendant offered competing claims:

[T]he Commonwealth contends a reasonable jury could conclude Palmer suffered a “physical injury,” even without the assistance of the legal definition; hence, the error cannot be viewed as affecting the verdict. In contrast, Claus characterizes [the deputy jailer's] testimony as “vague,” and he contends he suffered prejudice from the error because the jurors relied on their own opinions regarding the meaning of physical injury and possibly applied an incorrect standard.<sup>72</sup>

On the facts of the particular case—in which the deputy jailer testified that the defendant hit him upon entering the defendant's cell following an altercation—the court ruled that there was no prejudice from the missing instruction because “the verdict would have been the same even if the statutory definition of ‘physical injury’ had been included in the instruc-

68. *Brewster v. Commonwealth*, 477 S.E.2d 288, 289 (Va. Ct. App. 1996). The Judge in this case did not allow an extra jury instruction to define “serious bodily injury.” *Id.*

69. *Commonwealth v. Mott*, 539 A.2d 365, 367 (Pa. 1988); *see also* *Braley v. State*, 572 S.E.2d 583, 590 (Ga. 2002) (“‘Bodily injury’ is a term that is ‘commonly understood’” (quoting *Ferguson v. State*, 438 S.E.2d 682, 684 (Ga. Ct. App. 1993))); *Commonwealth v. Goins*, 501 A.2d 279, 280 (Pa. 1985).

70. *Claus v. Commonwealth*, No. 2009 CA 000555 MR, 2010 WL 3717243, at \*1 (Ky. Ct. App. Sept. 24, 2010) (“An individual confined to a detention facility is guilty of third-degree assault when he intentionally or wantonly causes, or attempts to cause, physical injury to an employee of the facility.”).

71. *Id.*

72. *Id.* at \*2.

tions.”<sup>73</sup> Here, as before, the justice system assumes that lay jurors share a common, correct understanding of bodily injury.

The assumption has also been on display in cases in which defendants have challenged the constitutionality of bodily injury definitions on the grounds that they are too vague. While I do not suggest that confusion over bodily injury necessarily rises to the level of unconstitutional vagueness, these cases are nevertheless instructive because they reveal underlying judicial attitudes.

For instance, the Supreme Court of Montana rejected the vagueness contention, reasoning first that “‘physical pain’ is not an ambiguous term, as any human being who has ever suffered such pain is obviously aware,” and second that “words of common usage in the English language need not be defined.”<sup>74</sup>

In Indiana, a court ruled that the term “bodily injury,” when challenged for being unconstitutionally vague, was clearly understood by the common person: “We can think of no phenomenon of more common experience and understanding than the concepts of ‘bodily injury’ and ‘physical pain.’ Likewise, we do not find the concept of ‘impairment of physical condition’ to be so esoteric as to avoid a consensus of meaning among persons of common intelligence.”<sup>75</sup>

Such pronouncements about a consensus of meaning rest, to date, solely on judicial assessments of jurors’ ordinary and common experience. These judicial assessments, of course, may be accurate, especially in easy cases such as injuries to appendages. And I do not claim that it is only with bodily injury that judges rely on their own views to determine ordinary usage.<sup>76</sup> Moreover, it must be emphasized that the analysis above rests on a narrow set of decisions mostly related to vagueness challenges. Were prosecutors to regularly advance bodily injury arguments of the type I explore in this paper, it could well be that judges might offer more detailed instructions. But whether and how they would craft such instructions would surely depend in part on assumptions about how ordinary people would concep-

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73. *Id.* at \*3.

74. *State v. Hart*, No. 95-320, slip op. at 7 (Mont. Jan. 9, 1997).

75. *Rogers v. State*, 396 N.E.2d 348, 352 (Ind. 1979).

76. Indeed, as legal scholar Lawrence Solan has suggested, “During most of American judicial history, the predominant methodology for discovering ordinary meaning has been introspection. Without fanfare, judges simply rely upon their own sense of how common words are typically used.” Lawrence M. Solan, *The New Textualists’ New Text*, 38 *LOY. L.A. L. REV.* 2027, 2054 (2005).

tualize the crime victim's mental injuries, especially in light of the emergence of a neuroscientific understanding of "mental" illness and injury. I now turn to this emerging body of neuroscientific knowledge.

## II. BRAIN INJURY AS BODILY INJURY: THE VIEW FROM NEUROSCIENCE

Bodily injury elements in criminal law have not yet been challenged on the grounds of new neuroscientific findings. In this Part, I explain why, at least theoretically, this may change sometime in the future. I first discuss the general rise of neurolaw, pointing out how the focus of most research has been on the defendant's and not the victim's brain.<sup>77</sup> I then discuss the Michigan governmental immunity case of *Allen v. Bloomfield Hills*<sup>78</sup> as an example of the types of brain-based bodily injury arguments that might bleed into the criminal law. Appendix B provides an illustrative example of how a "mental" injury, PTSD, can be understood and explained in biochemical and brain-based language.

### A. NEUROSCIENCE AND THE CRIMINAL VICTIM'S BRAIN

This sub-part briefly reviews the rise of neurolaw, discusses how neuroscientific research has led to increasing recognition of mental illness as a brain-based injury, and offers evidence suggesting that brain-based arguments in the context of bodily injury are likely to increase in future years.

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77. In this Article, the phrases "Law and Neuroscience," "Neuroscience and Law," and "Neurolaw" will be used interchangeably to refer to the application of neuroscience findings to law. For general introductions to law and neuroscience, see OWEN D. JONES, JEFFREY D. SCHALL & FRANCIS X. SHEN, *LAW AND NEUROSCIENCE* (forthcoming 2013); STEPHEN J. MORSE & ADINA L. ROSKIES, *A PRIMER ON CRIMINAL LAW AND NEUROSCIENCE* (Stephen J. Morse & Adina L. Roskies eds., 2012); Henry T. Greely & Anthony D. Wagner, *Reference Guide on Neuroscience*, in *REFERENCE MANUAL ON SCIENTIFIC EVIDENCE* (Fed. Judicial Ctr. et al. eds., 3d ed. 2012); Oliver R. Goodenough & Micaela Tucker, *Law and Cognitive Neuroscience*, 6 *ANN. REV. L. SOC. SCI.* 61 (2010); Owen D. Jones et al., *Brain Imaging for Legal Thinkers: A Guide for the Perplexed*, 2009 *STAN. TECH. L. REV.* 5 (2009); Francis X. Shen, *The Law and Neuroscience Bibliography: Navigating the Emerging Field of Neurolaw*, 38 *INT'L. J. LEGAL INFO.* 352 (2010); Stacey A. Tovino, *Functional Neuroimaging and the Law: Trends and Directions for Future Scholarship*, 7 *AM. J. BIOETHICS* 44 (2007). For additional resources, see MACARTHUR FOUND. RES. NETWORK ON LAW & NEUROSCIENCE, [www.lawneuro.org](http://www.lawneuro.org) (last visited Mar. 12, 2013).

78. 760 N.W.2d 811 (2008).

## 1. The Emergence of Law and Neuroscience

Many indicators suggest that neuroscientific evidence is rapidly becoming more prevalent and prominent in criminal proceedings across the country. Although the absolute number of neurolaw cases remains small, data collected by law professor Nita Farahany indicate a rapid rate of growth, with twice as many reported cases involving neuroscientific evidence in 2009 than in 2006.<sup>79</sup> The emerging intersection of neuroscience and law follows the quite rapid and large growth of the field of neuroscience more generally. In 1969 the Society for Neuroscience (SfN) formed with 500 members.<sup>80</sup> Today it numbers over 40,000 members and hosts an annual conference attended by more than 31,000 members.<sup>81</sup> The consistent and rapid growth of the neuroscience field suggests that the field is continuing on a trajectory to become even more important in the years to come.

The potential implications of neuroscience, for many areas of law and policy, are quite broad.<sup>82</sup> For example, scholars have debated both the theoretical and practical implications of neuroscience for law by addressing issues related to free will, determinism, and compatibilism.<sup>83</sup>

In addition to generating much theoretical debate, neuroscientific evidence is rapidly becoming more prevalent

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79. Nita A. Farahany, *An Empirical Study of Brains and Genes in U.S. Criminal Law* (2011) (unpublished manuscript) (on file with author).

80. *What We Do: History of SfN*, SOC'Y FOR NEUROSCIENCE, <http://www.sfn.org/About/What-We-Do/History-of-SfN> (last visited Mar. 1, 2013).

81. *Id.*

82. *See generally* LAW AND THE BRAIN (Semir Zeki & Oliver Goodenough eds., 2006) (discussing new opportunities for law resulting from the integration of law and neuroscience); Bruce A. Arrigo, *Punishment, Freedom, and the Culture of Control: The Case of Brain Imaging and the Law*, 33 AM. J.L. & MED. 457 (2007) (examining the application of functional magnetic resonance imaging brain-scanning technology to criminal justice); Nita A. Farahany & James E. Coleman, Jr., *Genetics, Neuroscience, and Criminal Responsibility*, in THE IMPACT OF BEHAVIORAL SCIENCES ON CRIMINAL LAW 183 (Nita A. Farahany ed., 2009); LAW AND NEUROSCIENCE: CURRENT LEGAL ISSUES 2010 (Michael Freeman ed., 2010); LAW, MIND AND BRAIN (Michael Freeman & Oliver R. Goodenough eds., 2009) (analyzing the intersection of law, justice, and neuroscience).

83. *See, e.g.*, Joshua Greene & Jonathan Cohen, *For the Law, Neuroscience Changes Nothing and Everything*, 359 PHIL. TRANSACTIONS ROYAL SOC'Y LONDON BIOLOGICAL SCI. 1775 (2004); Stephen J. Morse, *Determinism and the Death of Folk Psychology: Two Challenges to Responsibility from Neuroscience*, 9 MINN. J.L. SCI. & TECH. 1 (2008); Michael S. Pardo, *Philosophical Foundations of Law and Neuroscience*, 2010 U. ILL. L. REV. 1211 (2010).

and prominent in criminal proceedings across the country. For instance, the federal courts have seen their first *Daubert* hearing on the admissibility of functional magnetic resonance imaging (fMRI) lie-detection evidence;<sup>84</sup> a jury in Florida was in part persuaded by quantitative electroencephalography (QEEG) brain evidence to give a defendant a life sentence instead of the death penalty;<sup>85</sup> and the United States Supreme Court has made reference to the science of adolescent brain development in multiple rulings regarding life without parole for juveniles.<sup>86</sup> In the courtroom, neuroimaging evidence has been offered in criminal, constitutional, disability benefit, and contract cases, among others.<sup>87</sup> A growing number of conferences and symposia around the country have been launched to introduce judges and attorneys to these new developments.<sup>88</sup>

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84. *United States v. Semrau*, No. 07-10074, 2010 WL 6845092 (W.D. Tenn. 2010).

85. *State v. Nelson*, F05-846 (Fla. Cir. Ct. 2010).

86. *Miller v. Alabama*, 132 S.Ct. 2455, 2464–66 (2012); *Graham v. Florida*, 130 S. Ct. 2011, 2026 (2010).

87. Jones et al., *supra* note 77; Owen D. Jones & Francis X. Shen, *Law and Neuroscience in the United States*, in *INTERNATIONAL NEUROLOGY* 349 (Tade M. Spranger ed., 2011).

88. For example, in 2007, the Gruter Institute for Law and Behavioral Research ran a conference titled *Law, Biology and the Brain*. In 2008, the Berkman Center for Internet and Society and the Petrie-Flom Center for Health Law Policy, Biotechnology and Bioethics of Harvard Law School co-hosted a roundtable panel titled *Should Criminal Law Be Reconsidered in Light of Advances in Neuroscience?*; the Initiative on Neuroscience and Law at Baylor College of Medicine hosted an event the *Neuroscience and Law Conference*; the University of California Riverside Extension Law & Science Program and the Gruter Institute for Law and Behavioral Research hosted *Seminar on Law and Neuroscience*. In 2009, the University of Akron School of Law hosted a law review symposium titled *Neuroscience, Law, and Government*; the MacArthur Foundation Law and Neuroscience Project sponsored a symposium titled *Psychopathy and the Law*; the Stanford Technology Law Review hosted a symposium titled *Neuroscience and the Courts: The Implications of Advances in Neurotechnology*; and the Vermont Law Review published a special issue about the intersection of emotions and legal institutions. Symposium, *Emotions in Context: Exploring the Interaction Between Emotions and Legal Institutions*, 33 VT. L. REV. 3 (2009). In 2010, the American Enterprise Institute hosted an event titled *Understanding Humans Through Neuroscience*; Mercer Law Review hosted a conference titled *The Brain Sciences in the Courtroom*. In 2011, the Denver University Law Review hosted a symposium entitled *Guilty Minds: Neuroscience and Criminal Law Symposium*; and the Dana Foundation hosted a meeting titled *Neuroscience and the Law* in New York. Also in 2011, the National Academy of Sciences and the U.K. Royal Society co-sponsored a forum titled *Neuroscience and the Law*. The MacArthur Foundation Research Network on Law and Neuroscience continues to run such events. See *Education and Outreach*, MACARTHUR FOUND. RES. NETWORK ON LAW & NEUROSCIENCE, <http://www.lawneuro.org/outreach.php> (last visited Apr. 21,

Legislators are also already proposing new laws based on neuroscience findings. New York Assemblyman Michael Benjamin introduced legislation to “ban the use of magnetic resonance imaging (MRI) brain scans in a criminal proceedings” where a defendant’s or witness’s truthfulness or knowledge of a specific event is at issue” during the 2009 legislative session.<sup>89</sup>

In 2009 Alabama State Representative Arthur Payne proposed House Bill 785, providing that “a person commits the crime of assault in the second degree if the person, with intent to cause any physical injury to another person, causes serious physical injury to the brain of the other person.”<sup>90</sup> Representative Payne’s bill, which died in committee, proposed a definition of “serious physical injury to the brain” as “impairment of a person’s brain which creates a substantial risk of death, or which causes death or protracted impairment of health or protracted loss or impairment of the function of the brain.”<sup>91</sup>

Despite the increased attention to neuroscience and criminal law, comparatively little scholarship has examined the possible effects of neuroscientific evidence on our understanding of the crime *victim’s* brain.<sup>92</sup> This Article thus turns next to a brief review of the psychology and neuroscience of crime victim trauma.

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89. H.R. A9154, 232d Leg., Reg. Sess. (N.Y. 2009), *available at* [http://assembly.state.ny.us/leg/?default\\_fld=&bn=A09154&term=2009&Summary=Y&Memo=Y&Text=Yhttp://assembly.state.ny.us/leg/?bn=A09154http://assembly.state.ny.us/leg/?bn=A09154](http://assembly.state.ny.us/leg/?default_fld=&bn=A09154&term=2009&Summary=Y&Memo=Y&Text=Yhttp://assembly.state.ny.us/leg/?bn=A09154http://assembly.state.ny.us/leg/?bn=A09154).

90. H.R. 785, Reg. Sess. (Ala. 2009).

91. *Id.*

92. There are exceptions; for example, in a short essay on the possible applications of law and neuroscience for prosecutors, I speculated that “one future possibility is that neuroscience offers us more effective ways to communicate the long-lasting and often devastating effects of crime on the brains of crime ‘victims.’” Francis X. Shen, *Law and Neuroscience: Possibilities for Prosecutors*, 33 CAL. DIST. ATT’YS ASS’N PROSECUTOR’S BRIEF 17, 23 n.41 (2011). To be sure, examination of the victim’s brain has been carried out in some neuroscience and tort law scholarship. *See, e.g.*, Howard Fields, *Can Neuroscience Identify Pain?*, in A JUDGE’S GUIDE TO NEUROSCIENCE 32 (2010); Betsy J. Grey, *Neuroscience and Emotional Harm in Tort Law: Rethinking the American Approach to Free-Standing Emotional Distress Claims*, in LAW AND NEUROSCIENCE: CURRENT LEGAL ISSUES 203 (Michael Freeman ed., 2010); Betsy J. Grey, *Neuroscience, Emotional Harm, and Emotional Distress Tort Claims*, 7 AM. J. BIOETHICS 65 (2007); Adam J. Kolber, *The Experiential Future of the Law*, 60 EMORY L.J. 585 (2011); Adam J. Kolber, *Pain Detection and the Privacy of Subjective Experience*, 33 AM. J.L. & MED. 433 (2007); Shen, *Monetizing Memory Science*, *supra* note 4; Rick Swedloff & Peter H. Huang, *Tort Damages and the New Science of Happiness*, 85 IND. L.J. 553 (2010).



## 2. Brain-Based Explanations for Crime Victims' Mental Injuries

Although assessment of the psychological costs of crime has not been a central concern of emerging law and neuroscience scholarship, there is an extensive research literature on these costs.<sup>93</sup> This research base finds that there is much variation in how individual crime victims will react psychologically to their victimization experience, but it is well established that common disorders arising from criminal assault include depression, anxiety, and PTSD.<sup>94</sup>

Contemporary research on the cost of crime victimization has focused on crime's effect on victims' quality of life.<sup>95</sup> A recent review of the research concludes: "findings from the well-established literature on general trauma and the emerging research on crime victimization indicate significant functional impact on the quality of life for victims."<sup>96</sup> Victimology research

93. See, e.g., LAURENCE MILLER, *COUNSELING CRIME VICTIMS: PRACTICAL STRATEGIES FOR MENTAL HEALTH PROFESSIONALS* (2008); MARLENE A. YOUNG, *Psychological Trauma of Crime Victimization*, in *VICTIM ASSISTANCE: FRONTIERS AND FUNDAMENTALS* 1 (1993); Irene Hanson Frieze, Sharon Hymer & Martin S. Greenberg, *Describing the Crime Victim: Psychological Reactions to Victimization*, 18 *PROFESSIONAL PSYCHOL.: RESEARCH & PRACTICE* 299 (1987); Patricia A. Resick, *Psychological Effects of Victimization: Implications for the Criminal Justice System*, 33 *CRIME & DELINQUENCY* 468 (1987); Philip W. Wirtz & Adele V. Harrell, *Assaultive Versus Nonassaultive Victimization: A Profile Analysis of Psychological Response*, 2 *J. INTERPERSONAL VIOLENCE* 264 (1987). For discussion of victimology more generally, see ANDREW KARMEN, *CRIME VICTIMS: AN INTRODUCTION TO VICTIMOLOGY* (7th ed. 2010).

94. Ted R. Miller et al., *Victim Costs of Violent Crime and Resulting Injuries*, 12 *HEALTH AFFAIRS* 186, 196 (1993). For discussion in the context of rape, see Francis X. Shen, *How We Still Fail Rape Victims: Reflecting on Responsibility and Legal Reform*, 22 *COLUM. J. GENDER & L.* 1 (2011); Shen, *Monetizing Memory Science*, *supra* note 4; Francis X. Shen, *Assessing the Harms of Rape*, Dissertation Chapter, Harvard University (2008) (on file with author).

95. See, e.g., Rochelle F. Hanson, Genelle K. Sawyer, Angela M. Begle & Grace S. Hubel, *The Impact of Crime Victimization on Quality of Life*, 23 *J. TRAUMATIC STRESS* 189 (2010). One way of conceptualizing the costs is by focusing on different domains such as: "(a) role functioning [i.e., difficulties in social, occupational, and interpersonal functioning], (b) life satisfaction and well-being, and (c) social-material conditions" (i.e., health costs, health care utilization, and employer costs). *Id.* at 190 (citing Madeline M. Gladis et al., *Quality of Life: Expanding the Scope of Clinical Significance*, 67 *J. CONSULTING & CLINICAL PSYCHOL.* 320 (1999)).

96. *Id.* at 194. Additional psychological externalities include the possible negative psychological consequences for those who must regularly observe violence in their communities. Naomi Breslau & Glenn C. Davis, *Migraine, Major Depression and Panic Disorder: A Prospective Epidemiologic Study of Young Adults*, 12 *CEPHALALGIA* 85, 85 (1992); Naomi Breslau et al., *Traumatic Events and Posttraumatic Stress Disorder in an Urban Population of Young*

has established that a large percentage of the costs of crime for victims is psychological.<sup>97</sup>

We can look to other policy domains to see momentum for recognizing these psychological injuries as bodily. Echoing the quote at the outset of this paper from Speaker Pelosi, in 2009 on the floor of the United States House of Representatives, Congressman Patrick Kennedy (D-RI) argued that insurance companies must “acknowledge that the brain is part of the body.”<sup>98</sup>

As neuroscience discovers more about the biochemical processes that correlate with mental phenomena, the distinction between “physical” and “mental” injury is being revisited in many legal and policy contexts.<sup>99</sup> In health law, for instance, there has been a sustained effort to enact mental health parity laws that recognize “biologically based mental illness.”<sup>100</sup> Mark Anderson, who served as the late Senator Paul Wellstone’s senior mental health policy advisor in the Senate, describes the emerging policy position this way:

There is an increased understanding that the mind/body split that 18th century philosophers detailed is a fiction. The brain is a real part of the body and the brain and other organs of the body interact

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*Adults*, 48 ARCHIVES GEN. PSYCHOL. 216, 216 (1991).

97. Mark A. Cohen & Roger Bowles, *Estimating Costs of Crime*, in *HANDBOOK OF QUANTITATIVE CRIMINOLOGY* 143 (Alex R. Piquero & David Weisburd eds., 2010); Miller et al., *supra* note 94, at 196.

98. 155 CONG. REC. H8188 (daily ed. July 16, 2009) (statement of Rep. Patrick Kennedy).

99. See Brian D. Shannon, *The Brain Gets Sick, Too—The Case for Equal Insurance Coverage for Serious Mental Illness*, 24 ST. MARY’S L.J. 365 (1993); Stacey A. Tovino, *Neuroscience and Health Law: An Integrative Approach?*, 42 AKRON L. REV. 469, 489–97 (2009); see also Martha Chamallas, *Removing Emotional Harm from the Core of Tort Law*, 54 VAND. L. REV. 751, 752 (2001) (arguing that “[i]n the hierarchy of torts, emotional and relational harms are not as fully protected as physical injury and property damage”); Martha Chamallas, *The Architecture of Bias: Deep Structures in Tort Law*, 146 U. PA. L. REV. 463 (1998); John J. Kircher, *The Four Faces of Tort Law: Liability for Emotional Harm*, 90 MARQ. L. REV. 789 (2007); *State Laws Mandating or Regulating Mental Health Benefits*, NAT’L CONF. ST. LEGISLATURES, <http://www.ncsl.org/default.aspx?tabid=14352> (last updated Dec. 2012). In the area of mental health, due to both interest group pressure and new scientific research, many states have redefined mental illness as “biologically based.” Marcia C. Peck & Richard M. Scheffler, *An Analysis of the Definitions of Mental Illness Used in State Parity Laws*, 53 PSYCHIATRIC SERVICES 1089, 1091–93 (2002). There is evidence that this is happening in the United Kingdom as well. See, e.g., Bell, *supra* note 6.

100. Shannon, *supra* note 99; Tovino, *supra* note 99; see also NAT’L CONF. ST. LEGISLATURES, *supra* note 99.

in numerous ways so that a health care system that does not treat the brain with the body is outmoded.<sup>101</sup>

Survey data finds that there is widespread support for mental health parity. When respondents in a nationally representative sample were asked, “Is mental health care just as important to cover as physical health care?” an overwhelming 78% said yes.<sup>102</sup> In a different national poll, 82% of U.S. citizens agreed with the statement that “[t]reatment for mental illness should be included in the President’s proposal to the same extent as treatment for physical illnesses.”<sup>103</sup> Additional data find that in the period from 1996 to 2006 the percentage of citizens viewing depression as a neurobiological disease increased from 54% to 67%.<sup>104</sup>

This shift toward a neurobiological understanding of mental illness is due in part to the concerted efforts of mental health advocacy organizations to educate the public. For instance, the National Alliance on Mental Illness (NAMI) sponsors a number of educational programs, including a program created in 1999 called “Breaking the Silence: Teaching the Next Generation About Mental Illness.”<sup>105</sup>

Campaigns to end stigmatization of mental illness have relied in large part on brain evidence, and have argued that there is no neuroscientific basis for differentiating insurance coverage for mental (as opposed to physical) illness.<sup>106</sup> And these

101. Mark Anderson & Lynda Cannova, *50 Years of Mental Health Hope and Struggle: 1957–2007*, COUNCIL ON CRIME & JUST., <http://www.crimeandjustice.org/councilinfo.cfm?pID=54> (last visited Mar. 3, 2013).

102. Kristina W. Hanson, *Public Opinion and the Mental Health Parity Debate: Lessons from the Survey Literature*, 49 PSYCHIATRIC SERVICES 1059 (1998) (citing NATIONAL SURVEY OF 800 REGISTERED VOTERS CONDUCTED FOR THE BAZELON CENTER FOR MENTAL HEALTH LAW, MELLMAN-LAZARUS-LAKE, INC. (1994)).

103. *Id.* at tbl. 1 (citing NATIONAL TELEPHONE SURVEY OF 1,006 ADULTS CONDUCTED FOR NBC NEWS AND THE WALL STREET JOURNAL, HART & TEE-TER RESEARCH CO. (1993)).

104. Bernice A. Pescosolido et al., “A Disease Like Any Other”? A Decade of Change in Public Reactions to Schizophrenia, Depression, and Alcohol Dependence, 167 AM. J. PSYCHIATRY 1321 (2010).

105. *Breaking the Silence: Teaching School Kids About Mental Illness*, NAT’L ALLIANCE ON MENTAL ILLNESS, <http://tinyurl.com/3kcwpxv> (last visited Mar. 3, 2013).

106. Brian D. Shannon, *Paving the Path to Parity in Health Insurance Coverage for Mental Illness: New Law or Merely Good Intentions?*, 68 U. COLO. L. REV. 63, 65–70 (1997); see also Pescosolido et al., *supra* note 104, at 1327 (“[n]euroscientific advances are fundamentally transforming the landscape of mental illness and psychiatry”). New neuroscientific evidence may further erode the physical/mental barrier. For instance, in one functional magnetic

campaigns have been ongoing since the 1990s. For instance, in 1996 in testimony before Congress, Dr. Steven Hyman—a Harvard neuroscientist, and then director of the National Institute of Mental Health—said:

I can state without reservation that research shows no biomedical justification for differentiating serious mental illness from other serious and potentially chronic disorders of the nervous system such as stroke, brain tumor, or paralysis. There is absolutely no biomedical justification for policies that judge mental disorders as being in any way less real or less deserving of treatment . . . .<sup>107</sup>

While many policymakers have now embraced Dr. Hyman's position in the context of mental health parity policies, the criminal justice system still relies in critical ways on distinctions between a victim's mental and physical injuries.<sup>108</sup> To be clear, and as I will argue later in the Article, there are good arguments for and against maintaining these distinctions, even as they dissolve in other legal arenas. But before turning to those arguments, we must understand how the distinctions matter.

An illustrative example can be seen in how one California law firm (specializing in criminal defense) explains the state's

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resonance imaging (fMRI) study from 2011, a team of neuroscientists led by Ethan Kross found that the brain activation patterns of social rejection (having subjects view the photo of an ex-partner who recently rejected them) were similar to the brain activation patterns of physical pain (putting painful heat on subjects' forearms). Ethan Kross, Marc G. Berman, Walter Mischel, Edward E. Smith & Tor D. Wager, *Social Rejection Shares Somatosensory Representations with Physical Pain*, 108 PROC. NAT'L ACAD. SCI. U.S. OF AMERICA 6270, 6270 (2011); see also Naomi I. Eisenberger, Matthew D. Lieberman & Kipling D. Williams, *Does Rejection Hurt? An fMRI Study of Social Exclusion*, 302 SCI. 290 (2003) (examining the neural correlates of social exclusion and testing the hypothesis that the brain bases of social pain are similar to brain bases of physical pain).

107. *Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations for 1997: Hearings Before Subcomm. of the Comm. on Appropriations*, 104th CONG. 377 (1996) (statement of Steven Hyman, Director of the National Institute of Mental Health) [hereinafter *Hearings*].

108. In tort law, there is a longer history of recognizing and evaluating non-physical harm. It had already been said in 1955 that "the literature on the subject [of distinguishing mental from physical harm] is voluminous, if not exhaustive." *Kaufman v. W. Union Tel. Co.*, 224 F.2d 723, 731 (5th Cir. 1955). As far back as 1993, the Iowa Supreme Court observed that "the medical community now knows that 'every emotional disturbance has a physical aspect and every physical disturbance has an emotional aspect.'" *Pekin Ins. Co. v. Hugh*, 501 N.W.2d 508, 512 (Iowa 1993) (quoting Comment, *Negligently Inflicted Mental Distress: The Case for an Independent Tort*, 59 GEO. L.J. 1237, 1241 n.24 (1971) (citation omitted)). The court concluded that an insurance policy's definition of "bodily injury" provided coverage for emotional distress. *Id.*

domestic violence law to its potential clients.<sup>109</sup> The firm poses the following question on its web site: “How does the prosecutor prove that I am guilty of a Penal Code 273.5 [domestic violence] violation?”<sup>110</sup> The firm tells its clients that amongst the elements the State must prove are that the defendant “inflicted corporal (bodily) injury upon (a) your current or former spouse, (b) your current or former cohabitant (that is, someone with whom you share or shared a residence), or (c) the mother or father of your child.”

In defining the term bodily injury for its clients, the law firm writes on its web site that “a ‘bodily’ injury is just that . . . a *physical* injury to the body. . . . [C]ommon examples . . . include: hitting, punching, kicking, slapping, biting, and pushing.”<sup>111</sup> The firm specifically notes that “[s]ince a corporal injury is a bodily injury, causing emotional and/or mental abuse alone will not subject one to liability.”<sup>112</sup> This example illustrates nicely the way in which the definition of bodily injury is communicated by attorneys to their potential clients. In this context, it is made clear that *physical* injury to the victim is required in order to trigger criminal liability for domestic violence; you can mentally abuse your spouse and you won’t be held criminally liable.

### 3. The Future of Brain-Based Bodily Injury Claims

The rise of neuroscience and law generally, and the increasing willingness of society and different bodies of law to recognize mental injury as brain-based, suggests that future litigation over bodily injury will increasingly involve neuroscientific evidence. To gain some additional purchase on this prediction, I conducted a search in Westlaw for cases that included both the word “brain” and the phrase “bodily injury.” This is, at best, a rough proxy for the actual number of such cases. But the results, presented in Figure 1, are nonetheless suggestive.

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109. See *California Penal Code 273.5 PC: Corporal Injury on a Spouse, Cohabitant, or Fellow Parent*, SHOUSE L. GROUP, [http://www.shouselaw.com/domestic\\_violence273-5.html](http://www.shouselaw.com/domestic_violence273-5.html) (last visited Mar. 12, 2013).

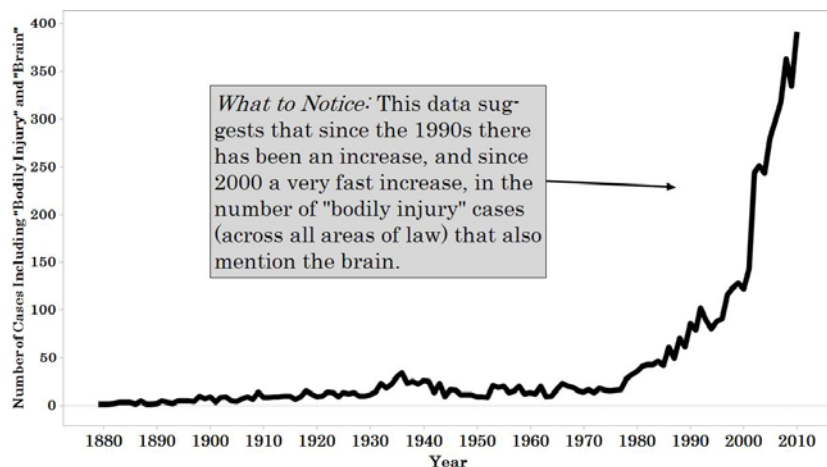
110. *Id.*

111. *Id.*

112. *Id.* The firm does also note, however, that “instances of emotional and/or mental abuse may sometimes be prosecuted under Penal Code 422, California’s criminal threats law or under Penal Code 646.9, California’s stalking law.” *Id.*

Since the 1980s, and especially since the late 1990s, the number of these cases seems to be rising dramatically.<sup>113</sup> Such growth, if indeed the chart is accurate in measuring it, would be similar to the growth being seen in neurolaw cases more generally.<sup>114</sup> At a minimum, it suggests that preparing for brain-based bodily injury claims is a wise strategy for courts and legislatures to adopt.

**Figure 1**  
**Results of “Brain” & “Bodily Injury” Search in**  
**Westlaw’s ALLCASES Database:<sup>115</sup>**  
**Number of Criminal and Civil Case Hits, by Year**



#### B. THE CASE OF *ALLEN V. BLOOMFIELD HILLS*

We do not know what a brain-based bodily injury case would look like in criminal law, but there is at least one non-criminal case in which an analogous argument persuaded a

113. See *infra* Figure 1.

114. See *supra* text accompanying note 79.

115. This database “contains documents from the U.S. Supreme Court, courts of appeals, former circuit courts, district courts, bankruptcy courts, former Court of Claims, Court of Federal Claims, Tax Court, related federal and territorial courts, military courts, the state courts of all 50 states and the local courts of the District of Columbia.” Scope ALLCASES, WESTLAW CLASSIC, rootURL (follow “Scope” hyperlink next to the ALLCASES hyperlink in “Cases” source box on main page) (last visited Mar. 12, 2013). Analysis of randomly selected hits suggests that the volume of these results is largely due to criminal cases centering on violence to the brain (either to victim or defendant).

court. In 2010, a case before the Michigan Supreme Court would have dealt with precisely the question of whether PTSD constitutes a “bodily” harm had the parties not settled out of court.<sup>116</sup> The case was brought by plaintiff Charles Allen, who was conducting a train when he hit a school bus (with only a driver inside) that had moved around the railroad barriers and onto the train tracks.<sup>117</sup> Allen hit the bus at a speed at sixty-five miles per hour, and the bus driver was seriously injured.<sup>118</sup> Allen brought his suit against the owner of the school bus, the Bloomfield Hills School District.<sup>119</sup>

By making the school district the target of the suit, Allen was aiming to take advantage of Michigan’s motor vehicle exception to government immunity.<sup>120</sup> Michigan law states that “[g]overnmental agencies shall be liable for bodily injury and property damage resulting from the negligent operation by any officer, agent, or employee of the governmental agency, of a motor vehicle of which the governmental agency is owner.”<sup>121</sup> The operative words—and the reason this case is of great interest for this Article—are “*liable for bodily injury*.” Since Allen’s damages were primarily those from PTSD, and not more traditional “bodily” injury, his recovery would be barred by statute unless he could convince the court that the Michigan legislature intended to include PTSD as a “bodily” injury for purposes of the statute.<sup>122</sup>

Dr. Joseph C. Wu presented an affidavit on Allen’s behalf, stating that a PET scan of Allen “depicted ‘decreases in frontal and subcortical activity consistent with depression and post traumatic stress disorder.’” He further opined “that ‘the abnormalities in Mr. Allen’s brain as depicted on the September 8, 2006, PET scan are quite pronounced and are clearly different in brain pattern from any of the normal controls. They are also consistent with an injury to Mr. Allen’s brain.’”<sup>123</sup> Allen also submitted a report by Dr. Gerald A. Shiener noting that

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116. See *Allen v. Bloomfield Hills Sch. Dist.*, 760 N.W.2d 811, 815–16 (Mich. Ct. App. 2008) (discussing expert testimony on the relationship between PTSD and the brain), *appeal dismissed per stipulation*, 779 N.W.2d 793 (Mich. 2010).

117. *Id.* at 812.

118. *Id.*

119. *Id.*

120. *Id.*

121. MICH. COMP. LAWS § 691.1405 (2000).

122. See *Allen*, 760 N.W.2d at 814–15.

123. *Id.* at 815.

PTSD “causes significant changes in brain chemistry, brain function, and brain structure.”<sup>124</sup>

The trial court sided with the defense, which argued that proper statutory interpretation did not include PTSD as bodily,<sup>125</sup> but an appeal was made and the appellate court ruled in favor of Allen, reasoning that:

The brain is a part of the human body, so “harm or damage done or sustained” is injury to the brain and within the common meaning of “bodily injury” in MCL 691.1405, as elucidated in *Wesche*. The question on appeal then becomes, for purposes of reviewing the trial court’s grant of summary disposition to defendant, whether plaintiff produced sufficient evidence to create a material question of fact that he suffered a “bodily injury” as so defined. In doing so, we must still adhere to the court rules and follow the law. We must review any evidence of a claimed “bodily injury” in a light most favorable to the nonmoving party. Also, we must conduct our review with common sense, and with cognizance of modern medical science and the human body. Here, plaintiff presented objective medical evidence that a mental or emotional trauma can indeed result in physical changes to the brain.

Although the brain is the organ responsible for our thoughts and emotions, it is also the organ that controls all our physical functions. The fact that it serves more than one function hardly detracts from the fact that it is one of our major organs. It can be injured. It can be injured directly and indirectly. It can be injured by direct and indirect trauma. What matters for a legal analysis is the existence of a manifest, objectively measured injury to the brain. Consequently, to survive a motion for summary disposition, we must determine whether plaintiff produced sufficient evidence that Allen suffered from an objectively manifested physical injury to his brain.<sup>126</sup>

This ruling led to a further appeal, this time by the school district, to the Michigan Supreme Court, where again both sides made their case through briefs. The briefs submitted to the Michigan Supreme Court sparred over statutory interpretation of the phrase “bodily injury.”<sup>127</sup> Allen’s legal team cited multiple scientific sources, including the U.S. Surgeon General’s 1999 report on mental health, which argued that “[p]eople continue to see mental and physical as separate func-

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124. *Id.*

125. *See id.* at 812.

126. *Id.* at 815.

127. *See, e.g.*, Plaintiffs-Appellees’ Opposing Brief to Defendant-Appellant’s Application for Leave to Appeal at 14–20, *Allen v. Bloomfield Hills Sch. Dist.*, 779 N.W.2d 793 (Mich. 2010) (No. 137607), 2008 WL 7165010, at \*14–20; Defendant-Appellant’s Application for Leave to Appeal at 10–19, *Allen*, 779 N.W.2d 793 (No. 137607), 2008 WL 7165008, at \*10–19.



tions when, in fact, *mental functions (e.g., memory) are physical as well.*<sup>128</sup>

The defense pointed to legislative intent and past case law.<sup>129</sup> Regarding legislative intent, the Michigan Attorney General filed an amicus curiae brief in support of the defense arguing that “[n]othing in the statutory language of the motor vehicle exception reflects intent by the Legislature to apply the motor vehicle exception to mental, emotional, or psychiatric disorders, even if the secondary effect of such disorders is a change in the brain or any other part of the body.”<sup>130</sup> Relying on an earlier case, the Attorney’s General’s brief argued in several ways that “damages of a spiritual or mental nature are not encompassed within the plain language of the motor vehicle exception.”<sup>131</sup> The defense also made a slippery-slope policy argument, warning that swinging open the doors in this case would ultimately force the school district to allocate less money to students.

Recognizing the potential magnitude of the decision for tort recovery, the Court allowed supplemental briefs to be filed, as well as amicus briefs from the Michigan Association for Justice, the Michigan Attorney General, the Insurance Institute of Michigan,<sup>132</sup> and the Brain Injury Association of Michigan.<sup>133</sup> That so many third parties took a large interest in the case speaks to the significant implications of (re)defining bodily injury to include PTSD without additional “physical” manifestations.

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128. Plaintiffs-Appellees’ Supplemental Brief at 5, *Allen*, 779 N.W.2d 793 (No. 137607), 2009 WL 4227403, at \*5 (quoting U.S. DEP’T OF HEALTH & HUMAN SERVS., MENTAL HEALTH: A REPORT OF THE SURGEON GENERAL 6 (1999) (emphasis added) (citation omitted), available at <http://profiles.nlm.nih.gov/ps/access/NNBBHS.pdf>). It was also noted in the Surgeon General’s Report that “[t]he brain is the organ of mental function; psychological phenomena have their origin in that complex organ. Psychological and sociocultural phenomena are represented in the brain through memories and learning, which involve structural changes in the neurons and neuronal circuits.” U.S. DEP’T OF HEALTH & HUMAN SERVS., *supra*, at 50.

129. See *e.g.*, Defendant-Appellant’s Reply to Plaintiff-Appellees’ Opposing Brief to Defendant-Appellant’s Application for Leave to Appeal at 2–3, *Allen*, 779 N.W.2d 793 (No. 137607), 2008 WL 7165009, at \*2–3.

130. Brief of Amicus Curiae Attorney General in Support of Defendant-Appellee Bloomfield Hills School District’s Application for Leave to Appeal at 3, *Allen*, 779 N.W.2d 793 (No. 137607), 2009 WL 4227401, at \*3.

131. *Id.* at 3 (citing *Wesche v. Mecosta Cnty. Rd. Comm’n*, 746 N.W.2d 847, 853–54 (Mich. 2008)).

132. See *Allen v. Bloomfield Hills Sch. Dist.*, 764 N.W.2d 576 (Mich. 2009).

133. See *Allen v. Bloomfield Hills Sch. Dist.*, 772 N.W.2d 783 (Mich. 2009).

Because the case settled, we do not know how the Michigan Supreme Court would have ruled. Nor do we know how such an argument would have fared in a criminal context. But we can begin to explore the possibility of such an argument appearing in criminal courts through experimental research. I turn now to those experiments.

### III. BODILY INJURY EXPERIMENTS

This Part discusses original experiments that test lay understanding of bodily injury in criminal contexts. Because this is the first empirical assessment of lay understandings of the term “bodily injury,” the following strategy was employed as proof of concept. First, data was collected in the Common Understanding Experiment (Experiment One) to see if lay people share similar intuitions about what constitutes bodily injury. Second, the Jury Instructions Experiment (Experiment Two) was designed to test whether there are *any* conditions (even if stylized) under which mental trauma is considered by experimental subjects as bodily injury.<sup>134</sup> This Part is organized into five sub-Parts: (A) Context and Related Empirical Work; (B) Design of Common Understanding Experiment; (C) Results of Common Understanding Experiment; (D) Design Of Jury Instructions Experiment; and (E) Results of Jury Instructions Experiment.

#### A. CONTEXT AND RELATED EMPIRICAL WORK

Over the past two decades, scholars have increasingly employed quantitative empirical methods to assess the efficacy, fairness, and operation of law.<sup>135</sup> In the criminal law, social sci-

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134. Given the cost of running experiments with nationally representative samples (costs which can rise over \$10 per subject), establishing the most (or least) promising avenues for future research is especially important. See Adam J. Berinsky et al., *Evaluating Online Labor Markets for Experimental Research: Amazon.com's Mechanical Turk*, 20 POL. ANALYSIS 351, 353–54 (2012) (presenting evidence comparing traditional and online methods of conducting survey experiments). Additional inquiry, now warranted given the proof of concept, can help to determine with much more specificity under what conditions lay people are more/less likely to label a crime victim's injury as bodily injury.

135. See Theodore Eisenberg, *Why Do Empirical Legal Scholarship?*, 41 SAN DIEGO L. REV. 1741, 1742 (2004) (citing evidence of growth of empirical legal scholarship); Tracey E. George, *An Empirical Study of Empirical Legal Scholarship: The Top Law Schools*, 81 IND. L.J. 141, 144–47 (2006) (providing an intellectual history of the rise of empirical legal scholarship); Jeffrey J. Rachlinski, *Evidence-Based Law*, 96 CORNELL L. REV. 901, 904–10 (2011) (dis-

ence tools have been used to inform criminal law theory (and vice versa).<sup>136</sup> Empirically assessing the effects of criminal justice reform in the real world is hard because it is difficult to adequately control for a number of confounding variables.<sup>137</sup> In real-world legal settings (as in most real-world policy settings), true random assignment is not feasible or ethical.<sup>138</sup> One way that scholars have addressed this issue of causation is to develop experimental studies, where the causal effect of manipulations can be more readily ascertained.<sup>139</sup>

There are also empirical literatures examining the effects of many types of jury instructions on juror outcomes,<sup>140</sup> examining the effects of victim impact statements,<sup>141</sup> and exploring ju-

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cussing the trend toward more empirical legal scholars on law school faculties).

136. See, e.g., Paul H. Robinson & John M. Darley, *Objectivist Versus Subjectivist Views of Criminality: A Study in the Role of Social Science in Criminal Law Theory*, 18 OXFORD J. LEGAL STUD. 409, 416–18 (1998).

137. See, e.g., Robert Weisberg, *Tragedy, Skepticism, Empirics, and the MPCs*, 61 FLA. L. REV. 797, 811–13 (2009) (discussing how statistical evaluations of the Model Penal Code: Sentencing (MPCS) are difficult due in large part to an inability to show causation).

138. David S. Goldman, *Legal Construct Validation: Expanding Empirical Legal Scholarship to Unobservable Concepts*, 36 CAP. U. L. REV. 79, 116–17 (2007) (discussing the use of quasi-experimental methods in legal scholarship to avoid practical and ethical concerns associated with traditional randomized experiments).

139. For a general discussion of the rise of the empirical, including experimental, approach in law, see Richard H. McAdams & Thomas S. Ulen, *Introduction to the Symposium on Empirical and Experimental Methods in Law*, 2002 U. ILL. L. REV. 791 (2002). As legal theorist Paul Robinson and psychologist John Darley (pioneers in this research tradition) wrote fifteen years ago: “[W]e seek to demonstrate to criminal law theorists and code drafters . . . [that] experimentation[] can be brought to bear on their issues of debate.” Robinson & Darley, *supra* note 136, at 417. With the exception of randomized field trials, laboratory experiments are thought to trade better internal validity for worse external validity. See Gregory Mitchell, *Revisiting Truth or Triviality: The External Validity of Research in the Psychological Laboratory*, 7 PERSP. ON PSYCH. SCI. 109, 109 (2012) (reviewing research on the conventional wisdom that “highly controlled experiments produce internally valid findings with suspect external validity”). In the experiments reported in this Article, caution is warranted in making generalizations to other subject populations and to real-world conditions.

140. See, e.g., Robert P. Charrow & Veda R. Charrow, *Making Legal Language Understandable: A Psycholinguistic Study of Jury Instructions*, 79 COLUM. L. REV. 1306 (1979); Gabriella Ramirez et al., *Judges' Cautionary Instructions on Eyewitness Testimony*, 14 AM. J. FORENSIC PSYCHOL. 31 (1996).

141. Findings in the literature are mixed, but there is evidence that the severity of emotional harm described in victim impact statements affects punishment levels. For a review, see Janice Nadler & Mary R. Rose, *Victim Impact Testimony and the Psychology of Punishment*, 88 CORNELL L. REV. 419

ry decision making generally.<sup>142</sup> Related, though not directly on point, is empirical research on subject response to non-bodily (or “emotional”) harms. Empirical research has shown, for instance, that punitive damage awards vary significantly between bodily and non-bodily injuries (with punitive damages being awarded by judges less frequently than juries for non-bodily injuries).<sup>143</sup> At the same time, however, subjects respond with harsher punishments when they are told in victim impact statements about greater emotional harm experienced by the victim.<sup>144</sup>

In the realm of neurolaw, a small number of behavioral experiments have been conducted to test the effect of neuroscientific evidence on juror and judge decision making.<sup>145</sup> While some early empirical work suggested that the “seductive allure” of brain images would unduly persuade jurors,<sup>146</sup> a more recent and much more robust set of studies suggests just the opposite: relative to other scientific evidence that would be admitted in its place, there is no significant relationship between

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(2003). See also Jeremy A. Blumenthal, *Affective Forecasting and Capital Sentencing: Reducing the Effect of Victim Impact Statements*, 46 AM. CRIM. L. REV. 107 (2009) (reporting the results of two experiments suggesting that victim impact statements increase the imposition of capital sentences because of a perception of prolonged emotional harm); Paul G. Cassell, *In Defense of Victim Impact Statements*, 6 OHIO ST. J. CRIM. L. 611, 634–36 (2009) (presenting empirical evidence that victim impact statements do not affect sentence severity in either capital or non-capital cases); Julian V. Roberts, *Listening to the Crime Victim: Evaluating Victim Input at Sentencing and Parole*, 38 CRIME & JUST. 347, 373–75 (2009) (concluding that there is no aggregate effect on sentencing from victim impact statements).

142. See, e.g., Brian H. Bornstein & Edie Greene, *Jury Decision Making: Implications for and from Psychology*, 20 CURRENT DIRECTIONS PSYCHOL. SCI. 63 (2011); Jessica M. Salerno & Shari Seidman Diamond, *The Promise of a Cognitive Perspective on Jury Deliberation*, 17 PSYCHONOMIC BULL. & REV. 174 (2010).

143. Theodore Eisenberg et al., *Juries, Judges, and Punitive Damages: Empirical Analyses Using the Civil Justice Survey of State Courts 1992, 1996, and 2001 Data*, 3 J. EMPIRICAL LEGAL STUD. 263, 285–87 (2006).

144. See Blumenthal, *supra* note 141, at 114.

145. Lisa G. Aspinwall et al., *The Double-Edged Sword: Does Biomechanism Increase or Decrease Judges' Sentencing of Psychopaths?*, 337 SCIENCE 846 (2012); David P. McCabe et al., *The Influence of fMRI Lie Detection Evidence on Juror Decision Making*, 29 BEHAV. SCI. L. 566 (2011); N.J. Schweitzer et al., *Neuroimages as Evidence in a Mens Rea Defense: No Impact*, 17 PSYCHOL. PUB. POL'Y & L. 357 (2011); Deena Skolnick Weisberg et al., *The Seductive Allure of Neuroscience Explanations*, 20 J. COGNITIVE NEUROSCIENCE 470 (2008).

146. Weisberg et al., *supra* note 145, at 475–76.

the introduction of brain imaging evidence, per se, and punishment or blame outcomes.<sup>147</sup>

While these and other related studies are of interest, they are not instructive on the central questions of this Article: whether there is consensus on what constitutes “bodily injury,” whether the definition of the term provided in jury instructions matters, and whether appeals to brain-based arguments and evidence affect bodily injury determination.

Two previous experiments that I have conducted on bodily injury in the context of tort provide some preliminary expectations about what we might find in the criminal context.<sup>148</sup> In Tort Experiment One, I randomly assigned subjects to read one of three case summaries. Each summary was based on the *Allen* case described in Part II.B. Group One, the “Baseline” group, was exposed to only the summary, which made no mention of neuroscience. Group Two, the “Plaintiff” group, was exposed to only the plaintiff’s expert providing neuroscience information to support the plaintiff’s case that PTSD is a bodily injury. Group Three, the “Both” group, was exposed to both the plaintiff and the defendant experts’ testimony.

After reading the vignette, subjects were then asked: “Imagine for a moment that you were deciding this case, and you had to rule one way or the other. How would you rule?” Subjects were offered two choices: (a) John’s experience of Post-Traumatic Stress Disorder IS a “bodily” injury, and he should be able to collect on his insurance policy; (b) John’s experience of Post-Traumatic Stress Disorder is NOT a “bodily” injury, and he should NOT be able to collect on his insurance policy.<sup>149</sup>

Subjects in Tort Experiment Two were also randomly assigned to a Baseline, Plaintiff, or Both group. Subjects were asked to read a short case summary. The case summary in Experiment Two was based on an actual reported PTSD civil litigation case, *Sapirman v. Walmart Stores East, L.P.*<sup>150</sup> The case was chosen because it was a relatively straightforward case of premises liability and because the actual settlement amount

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147. Schweitzer et al., *supra* note 145, at 387–88.

148. See Shen, *supra* note 4.

149. The experiment did not, nor did it intend to, present subjects with a realistic trial experience. It does, however, provide us with a first step in that direction and with insights into the dynamics of public support for legislative policymaking in this arena.

150. No. 07-44531 32D, 2009 WL 4731140 (Fla. Cir. Ct. Sept. 29, 2009).

was known: \$207,500.<sup>151</sup> The facts reported were that the plaintiff was attacked in a Walmart parking lot one night in 2006, and he then sued Walmart to seek damages both for a shoulder injury and for PTSD.<sup>152</sup> The plaintiff reported that he “sought counseling and report[ed] a heightened level of anxiousness in busy areas and in parking lots.”<sup>153</sup> He sought only \$6000 in medical costs, leaving the rest—roughly \$200,000—for pain and suffering from PTSD and loss of consortium to the victim’s wife, who was also a plaintiff in the case.<sup>154</sup> The defense argued that the plaintiff was “not suffering from PTSD, noting that he was able to gain a promotion at work and had a child with his wife.”<sup>155</sup>

In the experiment (not in the real case), the plaintiff’s expert claimed he could confirm the plaintiff’s PTSD via a brain scan. The “Both” group, however, learned that upon cross-examination of the plaintiff’s expert, the case for biomarking PTSD was not as strong.<sup>156</sup> In this way, the vignette provided a glimpse into how individuals might respond both to the unchecked promise and the more realistic complexity of neuroscientific research on PTSD biomarkers.

After reading the vignette, all three groups in Experiment Two were asked: “Imagine for a moment that you were deciding this case, and you had to award some damage amount to [the victim]. How much would you award for the bad memories from PTSD?” Subjects then used a slider bar to choose an amount from \$0 to \$1,000,000.

The results from these two tort experiments suggested (a) that at baseline, a strong majority of subjects (72%) believe that PTSD constitutes a bodily injury; (b) that if subjects are exposed only to neuroscientific information that is favorable to the plaintiff, they are more likely (88%) to feel this way; but (c) if exposed both to the plaintiff’s scientific expert and a critique

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151. As reported, the amount was reached via mediation with mediator Cindy Hanna. *Id.*

152. *Id.*

153. *Id.*

154. *Id.*

155. *Id.*

156. A biological marker, or “biomarker” for short, is a physiological indicator of a disease. Christoph W. Turck et al., *Proteomic Strategies for Biomarker Discovery: From Differential Expression to Isoforms to Pathways*, in BIOMARKERS FOR PSYCHIATRIC DISORDERS 57, 60 fig.3.1 (2009).

from a defense expert, support for the bodily claim drops (to 62%).<sup>157</sup>

#### B. DESIGN OF COMMON UNDERSTANDING EXPERIMENT

Against this backdrop of experimental findings in the tort context, Experiment One was designed to offer more general findings on how lay people assess bodily injury. The primary goal was to establish—as a baseline—how subjects apply the bodily injury label to a range of different injuries. The experiment also set out to identify the possible effect (on bodily injury determination) of exposure to mental health parity arguments.

Subjects were randomly assigned to one of two groups. The control group was simply told: “Sometimes courts have to determine what injuries constitute ‘bodily’ injury. For each of the following injuries, please determine whether the injury constitutes a bodily injury.” Ten injuries, which vary in their severity, were presented for rating: Broken Leg, Broken Ribs, Concussion, Sprained Wrist, Scratch on Forearm, Torn Lung Tissue, Memory Loss, Post-Traumatic Stress Disorder, Recurring Headaches, and Depression. Subjects were asked to rate each injury on a 1–5 scale as follows: 1 = This injury is definitely not bodily injury; 2 = This injury is probably not bodily injury; 3 = This injury might be bodily injury; 4 = This injury is probably bodily injury; and 5 = This injury is definitely bodily injury.

Before rating the ten injuries, the treatment group was presented with the following paragraph: “Since the 1990s, many have argued for ‘mental health parity’—treating mental illness in the same way that we treat physical illness. For instance, in 1996 the director of the National Institute of Mental Health testified to Congress that: ‘I can state without reservation that research shows no biomedical justification for differentiating serious mental illness from other serious and potentially chronic disorders of the nervous system such as stroke, brain tumor, or paralysis. There is absolutely no biomedical justification for policies that judge mental disorders as being in any way less real or less deserving of treatment . . . .’”<sup>158</sup>

To gain additional purchase on how subjects conceptualize bodily injury, all subjects were asked after the rating exercise to provide their own definition of bodily injury: “Now, in your

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157. Shen, *supra* note 4, at 345.

158. *Hearings*, *supra* note 107.

own words, how would you describe or define the term ‘bodily injury?’” Subjects were required to provide an answer of at least fifty characters.

### 1. Experimental Subjects

To carry out both Experiment One and Experiment Two, I utilized a web-based experimental platform, Qualtrics, to host the experiment.<sup>159</sup> Research using Qualtrics-based experiments has been published and presented in a number of academic fields, suggesting that it meets scholarly expectations for quality online web-based experiments.<sup>160</sup>

All subjects were recruited via modest payments made available through Amazon’s Mechanical Turk payment service. No personally identifying information was collected. Studies assessing the quality of Turk subjects have found them to be engaged in the online experimental stimuli and to be significantly more representative than the convenience samples that would otherwise be used.<sup>161</sup> While certainly not the gold standard of a truly nationally representative (but prohibitively costly) sample, Mechanical Turk nonetheless provides high-quality, low-cost subjects.<sup>162</sup> As discussed in more detail in Appendix C, filtering questions were used to ensure that subjects were carefully reading through the experiment.

The total number of subjects was 180 for Experiment One and 425 for Experiment Two. This number provided enough

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159. Researchers in psychology have increasingly turned to web-based experiments because they offer a “large number of participants” and “high statistical power.” Ulf-Dietrich Reips, *Standards for Internet-Based Experimenting*, 49 *EXPERIMENTAL PSYCHOL.* 243, 244 (2002) (quoting Jochen Musch & Ulf-Dietrich Reips, *A Brief History of Web Experimenting*, in *PSYCHOLOGICAL EXPERIMENTS ON THE INTERNET* 61, 70 (Michael H. Birnbaum ed., 2000)).

160. Studies relying on Qualtrics experiments include Jonathan S. Abramowitz et al., *Obsessive-Compulsive Symptoms: The Contribution of Obsessional Beliefs and Experiential Avoidance*, 23 *J. ANXIETY DISORDERS* 160 (2009); Yany Grégoire et al., *When Customer Love Turns into Lasting Hate: The Effects of Relationship Strength and Time on Customer Revenge and Avoidance*, 73 *J. MARKETING* (2009); Paul H. Robinson et al., *The Disutility of Injustice*, 85 *N.Y.U. L. REV.* 1940 (2010).

161. Berinsky et al., *supra* note 134, at 366; Michael Buhrmester et al., *Amazon’s Mechanical Turk: A New Source of Inexpensive, yet High-Quality, Data?*, 6 *PERSP. PSYCHOL. SCI.* 3, 4 (2011); John J. Horton et al., *The Online Laboratory: Conducting Experiments in a Real Labor Market*, 14 *EXPERIMENTAL ECON.* 399, 402 (2011).

162. In order to better approximate a jury-eligible subject pool, I took the additional step of filtering out, via an initial screening question, subjects who indicated that they had been convicted of a felony.



statistical power in each experiment to test the Article's central hypotheses. At the end of each experiment, I collected demographic information from each of the subjects (summarized in Table 1). While not a truly nationally representative sample, the 605 subjects who participated in the experiments came from forty-eight states and the District of Columbia.<sup>163</sup> My sample was skewed in terms of gender, with 64% subjects female and only 36% male. My sample was 81% white, higher than the national average. In terms of education, my subjects are skewed toward having more education, but in terms of income, my subjects reported less income than the population distribution as a whole.<sup>164</sup> Taken as a whole, it can be said that while not nationally representative, the sample is surely more demographically diverse than traditional psychology experiments relying solely on college students.<sup>165</sup>

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163. Only Alaska and Idaho, which collectively make up less than 1% of the nation's population, were not represented in the pool of subjects.

164. It should be noted that the Census estimates do not take into account the most recent economic downturns, which may account for some of the discrepancy.

165. The issue is discussed in Francis X. Shen, et al., *Sorting Guilty Minds*, 86 N.Y.U. L. REV. 1306, 1324–26 (2011). Over-reliance on undergraduates has generated the term “science of the sophomore” and led to long-standing debates over the validity of studies relying solely on students. See, e.g., Michael E. Gordon et al., *The “Science of the Sophomore” Revisited: From Conjecture to Empiricism*, 11 ACAD. MGMT. REV. 191 (1986). For one critique of the representativeness of experimental samples in the social sciences, see Steven Levitt & John A. List, *What Do Laboratory Experiments Measuring Social Preferences Reveal About the Real World?*, 21 J. ECON. PERSP. 153, 154 (2007) (suggesting that “great caution is required when attempting to generalize lab results out of sample”). For reviews of the literature, see generally Jerald Greenberg, *The College Sophomore as Guinea Pig: Setting the Record Straight*, 12 ACAD. MGMT. REV. 157 (1987) (recognizing value in the role of college students in experimental research); Marc Hooghe et al., *Why Can't a Student Be More Like an Average Person?: Sampling and Attrition Effects in Social Science Field and Laboratory Experiments*, 628 ANNALS AM. ACAD. POL. & SOC. SCI. 85 (2010) (discussing the limitations of experimental samples that only include students); Robert A. Peterson, *On the Use of College Students in Social Science Research: Insights from a Second-Order Meta-Analysis*, 28 J. CONSUMER RES. 450 (2001) (emphasizing the importance of including non-student samples before attempting to generalize experimental results). The discussion stretches back over half a century. See, e.g., Maurice L. Farber, *The College Student as Laboratory Animal*, 7 AM. PSYCHOLOGIST 102 (1952).

<b>Education</b>	<b>Subjects</b>	<b>U.S. Census</b>
Less than HS	2%	18%
High school / GED	11%	30%
Some college	29%	20%
Assoc. degree	10%	7%
Bachelor's	34%	17%
Graduate Degree	14%	10%
<b>Income</b>	<b>Subjects</b>	<b>U.S. Census</b>
< \$20,000	30%	\$1-\$24,999: 22%
\$20,000-\$40,000	31%	\$25,000-\$34,999: 19%
\$40,000-\$60,000	21%	\$35,000-\$49,999: 21%
\$60,000-\$80,000	10%	\$50,000-\$64,999: 14%
\$80,000-\$100,000	2%	\$65,000-\$74,999: 6%
> \$100,000	6%	\$75,000-\$99,999: 8%
<b>Gender</b>	<b>Subjects</b>	<b>U.S. Census</b>
Male	38%	49%
Female	62%	51%
<b>Race</b>	<b>Subjects</b>	<b>U.S. Census</b>
White	81%	74%
Non-White	19%	26%

### C. RESULTS OF COMMON UNDERSTANDING EXPERIMENT

The results of Experiment One—both subjects' rating of bodily injury and the definitions they provided in their own words—suggest that there is tremendous variation in whether mental injuries are considered by lay people as “bodily.” The results are presented graphically in Figures 2.1 and 2.2, and summarized in Table 2.

#### 1. Baseline Variation in Bodily Injury Rating

We can begin with the most straightforward data point: how do subjects determine bodily injury when you ask them (absent any other information) to do so? The answer to this question, presented in Figure 2.1, is revealing. If all subjects held a common, clear understanding of bodily injury, then we

would expect to see solid black bars (definitely bodily injury) and solid light gray bars (definitely *not* bodily injury). If, however, there is more uncertainty in bodily injury determinations, then we should see more of the middle gray colors for the intermediate categories.

Even a quick glance at Figure 2.1 reveals that—with the notable and important exceptions of injuries such as a broken leg, broken rib, and concussion—we see much more uncertainty about bodily injury than would be expected in a world of complete common understanding. For instance, the number of subjects who chose the “Maybe” option was as follows: one out of five for torn lung tissue and depression; one out of four for PTSD; one out of three for memory loss; and nearly one out of two for recurring headaches.

That said, there is also a clear clustering pattern, most evident in Figure 2.2. Four injuries—depression, PTSD, memory loss, and recurring headaches—are bunched to the left and receive the lowest bodily injury ratings. Two injuries—torn lung tissue and scratch on the forearm—are in the middle. Four injuries—sprained wrist, concussion, broken ribs, and broken leg—are clustered to the right, and receive the highest bodily injury ratings. In this sense, then, one might infer some common understanding of relative “bodily-ness.” But two points are warranted. First, the variation around these averages is significant, suggesting that there is sizeable disagreement masked by the group averages. Second, and more important, even the group clustered toward the left is *not* clustered near the *definitely not* bodily injury pole.

In other words, there seems to be an inclusion-consensus: some injuries (e.g., broken bones) are definitely bodily injury. But there is no clear exclusion-consensus: subjects cannot readily determine what injuries are definitely *not* bodily injury.

## 2. Introduction of Mental Health Parity Arguments

Experiment One also examined the effect of exposure to a mental health parity argument (as made by Dr. Steven Hyman in congressional testimony in 1996).<sup>166</sup> The results—presented graphically in Figure 2.2, summarized in Table 2, and explored more in depth in Appendix C—suggest that reading about mental health parity had only a small effect on bodily injury determinations. After controlling for subject demographic character-

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166. See *Hearings*, *supra* note 107.

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istics,<sup>167</sup> the introduction of the brain information only had a significant effect on the sprained-wrist, lung-tissue, and recurring-headaches injuries.

### 3. Bodily Injury in Subjects' Own Words

Each of the 180 subjects in Experiment One provided, in their own words, a definition of "bodily injury." Here I examine only those responses from the control group—subjects who were given no information about mental health parity or brain-based explanations of mental disease. Analysis of these responses reveals that—even at baseline—subjects vary in the degree to which they include mental injuries.

Many respondents supplied definitions of bodily injury that excluded mental injuries. For example:

- "[I]njury to the physical self whether it be the muscles, bones or joints."
- "Any sort of bone, muscle, or tissue damage would normally be counted as a bodily injury."
- "An injury to one's physical body, not one's mental faculties."
- "Any physical injury that is a result from some kind of accident or collision."
- "Bodily injury would be any physical damage done to a person or any injury resulting from a physical assault."

But many other subjects explicitly mentioned psychological or mental harms. For example:

- "Any injury that leaves either physical or psychological trauma and can be observed by a medical professional."
- "I believe bodily injury to be defined as a physical or mental injury to a person which causes impairment."
- "Bodily injury is harm caused by some event or series of events. The harm is typically physical, but could also include psychological damage or microscopic damage to bodily organs such as lungs, heart, or brain. Injury means damage, breakage, or impairment which causes the recipient to function in a more negative way."
- "Bodily injury to me is any kind of trauma or injury that affects a person's life functions of any organ or body part including the brain and causes pain, distress or impaired ability to live and function in the same way that was possible before the trauma occurred."
- "Injury which impairs day-to-day functioning, primarily in a physical sense, but also may include injuries to the brain or to mental capacities and/or functioning. PTSD is as great (if not greater) a disruption to a person's normal functioning abilities as broken bones or other, more strictly 'physical' injuries might be."

In addition to confusion over the inclusion of mental

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167. See *supra* Table 1.

harms, subjects were at odds about whether there was an implicit requirement of severity. One subject raised the implicit issue of injury severity:

Bodily injury to me is something more major than a scratch on the [arm or recurring headaches. . . . Bodily injury in my opinions are broken bones, fractures, sprains in the neck, brain damage, slipped discs, . . . Bodily injury is more than a sprained wrist or ankle, to me that is just not severe enough to be called bodily injury.

Another subject honed in on severity in a different way: “Harm to one’s physical body that is measurable by a doctor, requires medication or therapy to heal and does not heal completely within 30 days.” The 30-days requirement reads into the term bodily injury an implicit requirement of substantial or long-lasting injury.

For other subjects, however, bodily injury implied no a priori requirement of magnitude. As one subject wrote, “Bodily injury can cover a very wide variety of magnitudes from a sprain or bruise or some other relatively temporary injury up to paralysis or death; therefore there is a definite need to consider the magnitude of the bodily injury when using the term.” And another wrote that “even minor issues like scratches or cuts could count too.” In short, there were many different opinions about whether bodily injury should be taken at face value, or whether it really should be understood as implying a *sufficiently bad* bodily injury.<sup>168</sup>

Also telling was subjects’ emphasis on documentation and measurement. One subject wrote that bodily injury is “an injury to your physical body that can be diagnosed with a clinical test (x-ray, blood test). I wouldn’t count any mental health issues because I don’t think there is an accurate clinical test [for] diagnosis.” Another emphasized visibility: “You must be able to see the visible mark or sign of injury for it to be considered to be bodily. A headache would not be considered a bodily injury

168. Judges too have argued about this issue. In an Indiana case, where the issue was whether the victim experienced a bodily injury, one judge equated physical pain with bodily injury. *Lewis v. State*, 898 N.E.2d 429, 434–35 (Ind. Ct. App. 2008), *trans. denied*, 915 N.E.2d 986 (2009). But another judge wrote a concurring opinion to “respectfully disagree . . . to the extent [the majority opinion] suggests that any degree of pain, no matter how slight, is sufficient to constitute an ‘impairment of physical condition’ and therefore constitute ‘bodily injury’ for purposes of Indiana Code Section 35–41–1–4. I believe that something more than the mere sensation of pain is required; to hold otherwise is to read ‘impairment’ out of the statute.” *Id.* at 436 (Crone, J., concurring); *see also* *Bailey v. State*, 961 N.E.2d 1047 (Ind. Ct. App. 2012), for discussion of the severity issue.

because it is not able to [be seen].” Another subject went even further and said that bodily injury is “something that can physically be seen by the human eye.”<sup>169</sup>

Finally, one subject actually speculated in his/her answer that his/her conception of bodily injury might be at odds with the law: “Harm to a person that causes injury, be it physical, mental, or emotional. This does not agree with current law, I think.” It is not possible to know from the data presently collected how widespread this disconnect is, but it is ripe for further investigation.

This brief review of the definitions provided by subjects suggests that confusion arises from at least three questions: (1) does bodily injury include mental injury? (2) is there an implicit severity requirement for bodily injury? and (3) must the injury be “visible”?<sup>170</sup> Subjects answer these questions in different ways, leading to a lack of common understanding of the term.

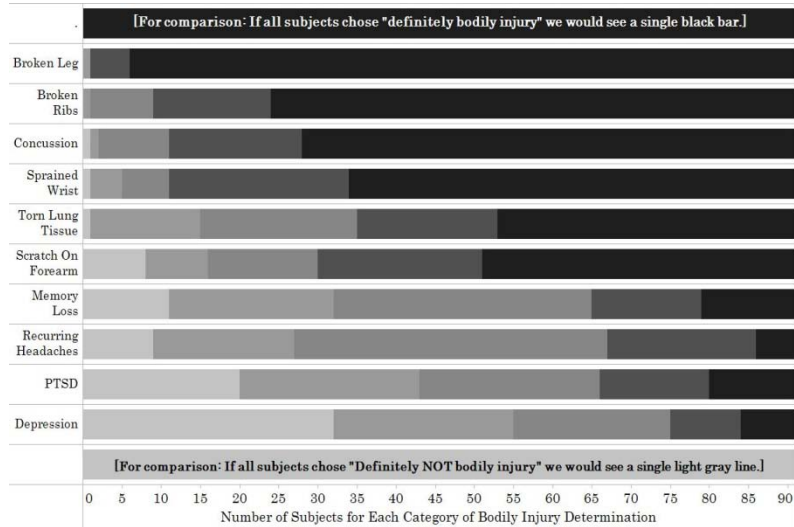
I have suggested that the confusion is driven in large part by the “bodily” part of bodily injury, but it’s also plausible that the confusion is being generated in part by the word “injury.” For instance, is depression an injury, disorder, disease, condition, some combination of these, or something else altogether? And is a scratch a minor injury, a harm, just a *de minimus* change, or something else? My experiments, which did not randomly assign subjects to these different variants (e.g., bodily disorder, bodily condition, and the like) cannot speak directly to the question. But surely the language matters, and future research would do well to consider its effects.

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169. Because so many subjects emphasized visibility and measurement, it raises the interesting possibility of how they would react to new technology (e.g. fMRI) that—at least theoretically—might measure and make “visible” the brain’s functioning.

170. In many ways, subjects are echoing the concerns that William Prosser raised in his classic article on mental suffering in tort law: “There are in reality two problems: to distinguish true claims from false ones, and to distinguish the trifling insult or annoyance from the serious wrong.” William L. Prosser, *Intentional Infliction of Mental Suffering: A New Tort*, 37 MICH. L. REV. 874, 877 (1939).

**Figure 2.1**  
**At Baseline: Number of Subjects Determining Whether a Selected Injury Is: Definitely Not; Probably Not; Maybe; Probably; or Definitely Not “Bodily Injury”**

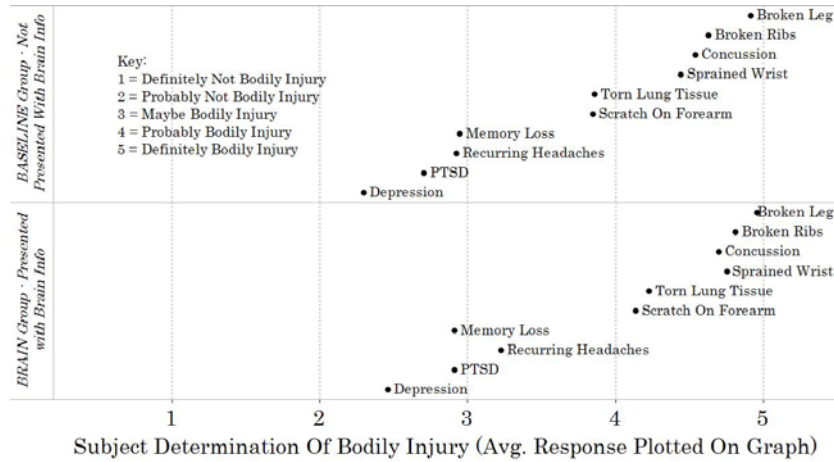


**Category**

- Definitely Is Bodily Injury
- Probably Is Bodily Injury
- Maybe Is Bodily Injury
- Probably Is Not Bodily Injury
- Definitely Is Not Bodily Injury

*What to Notice in Figure 2.1:* If subjects fully shared a clear and common understanding of the term, we should expect to see a series of nearly all black, or all very light gray bars (because all subjects are definitely sure whether each injury is bodily or not). But this is not what the data show. With the exception of broken legs, broken ribs, concussions, and sprained wrists, there is considerable uncertainty in the bodily injury determination. This is seen in: (1) the size of the medium gray line (representing the “Maybe” bodily injury choice), (2) subjects’ hesitation to label the mental injuries as *definitely* not bodily injury, and (3) the extent to which many subjects—even without any prompting about brain-based understanding of mental illness—identified PTSD as probably or definitely bodily injury.

**Figure 2.2**  
**Subject Determination of Bodily Injury, Average Response by Injury and by Presentation of Brain-Based Explanation for Mental Illness**



*What to Notice in Figure 2.2:* In Experiment One, half of the subjects were randomly assigned to read a short paragraph explaining mental illness as a brain-based disease. This Figure illustrates the differences in bodily injury rating between the “Baseline” group (who received no additional information) and the “Brain” group (who read about mental health parity). It should be noticed that the injuries group into roughly three categories: (1) injuries that are clearly bodily injury: broken leg, broken rib, concussion, and sprained wrist; (2) injuries that are probably bodily injury: torn lung tissue and scratch on forearm; and (3) injuries that may be bodily injury: recurring headaches, PTSD, memory loss, and depression (to a lesser degree). Introduction of the brain information in this context has only limited effect on the bodily injury determination.



**Table 2**  
**Percentage of Subjects in Experiment One Determining Whether a Selected Injury Is: Definitely Not, Probably Not, Maybe, Probably, or Definitely Bodily Injury**

<i>Baseline: Subjects Simply Asked to Determine Bodily Injury (N = 91)</i>					
	Definitely NOT	Probably NOT	MAYBE	Probably IS	Definitely IS
Broken Leg	0%	1%	0%	5%	93%
Broken Ribs	0%	1%	9%	16%	74%
Concussion	1%	1%	10%	19%	69%
Sprained Wrist	1%	4%	7%	25%	63%
Scratch On Forearm	9%	9%	15%	23%	44%
Torn Lung Tissue	1%	15%	22%	20%	42%
Memory Loss	12%	23%	36%	15%	13%
PTSD	22%	25%	25%	15%	12%
Recurring Headaches	10%	20%	44%	21%	5%
Depression	35%	25%	22%	10%	8%
<i>Before Determining Bodily Injury, Subjects Presented with Short Paragraph of Congressional Testimony on Mental Health Parity (N = 89)</i>					
	Definitely NOT	Probably NOT	MAYBE	Probably IS	Definitely IS
Broken Leg	0%	0%	0%	4%	93%
Broken Ribs	0%	0%	2%	14%	81%
Concussion	0%	1%	5%	15%	76%
Sprained Wrist	0%	1%	4%	12%	80%
Scratch On Forearm	7%	8%	10%	15%	58%
Torn Lung Tissue	1%	5%	19%	18%	55%
Memory Loss	15%	13%	42%	20%	8%
PTSD	20%	20%	24%	18%	16%
Recurring Headaches	9%	12%	40%	23%	14%
Depression	27%	27%	23%	10%	10%

*Notes:* Confirming the visual presentation in Figure 2.1 and Figure 2.2, this table shows that subjects—even in the baseline condition—are ambivalent about determining bodily injury for injuries such as memory loss, PTSD, recurring headaches, and depression. While there is clear consensus that injuries such as broken legs, broken ribs, concussions, and sprained wrists are bodily injury, the consensus does not extend to all of the other injuries.

#### D. DESIGN OF JURY INSTRUCTIONS EXPERIMENT

Having established the baseline finding that there is variation in subject understanding of the bodily injury concept, the Jury Instructions Experiment (Experiment Two) begins to uncover how subjects make bodily injury determinations in criminal contexts. As discussed in Part I, there are many crimes for which bodily injury matters. I chose, for the initial proof of concept, two frequently occurring crimes: assault and burglary. For each crime, I created fact patterns that (save for the description of the victim's injuries) would not likely constitute bodily injury in most traditional views of the term.<sup>171</sup>

Both aggravated burglary and assault are often defined, in part, by a requirement that the defendant intend to and/or actually inflict bodily (or great bodily) harm.<sup>172</sup> Aggravated burglary requires that the “actor purposely, knowingly, or recklessly inflicts or attempts to inflict bodily injury on anyone.”<sup>173</sup> In assault and battery, the result of conduct must typically include bodily injury.<sup>174</sup> The traditional view is that this bodily injury includes hitting, even when there is no permanent wound

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171. These crimes also differ significantly in the ease of justification for criminalization of the act. As described by criminal theorist Joel Feinberg, “typical hard cases for the legislator involve conflicts between *the active interests* . . . of some persons . . . to say what they wish . . . and the *passive interests* of other persons in being unassailed . . .” The hard case selected was verbal assault, and the easy case was burglary of a house. 1 JOEL FEINBERG, *THE MORAL LIMITS OF THE CRIMINAL LAW: HARM TO OTHERS* 203–04 (1984).

172. The definition of both crimes varies, of course, by jurisdiction. See *infra* Table A2.

173. MODEL PENAL CODE § 221.1(2) (1981). Second degree burglary can also be found if it is “perpetrated in the dwelling of another at night” or with a deadly weapon. *Id.*

174. WAYNE R. LAFAVE, *Physical Harm and Apprehension Thereof*, in 2 *SUBSTANTIVE CRIMINAL LAW* 550, 553–54 (2d ed. 2003). At common law, assault was defined as attempted battery. ROLLIN M. PERKINS, *CRIMINAL LAW* 114 (2d ed. 1969). I use the term “assault and battery” since in some states assault is defined to include what other states classify as battery. See LAFAVE, *supra*, at 551 n.2.

or bruise, as well as offensive touching (such as fondling or spitting in another's face).<sup>175</sup> The Model Penal Code's approach—and the approach used in most states—limits battery to “physical” or “bodily” injury.<sup>176</sup> State criminal code definitions of simple assault provided in the Appendix make clear how prevalent the element of bodily (or physical) injury is.<sup>177</sup>

Having identified the crimes of interest, I next constructed two short fact patterns (reprinted in full in Appendix C), one for burglary and one for assault. In the burglary fact pattern, the protagonist John breaks into a private home to steal a television. Subjects were told that John knows someone is at home, and that John yells at the homeowner. Subjects were told that the homeowner has recurring nightmares about the break-in, and that she has been diagnosed with PTSD due to the event.<sup>178</sup> Subjects were also told that an expert medical witness testified during the trial that the homeowner suffered from PTSD related to the break-in. The defendant John does not contest the facts of the case, and does not challenge the intent or causation issues, but argues that he is guilty only of the lesser charge of burglary because the homeowner's injuries do not constitute “bodily injury.”

In the assault fact pattern, the protagonist John begins yelling at a fellow subway passenger, humiliating him in front of the others riding on the train. Subjects were told that since

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175. LAFAVE, *supra* note 174, at 553.

176. *Id.* LaFave notes that “this is the prevailing view in those jurisdictions with new criminal codes, as reflected in the use of such statutory terms as ‘physical injury,’ ‘bodily injury,’ ‘bodily harm,’ ‘physical harm,’ ‘force or violence upon the person,’ or, occasionally, ‘serious bodily injury.’” *Id.* A minority of these codes follow a much broader view, sometimes extending the crime to any touching or physical contact, but more often requiring that the contact be ‘offensive,’ ‘insulting or provoking,’ or done ‘in a rude, insolent, or angry manner.’” *Id.* at 553–54.

177. It is worth noting that historically even the least touching, as well as actions that do not involve body-to-body touching, often qualify as simple assault and battery. For instance, a finding of battery may result from spitting in another's face. *See* R v. Cotesworth, (1705) 87 Eng.Rep. 928 (K.B.). A finding of battery may also result from throwing a cup of urine in another's face. *See* *People v. Pinholster*, 1 Cal. 4th 865, 961 (1992).

178. I am not aware of research specifically on the development of PTSD after such home burglaries. Stress disorder has been found to be produced by bank robberies and armed robberies. *See* Maj Hansen & Ask Elklit, *Predictors of Acute Stress Disorder in Response to Bank Robbery*, 2 EUR. J. PSYCHOTRAUMATOLOGY 5864 (2011); André Marchand et al., *A Randomized Controlled Trial of an Adapted Form of Individual Critical Incident Stress Debriefing for Victims of an Armed Robbery*, 6 BRIEF TREATMENT & CRISIS INTERVENTION 122 (2006).

the incident, the victim has had recurring nightmares and traumatic memories about the experience. The victim now finds it difficult to ride the subway because of these bad memories. Once again, John does not contest the facts, and does not raise intent or causation issues, but argues solely that he cannot be found guilty of assault because the victim experienced no “bodily injury.”

Both scenarios were highly stylized, and facts stipulated, so as to remove the intent element, eliminate the causation issue, and focus squarely on whether the victim’s harm constitutes bodily injury. Future research can, of course, address these additional issues. But in the first instance, it is important to establish a baseline with these basic fact patterns.<sup>179</sup>

Table 3 lists the three different prosecution arguments, and five types of jury instructions, that I employ in this experiment. The 3 x 5 design gives me fifteen unique variations of each crime scenario. Subjects were randomly assigned to one of the fifteen versions of each scenario. After reading through the crime scenario, subjects were prompted to determine whether the crime victim experienced bodily injury or not. Presentation of the burglary and assault cases was counter-balanced to account for ordering effects.

Because courts have routinely asserted (without empirical validation) that common understanding of the term “bodily injury” is clear,<sup>180</sup> I explicitly asked subjects, “On a scale from 0–9—with 0 being not well understood and very confusing, and 9 being very well understood and not at all confusing—how well did you understand the term ‘bodily injury’?”

For a given subject, the prosecution argument and jury instructions in the assault scenario were identical to the burglary scenario. For example, a subject who was in the baseline condition for burglary (i.e., no prosecution mention of the brain, and no bodily injury definition provided in the jury instructions) was also in the baseline condition for the assault scenario.

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179. As discussed in Part IV, future experiments can begin to unpack the intent element as it relates to different conceptions of bodily injury. In California’s penal code, for instance, the introduction of the infliction of the great bodily harm aggravator brought with it a debate over what type of intent—general or specific—was required. See Michael M. Blazina, “*With the Intent to Inflict Such Injury*”: *The Courts and the Legislature Create Confusion in California Penal Code Section 12022.7*, 28 SAN DIEGO L. REV. 963 (1991).

180. See, e.g., *United States v. Johnson*, 637 F.2d 1224, 1246 (9th Cir. 1980) (claiming that “bodily injury” is amenable to a “common sense” understanding).

**Table 3**  
**Illustration: Constructing Fifteen Unique Burglary Scenarios from a Common Fact Pattern**

All Subjects Were Provided with the Basic Fact Pattern for Burglary Scenario:	Subjects Were Randomly Assigned to One of Three Types of Prosecution Argument:	Subjects Were Also Randomly Assigned to One of Five Definitions of Bodily Injury Provided in Jury Instruction:
<p><b>[All Subjects]</b> Defendant (John) is charged with aggravated burglary. John admits to breaking into a private home and stealing the TV, knowing that someone was in the home when he broke in. John yells at the homeowner. The homeowner later experiences recurring nightmares about the break-in and is diagnosed with Post-Traumatic Stress Disorder (PTSD) due to the event. An expert medical witness testifies during the trial that the homeowner suffered from PTSD related to the break-in.</p>	<p><b>[A]</b> (Baseline: Subjects given no information about the prosecution's argument.)</p>	<p>A1. (Baseline) No definition provided                      A2. Black's (1990) definition                      A3. Black's (Current) definition                      A4. Federal definition                      A5. Brain-inclusive federal definition</p>
	<p><b>[B]</b> The prosecution argues that the brain is a part of the body, that the homeowner's PTSD and nightmares are the result of biochemical changes in her brain cells, and therefore that she has experienced bodily injury.</p>	<p>B1. (Baseline) No definition provided                      B2. Black's (1990) definition                      B3. Black's (Current) definition                      B4. Federal definition                      B5. Brain-inclusive federal definition</p>
	<p><b>[C]</b> To support the argument (B) above, an expert witness, in support of the diagnosis of PTSD, testifies that the homeowner's brain activity was abnormal. A brain scan showing abnormal activity was admitted into evidence.</p>	<p>C1. (Baseline) No definition provided                      C2. Black's (1990) definition                      C3. Black's (Current) definition                      C4. Federal definition                      C5. Brain-inclusive federal definition</p>

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*Note:* For both the burglary and the assault crimes, I constructed fifteen (3 prosecution arguments x 5 jury instructions) unique scenarios. Full text of the scenarios is presented in Appendix C.3. Notice that each scenario uses an identical fact pattern. The only difference between treatments is the type of argument made (and evidence used) by the prosecution, and the definition of bodily injury provided to subjects in the jury instructions.

#### E. RESULTS OF JURY INSTRUCTIONS EXPERIMENT

In this sub-Part, I summarize the results of Experiment Two. Appendix C.4 provides additional discussion of the details of the statistical analysis.

##### 1. Do Jury Instructions Matter for Assessment of Bodily Injury in Burglary and Assault Contexts?

If jurors hold a robust common understanding of bodily injury, then different definitions should have only minimal impact compared to the baseline (because the instructions would simply be confirming what subjects already know). Experiment Two allows us to test the validity of such logic.

The results in the top panes of Figure 3 (burglary) and Figure 4 (assault) strongly suggest that—even without introduction of brain evidence—subject assessment of bodily injury is contingent on the way in which it is defined. To begin with, in the baseline burglary case, with no definition of bodily injury provided, fully one in five subjects still found that the victim's PTSD constituted bodily injury.

In both the burglary and the assault scenarios, subjects receiving the federal definition of bodily injury (with its more inclusive listing) were significantly more likely to find that John inflicted bodily injury. In the assault case, the numbers are striking: 28% of subjects receiving the federal definition found bodily injury, compared to only 7% of those receiving no definition. In both scenarios, Black's 1990 definition (which included the phrase "not mental, but corporeal") produced the lowest percentage of subjects finding bodily injury (only 4% in the assault case, and 11% in the burglary case).

##### 2. Do Brain-Based Definitions and Evidence Affect Juror Assessment of Bodily Injury?

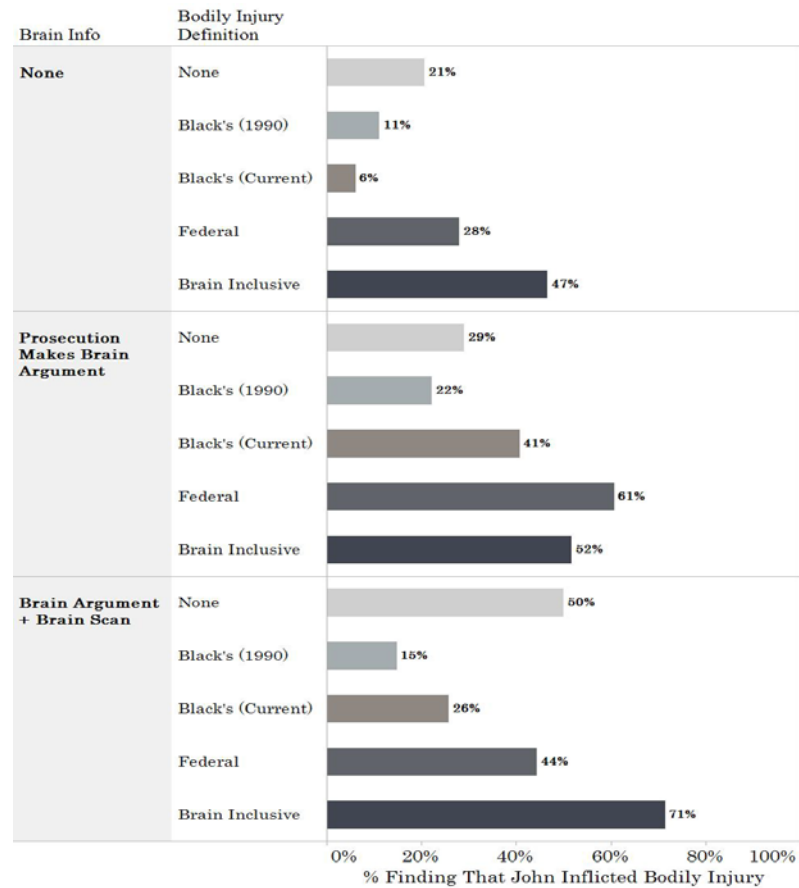
In both the burglary and assault cases, the prosecution's introduction of brain-based arguments and evidence has a sig-

nificant, positive effect on the likelihood of subjects finding that John inflicted bodily injury on the victim. Notably, even without the prosecution making mention of a brain argument, simply modifying the federal-rules definition to be brain inclusive—by adding to the itemized list “impairment of the brain’s normal functioning”—leads to a significant increase in finding of bodily injury. This is true even in the condition where no extra brain information is provided by the prosecution. Thus, even when PTSD was not described as a brain-based disease, subjects understood it as such, and placed it within the bodily injury category, when applying the modified federal definition.

When the prosecution’s brain-based arguments are added to the mix, we see the expected increase in bodily injury determinations (rising up to 71% in the burglary case, when brain evidence is presented and a brain argument is made). Importantly, though, the restrictive Black’s 1990 dictionary definition significantly constrains bodily injury findings even when brain scan evidence is presented. This suggests that subjects are quite sensitive to the instructions received, and moreover that the effect of the brain evidence cannot be divorced from the jury instructions. Of note, and deserving of further study, is the finding that when given no definition of bodily injury, but presented with brain scan evidence, fully 50% of subjects find that the verbal assault victim has experienced bodily injury. When the Black’s dictionary definitions are introduced, this plummets to 6–7%.

There are, however, some findings that are not as readily explained. For instance, in the Burglary scenario, the prosecution’s introduction of a brain scan (compared to just making the brain argument with the scan) actually *reduces* the percentage of subjects finding PTSD to be a bodily injury. By contrast, in the assault scenario, introducing the brain scan (again compared to the condition where the prosecution makes the brain-based argument, but without the scan) raises the percentage finding bodily injury from 3% to 50%. These and other anomalies suggest that, although there are discernible patterns in the data, there is also tremendous variance in subject response. Additional research is needed to better understand in what contexts bodily injury is more, or less, confusing to the lay public.

**Figure 3**  
**Burglary: Percentage of Subjects Finding that the**  
**Victim Experienced Bodily Injury**

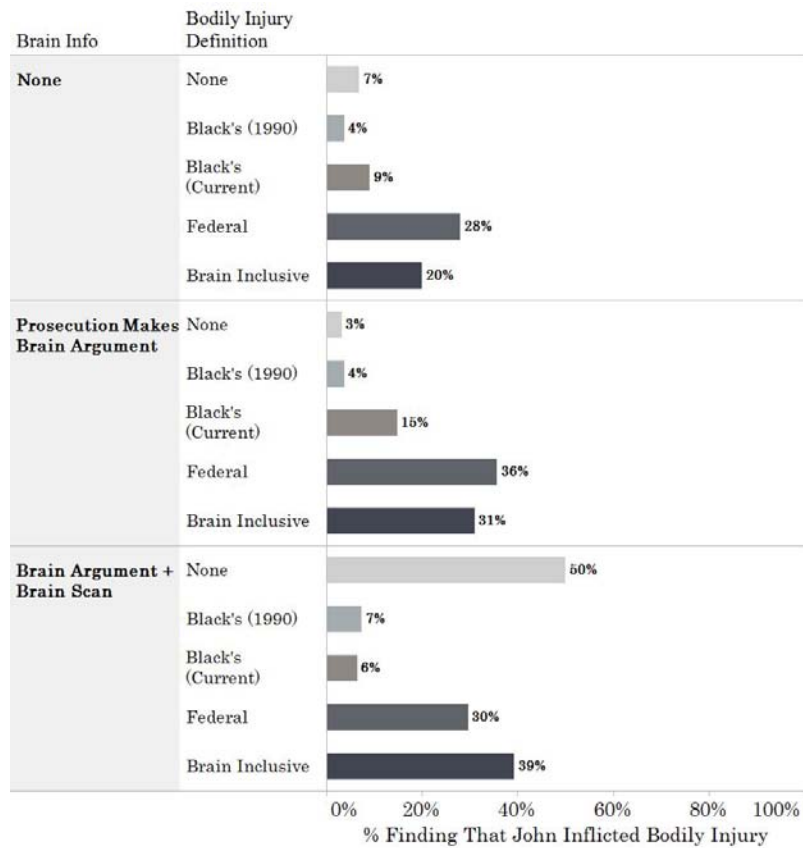


*What to notice in Figure 3:* The figure presents the percentage of subjects, in each of the 15 conditions, finding that the crime victim experienced bodily injury. The bars are shaded according to the type of bodily injury definition provided, and results are grouped according to the type of prosecution argument. The results shown in this figure suggest that: (1) even without brain-based arguments, differing definitions of bodily injury in jury instructions affect juror decisions; (2) when brain-based arguments are introduced by the prosecution, jurors are more persuaded that PTSD is a bodily injury; and (3) the combination of a brain-based argument and a (purportedly) confirming brain



scan is very successful in convincing jurors that PTSD is a bodily injury.

**Figure 4**  
**Assault: Percentage of Subjects Finding That the Victim Experienced Bodily Injury**



*What to notice in Figure 4:* The figure presents the percentage of subjects, in each of the 15 conditions, finding that the crime victim experienced bodily injury. The bars are shaded according to the type of bodily injury definition provided, and results are grouped according to the type of prosecution argument. The results shown in this figure show that: (1) even without brain-based arguments, the federal definition of bodily injury operates quite differently than the Black's Law definition; (2) in the assault context, brain-based arguments and brain scan evi-

dence affect juror outcomes, but are not as persuasive as in the burglary context.

#### IV. DISCUSSION

In first-year criminal law, law students learn that “[t]he harm is the body—the linchpin—of the crime.”<sup>181</sup> On closer examination, for many crimes against the person, it may be further said that harm in the form of *bodily injury* is the linchpin. Thus, how legislatures define, and how courts and jurors understand and apply, definitions of bodily injury affects the operation of the criminal law. The previous Part presented results about how subjects understand bodily injury. In this Part, I discuss the implications of the results for the conceptualization of crime victim harms in the criminal law.

##### A. CAUTIONS

In a separate empirical assessment of key provisions in the Model Penal Code, my co-authors and I wrote that “we must suggest caution” for the MPC study was “but one set of experiments in a young—indeed almost non-existent—empirical literature. Future studies may point in different and unanticipated directions.”<sup>182</sup> The same caution must be made at the outset here. The results just presented are from only two experiments, with highly stylized fact patterns, and additional work is certainly required to better understand what actual juror assessments would look like in different contexts.

As discussed in Part III, the scenarios utilized in Experiment Two are intended to serve as a proof of concept. To this end, the results clearly suggest that additional experiments are worthwhile to pursue.<sup>183</sup> These additional experiments can more carefully address the complicated issues of intent of the accused, and causation between the actions of the accused and the mental/brain harm caused to the alleged victim.

Future work should include scenarios with a more robust defense. Prosecutors must prove every element of the offense beyond a reasonable doubt, and thus the burden of persuasion is high. It remains to be seen whether the prosecution, even when using a brain-based argument, can successfully persuade

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181. JOSHUA DRESSLER, UNDERSTANDING CRIMINAL LAW 112 (6th ed. 2012).

182. Shen, *supra* note 165, at 1344.

183. See *supra* Part III.E.2.

subjects in the face of defense challenges on the grounds of intent, causation, or scientific validity (e.g., through the testimony of a competing expert or cross-examination of the prosecution expert). Perhaps with these procedural safeguards in place, subjects will not be so moved by the brain evidence.

Additional crime scenarios should also be considered. Varying the criminal charges, the extent of trauma experienced by the victim, and the extent of the defendant's violence toward the victim may all affect juror outcomes. One set of scenarios will explore the lower bounds of "bodily" injury for subjects. For instance, would a mere scratch constitute "bodily injury"? There are also a host of related conceptual questions to work out. For instance, is the definition of bodily injury embedded in the criminal code an objective standard (requiring us to ask whether the reasonable person views PTSD as a bodily injury), or a subjective standard (requiring us instead to ask whether the defendant viewed PTSD as a bodily injury)? Additional studies are required to answer such questions.

## B. IMPLICATIONS

The caveats just discussed notwithstanding, the results of this study suggest that rather than sharing a common understanding of bodily injury, ordinary people display much variety in how they understand the concept. Experiment One showed that the bodily injury classification is not straightforward for injuries such as PTSD, memory loss, and depression.<sup>184</sup> In addition, Experiment One found that lay subjects define and describe bodily injury in many different ways.<sup>185</sup>

Experiment Two showed how this variation in understanding bodily injury can play out in criminal contexts. Subjects assess bodily injury in context, based on the evidence presented and arguments made at trial, and the definition they receive in jury instructions.<sup>186</sup>

### 1. PTSD at the OK Boys Ranch

I stated earlier that there are no cases of the type I constructed in my experiments. There is, however, at least one case in which it would have made a material difference to learn

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184. See *supra* Table 2.

185. See *supra* Figure 2.1.

186. See *supra* Part III.E.

that common understanding may include PTSD as a bodily injury. The case is *State v. Van Woerden*, and I review it here.<sup>187</sup>

The OK Boys Ranch was a group home for boys that closed in the late 1990s after allegations of sexual and physical abuse.<sup>188</sup> Three defendants were charged with criminal mistreatment in the second degree, and the State's "theory was that, as a result of the defendants' failure to protect them from abuse, 10 boys developed Post-Traumatic Stress Disorder (PTSD)."<sup>189</sup> In order to convict, the State had to prove "that PTSD constitutes either 'great bodily harm' or 'substantial bodily harm.'"<sup>190</sup> Both the trial court and the appellate court rejected this argument, and the courts' reasoning is telling.<sup>191</sup>

The State made exactly the argument that I have explored here, that "PTSD meets either definition because it is either a bodily injury, i.e., an illness, or a physical condition that causes an impairment of the function of an organ, i.e., the brain."<sup>192</sup> Specifically, the State argued that PTSD affects "way the brain tells the body to react physically to various stimuli[.]"<sup>193</sup> The State, much like the scenario presented in the experiment, had an expert testify to the following:

Although generally understood as a psychological disorder, PTSD also may be viewed from a biologic perspective. There is now accumulating evidence to suggest that severe psychological trauma can cause alterations in the organism's neurobiologic response to stress even years after the original insult." PTSD alters brain chemistry leading to "hypervigilance, increased startle, affective lability, anxiety, dysphoria, and increased autonomic nervous system hyperreactivity."<sup>194</sup>

In assessing this argument, the Court went through many of steps discussed thus far. It recognized that "[u]ndefined statutory terms are given their usual and ordinary meaning" and looked to both Webster's and Black's Law Dictionary.<sup>195</sup> The Court was ultimately guided by rules of statutory construction and the rule of lenity to rule that bodily injury includes only physical illnesses.<sup>196</sup>

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187. *State v. Van Woerden*, 967 P.2d 14 (Wash. Ct. App. 1998).

188. *Id.* at 16.

189. *Id.*

190. *Id.*

191. *Id.*

192. *Id.* at 17.

193. *Id.* at 18.

194. *Id.* at 18-19.

195. *Id.* at 17-18.

196. *Id.* at 18.

Addressing the question of whether PTSD was an impairment of physical condition, the Court in my view strained to distinguish it in the following way:

[U]nder the statute, the State must prove that PTSD is an impairment of physical condition that causes an impairment of the functioning of the brain, not merely that PTSD impairs the functioning of the brain. Based on the evidence submitted by the State, PTSD is a psychological disorder that alters the functioning of the brain. Therefore, even though PTSD has measurable and perhaps “deleterious physiological impacts on the brain’s functioning,” it does not meet the definition of bodily injury because it is foremost the impairment of a mental, as opposed to a physical, condition.<sup>197</sup>

The logic of the Court’s reasoning here is, as best I can tell, as follows:

- (1) PTSD is a “psychological disorder.”
- (2) PTSD alters the function of the brain (in fact it may have deleterious physiological impacts)
- (3) BUT (and this is the crucial point), *because it is a “psychological disorder”* it is “foremost the impairment of a mental . . . condition.”<sup>198</sup>

If this is an accurate reading of the case, then it suggests that psychology (or “mind”) is somehow antecedent to the brain.<sup>199</sup> And this logic is antithetical to the standard cognitive neuroscience understanding that “the brain is what the mind does.”<sup>200</sup>

The Court, of course, is well within its rights to reject that neuroscientific view. And as I suggest later, drawing this dualist line in the legal sand might well be good policy. But the Court had to strain to hold that PTSD is not an impairment of physical condition, and I think it likely that such strain will only increase in the years to come as we increasingly see PTSD as a biologically-based disorder.

## 2. Much Ado About Nothing?

Two of the possible negative outcomes from an ill-defined concept of bodily injury are: (1) over-criminalization because

197. *Id.* at 19.

198. *Id.*

199. Even if the Court meant that the behavioral manifestations of PTSD affect the brain (which certainly they do, as the brain is always interacting with its environment), it would still be odd to claim that those behavioral manifestations were originating from someplace other than the mind-brain.

200. See, e.g., Weisberg et al., *supra* note 145, at 476 (“For instance, neuroscience may illustrate a connection between the mind and the brain that people implicitly believe not to exist, or not to exist in such a strong way . . .”).

defendants are made liable for inflicting, or attempting to inflict, injuries that are “bodily” but not sufficiently bad; and (2) under-criminalization because individuals who commit acts that inflict substantial, but purely mental, harm are not held liable.

But is there really need for such concern? Several counter-arguments present themselves. First, one might argue that the subset of non de minimus *purely* mental harms is negligible. This would be the case if substantial emotional or mental harm is always (or almost always) accompanied by physical harm (attempted or actual). But it is not hard to think of many typical situations in which mental harm is experienced, but not physical harm (as traditionally defined). A good example is the spousal verbal abuse example mentioned earlier. We can imagine that the spouse being repeatedly verbally abused (even if there was no touching) might experience a range of negative emotions, and depending on the facts, that the behavioral effects could be quite substantial (perhaps even substantial enough for someone to leave the relationship).<sup>201</sup> Again, this is not to say that such conduct should be criminalized; it is simply to make the point that such conduct—which causes mental but not physical injury—is not hard to imagine.

Moreover, the well-established tort of intentional infliction of emotional distress highlights many instances where an individual causes (and intends to cause) only mental anguish. The Restatement (Second) of Torts lists a number of examples, that would invite civil liability, including:

As a practical joke, A falsely tells B that her husband has been badly injured in an accident, and is in the hospital with both legs broken. B suffers severe emotional distress. A is subject to liability to B for her emotional distress. If it causes nervous shock and resulting illness, A is subject to liability to B for her illness.<sup>202</sup>

201. Of course, even if there were touching, it might fall into a category of not sufficient to produce bodily injury, but sufficient to produce mental injury. Consider the domestic case of a daughter and father in California, who according to the police report, “each touched the other in an angry manner, but without sufficient force to cause bodily injury.” Deborah Demander, *Six Face Misdemeanor Arraignments in Circuit Court*, UINTA COUNTY HERALD (Nov. 25, 2011), [http://www.uintacountyherald.com/v2\\_news\\_articles.php?heading=0&page=72&story\\_id=5085](http://www.uintacountyherald.com/v2_news_articles.php?heading=0&page=72&story_id=5085). While in that case, the facts were such that both pled guilty to a battery charge, one can imagine a case in where there are regular angry exchanges, and even though the victim knows he/she is not in physical danger, nevertheless it takes a mental toll.

202. RESTATEMENT (SECOND) OF TORTS § 46 (1977).

Should such a defendant in this situation face criminal liability as well? Again, there are reasonable arguments for and against. On one hand, if we wish to impose criminal liability (whether to deter or to express moral disapproval) on those individuals who intentionally inflict great, demonstrable harm, then we might wish to impose liability just as we would if the defendant had hit the victim on the arm.<sup>203</sup> Expanding liability in this context would be more consistent with the American Psychological Association's observation that "millions of Americans know that suffering from a mental health disorder can be as frightening and debilitating as any major physical health disorder."<sup>204</sup>

On the other hand, there are many good reasons to distinguish the two, and to avoid such expansion of the concept of bodily injury. Perhaps most importantly, such expansion of liability might lead to a slippery slope of liability for mental injuries. This has been a longstanding concern in tort law, and Prosser addressed it eloquently in his classic statement on the new tort of intentional infliction of emotional distress:

The most valid objection to the protection of "mental" interests lies in the "wide door" which might be opened, not only to fictitious and fraudulent claims, but to litigation in the field of trivialities and mere bad manners." It is easy to lie about what goes on inside the plaintiff's own head. It would be an absurd thing for the law to seek to secure universal peace of mind, and there are many interferences with it

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203. For those advocates of empirical desert, there might also be value in better aligning criminal statutes with citizen preferences (preferences that might demand more liability for purely mental harms). To be sure, there is currently an ongoing debate within criminal law scholarship about whether the principles of "justice" for the criminal defendant should be grounded in moral philosophy or (an empirical assessment of) a community's norms. See, e.g., PAUL H. ROBINSON, *DISTRIBUTIVE PRINCIPLES OF CRIMINAL LAW: WHO SHOULD BE PUNISHED HOW MUCH?* 10 (2008) (arguing that "one could adopt a distributive principle of 'desert' based upon the community's shared intuitions of justice rather than based upon philosophical notions of desert."); Paul H. Robinson, *Competing Conceptions of Modern Desert: Vengeful, Deontological, and Empirical*, 67 *CAMB. L.J.* 145, 154 (2008) (arguing that [t]he networks of interpersonal relationships in which people find themselves, the social norms and prohibitions shared among those relationships and transmitted through those social networks, and the internalised representations of those norms and moral precepts control people's conduct."); Paul H. Robinson & John M. Darley, *Intuitions of Justice: Implications for Criminal Law and Justice Policy*, 81 *S. CAL. L. REV.* 1 (2007); Paul H. Robinson, *Why Does the Criminal Law Care What the Lay Person Thinks Is Just? Coercive Versus. Normative Crime Control*, 86 *VA. L. REV.* 1838 (2000); Paul H. Robinson & John M. Darley, *The Utility of Desert*, 91 *NW. U. L. REV.* 453 (1997).

204. *Mental Health Parity and Addiction Equity Act*, AM. PSYCH. ASS'N, <http://www.apa.org/helpcenter/parity-law.aspx> (last visited Mar. 3, 2013).

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which must of necessity be left to other agencies of social control. If the plaintiff is to recover every time that her feelings are hurt, we should all be in court twice a week. . . . But this is a poor reason for denying recovery for any genuine, serious mental injury. It is the business of the law to remedy wrongs that deserve it, even at the expense of a "flood of litigation . . . ." <sup>205</sup>

While one way to address the slippery slope concern is to set the bar quite high for the severity of emotional harm required to trigger criminal liability, still concerns remain about proof and the causal connection between the defendant's actions and the crime victim. The criminal law might do well to avoid such thorny issues. <sup>206</sup>

So too can the rationale behind the existing mind-body dichotomy be clarified. Although the legal outcome (no liability) is the same, it is normatively quite different to say of a person who inflicts mental injury on another: "We're not holding this person liable because of seemingly intractable evidentiary concerns" versus "We're not holding this person liable because we don't think such mental injuries are as bad as physical injuries." <sup>207</sup> Neuroscience, as I have argued elsewhere, <sup>208</sup> can provide lawmakers with additional information but it cannot dictate policymaking. Even if the neuroscience and medical communities come to view all mental phenomena as instantiated in the brain, it does not mean that the law must follow. Law might also be flexible and choose to adopt the neuroscience view in some, but not all, contexts. For instance, the goals of tort law may demand a different definition of bodily injury than does the criminal justice system. Yet at present state statutes typically provide just one, general definition of bodily injury. <sup>209</sup>

However legislatures wish to weigh the competing policy considerations, the emerging neuroscience research and the requirements of justice, my view is that the law should, clearly and carefully, state its reasons for the bodily injury concept(s)

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205. Prosser, *supra* note 170, at 877.

206. Indeed, tort law has wrestled with this issue mightily and developed what has been called a patchwork of liability rules to handle emotional distress. Robert L. Rabin, *Emotional Distress in Tort Law: Themes of Constraint*, 44 WAKE FOREST L. REV. 1197 (2009).

207. A discussion of rationales necessarily raises a question about which behaviors we wish to deter, and how deterrence would work in the near and long term. For instance, how would we judge whether temporary mental harm would generate long term gain?

208. Francis X. Shen, *Neurolegislation and Juvenile Justice*, 59 LOY. L.A. L. REV. (forthcoming 2013).

209. See *infra* Table A2.



it adopts. I turn now the options legislatures can pursue to achieve this end.

### C. OPTIONS FOR STATUTORY REFORM

Legislatures have six primary options: (1) do nothing (which would then require potentially difficult statutory interpretation by courts); (2) explicitly *include* mental injuries within the bodily injury category (as they often already do in the case of child and elder abuse); (3) explicitly *exclude* mental injuries from the bodily injury category (as many insurance policies now do); (4) eliminate the category of “bodily” altogether and focus solely on severity of injury (as the Iowa code does); (5) develop crime-specific criteria for bodily injury (as the federal sentencing guidelines do in the case of forcible rape); or (6) eliminate the bodily injury element from particular crimes against the person to focus solely on offender behavior (as in stalking or harassment).

#### Option 1. Do Nothing (i.e., Judicial Interpretation of Current Statutes)

If legislatures choose not to address definitions of bodily injury, then the onus falls to courts’ statutory interpretation. If ordinary people label (at least certain types of) diagnosed mental trauma as bodily injury, will it and should it affect courts’ statutory interpretation of the term “bodily injury”? Such reinterpretation in the criminal context could, even without legislative action, change the scope of offenses against the person.

For the reasons I now lay out, however, such statutory interpretation is unlikely to be persuasive at least in the short run, and may even be unconstitutional in the criminal context. Judicial pronouncements on bodily injury in the criminal law frequently rely on the (asserted) common understanding that lay people have about the term. Common understanding (or “plain meaning”) requires an analysis of the author and audience of the statute in question.<sup>210</sup> The experiments just discussed provide evidence that the audience does not hold a consistent understanding of bodily injury, but rather is quite malleable in its views.<sup>211</sup>

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210. POPKIN, *supra* note 48, at 38.

211. See *infra* Table 2. A full-blown analysis of each state’s legislative history is beyond the scope of this Article, but there is at least circumstantial evidence that in other contexts (e.g., mental health law) legislators have shown a

But this malleability emerged under experimental conditions in which subjects were forced to think about the issue, and it doesn't mean that the public is regularly thinking about PTSD or anxiety as bodily injury. It certainly doesn't mean—and this is the legally relevant point—that would-be criminals (i.e., those who cause the mental injury) are on notice that such behavior is criminal. Clearly due process concerns would be implicated.<sup>212</sup>

Whether the term should be interpreted in a light most favorable to the accused (the common-law rule), or primarily in furtherance of the general purposes of the code, depends on the state. While many states have jettisoned the favorable to the accused rule,<sup>213</sup> others such as Florida still state that “[t]he provisions of this code and offenses defined by other statutes shall be strictly construed; when the language is susceptible of differing constructions, it shall be construed most favorably to the accused.”<sup>214</sup> Applying the rule of lenity would almost certainly lead courts to exclude from the bodily injury category harms such as PSTD, which have been traditionally “mental” injuries.

In those states where the general purpose of the criminal code is relevant to statutory interpretation of bodily injury, one can see at least a small possibility for justifying a broader bodily injury interpretation because states refer generally to harm (not specifically to bodily harm).<sup>215</sup> For instance, in Colorado, the criminal code “shall be construed in such manner as to promote maximum fulfillment of its general purposes, namely: . . . (c) To differentiate on reasonable grounds between serious

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clear willingness to view the brain as a part of the body. *See, e.g.*, State Alcohol, Drug Abuse, Developmental Disabilities and Mental Health Act, WIS. STAT. §§ 51.01–51.95 (2012). Thus, it might be argued that legislators do indeed intend for bodily injury to cover more expansive behavior than it presently does.

212. *See* *Smith v. Goguen*, 415 U.S. 566, 574 (1974) (“Due process requires that all ‘be informed as to what the State Commands or forbids . . . and that ‘men of common intelligence’ not be forced to guess at the meaning of the criminal law.” (citing *Lanzetta v. New Jersey*, 306 U.S. 451, 453 (1939)); *Connally v. Gen. Constr. Co.*, 269 U.S. 385, 391 (1926)).

213. Paul H. Robinson, *Criminal Law Defenses: A Systematic Analysis*, 82 COLUM. L. REV. 199, 265–66 (1982). *See, e.g.*, 11 DEL. CODE § 203 (2012) (“The general rule that a penal statute is to be strictly construed does not apply to this Criminal Code . . .”).

214. FLA. STAT. § 775.021 (2012).

215. For instance, in Arizona the criminal statutes are intended “[t]o proscribe conduct that unjustifiably and inexcusably causes or threatens substantial harm to individual or public interests.” ARIZ. REV. STAT. § 13-101(1) (2012).

and minor offenses, and prescribe penalties which are proportionate to the seriousness of offenses . . . .”<sup>216</sup> The language of the statute requires us to ask: is it reasonable to distinguish between degrees of culpability based on categorization of “bodily” and “mental” injury? Perhaps. But it’s also possible, even if not overly compelling, to argue that the distinctions should rest on severity of injury alone and not type of injury.

Thus, in the short term the path of statutory (re)interpretation is one that likely leads to exclusion of purely mental injuries. Most striking are concerns about legality, the basic principle that one cannot be criminally liable for conduct unless that conduct was defined as criminal *before* the act.<sup>217</sup> In this context, defendants are not likely to know that judges had reinterpreted statutes so that assault includes injuries to the brain, i.e., purely “mental” injuries of some sufficient degree. Even absent issues of notice, another important limitation arises if it remains unclear whether—for the specialized purpose of the criminal code—the term “bodily injury” has a specialized meaning. The classic case of *Nix v. Hedden*, in which the Supreme Court had to determine whether a “tomato” was a fruit or a vegetable, is instructive.<sup>218</sup> In *Nix* the court reasoned that because “tomato” had not received special meaning in trade or commerce, its ordinary meaning should apply.<sup>219</sup> But in the criminal context, where “bodily injury” has been used for many years in a certain way, there seems a very strong case that it has acquired a special meaning—a special meaning that need not change even if (with the advent of neuroscientific evidence) popular uses of the term change.

If this view is correct—that statutory interpretation of existing law to include mental harms within the definition of bodily injury will not be persuasive—then we are left with a situation in which courts will continue to assert a definition of bodily injury that doesn’t comport with lay understanding.<sup>220</sup> And, to the extent that the mind-body dichotomy continues to dissolve in other legal and policy contexts, the criminal law’s traditional definition will become increasingly archaic. Perhaps this is a tenable situation. But if we desire the lines of criminal liability to be more clearly demarcated, and if other areas of law contin-

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216. COL. REV. STAT. § 18-1-102(1)(c) (2012).

217. See DRESSLER, *supra* note 181, at 39.

218. *Nix v. Hedden*, 149 U.S. 304 (1893).

219. *Id.* at 306.

220. See *supra* Part III.

ue to close the mind-body gap, then it is both timely and important for legislatures to revisit this question in one of the following five ways.

Moreover, while the analysis above may hold for the short term, in the long term it's not clear that the public will continue to view mental illness and mental injuries in the same way as they do today. For instance, a non-profit organization in Maine called Fearless Nation PTSD Support ran an event in March 2012 to raise awareness of PTSD as a real, physical injury.<sup>221</sup> The founder of the nonprofit, Colleen Crary, commented that “[n]ew medical imaging makes it very clear now that PTSD severely alters the shape and function of the human brain, making it a brain injury. This presentation is created for the layperson to understand, with examples of brain changes that occur after trauma.”<sup>222</sup> In a similar vein, former Congressman Patrick Kennedy told a group of students at Syracuse University in 2012 that, “[t]he brain is part of the body last time I checked. It is not OK to marginalize people just because their illness is a part of the brain and not in any other part of the body.”<sup>223</sup> Efforts such as these—aimed at changing public attitudes about PTSD and mental illnesses—could one day take hold and lead to societal changes (and thus notice) in ordinary usage of the terms mental illness and mental injury.<sup>224</sup>

### Option 2. Explicitly **Include** Purely Mental and Emotional Injury

Legislatures that seek to include purely mental and emotional harms in the category of bodily injury can write this directly into the code. To see how this can be done, legislatures need only look at their child abuse and elder abuse statutes.

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221. John Platt, *Presentations on the Neurobiology of PTSD This Week*, PTSD NEWS (Mar. 26, 2012), <http://ptsd-news.blogspot.com/2012/03/presentations-on-neurobiology-of-ptsd.html>.

222. *Id.*

223. Alexandra Hitzler, *Kennedy Speaks on Research, Mental Health*, DAILY ORANGE, Oct. 11, 2012, <http://dailyorange.com/2012/10/kennedy-speaks-on-research-mental-health/>.

224. Of course, finding “ordinary meaning” is difficult for courts to do. See Lawrence M. Solan, *The New Textualists’ New Text*, 38 LOY. L.A. L. REV. 2027, 2053 (2005) (arguing that courts have no principled way to “actually decide just what makes ordinary meaning ordinary. The argument more resembles a food fight in a school for children with disciplinary problems than a serious argument among distinguished jurists.”).

For instance, in Florida, child abuse is defined as “[i]ntentional infliction of physical **or mental injury** upon a child.”<sup>225</sup> where mental injury is defined as “injury to the intellectual or psychological capacity of a child as evidenced by a discernible and substantial impairment in the ability of the child to function within the normal range of performance and behavior as supported by expert testimony.”<sup>226</sup>

As a bookend to these protections given to our youngest citizens, elder abuse laws typically include liability for neglect, which is said to occur when a caregiver’s fails “to endeavor to secure or maintain adequate care, services, or supervision for an individual, including food, clothing, shelter, or physical or mental health care, and creating significant risk or danger to the individual’s physical **or mental health**.”<sup>227</sup>

For society’s most vulnerable, then, the modern criminal code provides additional protections by explicitly criminalizing acts which lead to mental, as well as physical, injury. These statutes provide useful guidance for the ways in which mental injury or mental health language might be added to an expanded definition of bodily injury. So too might aspects of tort and insurance law provide useful guidance for interpreting the bodily injury concept. For instance, as discussed in the Appendix, one option is to adopt a “physical manifestation” requirement for mental injury liability.<sup>228</sup>

There are, however, good reasons not to go down these paths. Chief amongst the concerns are the evidentiary concerns and the issue of causation. The evidentiary concern is: how could a court verify, beyond a reasonable doubt, that the victim experienced a mental injury? And, relatedly, what types of injuries or harms would count for purposes of criminal liability? At present, there are no reliable biomarkers for mental disor-

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225. FLA. STAT. § 827.03(1)(b)(1) (2012) (emphasis added). Abuse also includes: “An intentional act that could reasonably be expected to result in physical or mental injury to a child; or active encouragement of any person to commit an act that results or could reasonably be expected to result in physical or mental injury to a child.” FLA. STAT. § 827.03(1)(b)(2)–(3). Definitions in other states similarly include mental abuse. See *Definitions of Child Abuse and Neglect*, U.S. DEPT OF HEALTH & HUMAN SERVS. (2011), [http://www.childwelfare.gov/systemwide/laws\\_policies/statutes/define.cfm/](http://www.childwelfare.gov/systemwide/laws_policies/statutes/define.cfm/).

226. FLA. STAT. § 827.03(1)(d) (2012).

227. This is language from Wisconsin. WIS. STAT. § 46.90 (2012) (emphasis added). Other states typically have similar language.

228. See *infra* Appendix A. A related requirement might be “visibility,” though with scientific tools that increasingly allow one to “see” the microscopic, visibility and physicality might be very similar to one another.

ders, and none will be included in the forthcoming Diagnostic and Statistical Manual of the American Psychological Association.<sup>229</sup> Thus, the court would have to evaluate the testimony of competing expert witnesses; not an easy task, especially when it's difficult and costly to identify malingering.<sup>230</sup> In addition, it's not hard to see the potential moral hazard this creates, as a non-victim could fake a mental injury much easier than faking a broken wrist.

Even if it could be established that there was an actual mental injury (however defined), the causation issue would still be difficult to resolve. In a typical physical battery, there is a fairly non-controversial causal connection between the actus reus of the perpetrator and the harm experienced by the victim. If John hits David with a baseball bat, and David's arm breaks, John's actions are not only necessary but sufficient for the onset of the injury. The picture is likely not as clear in many instances of mental injury.

### Option 3. Explicitly **Exclude** Purely Mental and Emotional Injury

For legislatures that seek to ensure that the concept of bodily injury does not expand, the results in this Article suggest that a simple and effective solution is to add a negating clause in the definition of bodily injury. The language used in the 1990 Black's Law Dictionary—"not mental, but corporeal"<sup>231</sup>—could be even further strengthened. My results suggest that such a definition might generate the common understanding that remains elusive at present. Legislatures seeking guidance for limiting language can look to private insurance contracts.<sup>232</sup>

In addition, the federal Prison Litigation Reform Act (PLRA) can be instructive.<sup>233</sup> The PLRA requires that in order to recover damages, a plaintiff must suffer physical injury. The statute clearly states: "No Federal civil action may be brought by a prisoner confined in a jail, prison, or other correctional facility, for mental or emotional injury suffered while in custody

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229. Steven E. Hyman, *Can Neuroscience Be Integrated into the DSM-V?* 8 NATURE REVIEWS NEUROSCIENCE 725, 725 (2007).

230. See generally Mary A. Conroy & Phylissa P. Kwartner, *Malingering*, 2 APPLIED PSYCH. CRIM. JUST. 29 (2006).

231. BLACK'S LAW DICTIONARY, *supra* note 52.

232. See *infra* Appendix A.

233. 42 U.S.C. § 1997e (2006).

without a prior showing of physical injury.”<sup>234</sup> Legislatures could be equally clear about excluding purely mental and emotional injuries. Legislatures would also have the option, following case law in the civil context, to require some sort of physical “manifestation” or require a combination of mental and (traditional) physical injury in order for the element to be satisfied. Of course, such line drawing would be difficult and would still require legislatures to think carefully about the relationship between mind and brain.

#### Option 4. Focus Only on Severity, Not Type of Injury

Slicing injury into the two categories of bodily and non-bodily, and criminalizing only the former, leads to a regime in which there is no criminal sanction even for extremely bad non-bodily harms. This possibility can be avoided if the criminal code focuses solely on the severity of injury, and drops its inquiry into the type of injury.

One way to operationalize this approach is to adopt a modified version of the current Iowa statutory definition of serious injury.<sup>235</sup> The relevant Iowa statute reads:

1. “Serious injury” means any of the following:
  - a. Disabling mental illness.
  - b. Bodily injury which does any of the following:
    - (1) Creates a substantial risk of death.
    - (2) Causes serious permanent disfigurement.
    - (3) Causes protracted loss or impairment of the function of any bodily member or organ.
  - c. Any injury to a child that requires surgical repair and necessitates the administration of general anesthesia.
2. “Serious injury” includes but is not limited to skull fractures, rib fractures, and metaphyseal fractures of the long bones of children under the age of four years.<sup>236</sup>

Notable in this statutory construction is the legislature’s use of “serious injury” as an umbrella term, without the word bodily. This allows for inclusion of both “disabling mental ill-

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234. 42 U.S.C. § 1997e(e); *see also* Siglar v. Hightower, 112 F.3d 191, 193 (5th Cir.1997).

235. IOWA CODE § 702.18 (2012). A review of Iowa case law, however, suggests that prosecutors have not used this statute to impose criminal liability purely for infliction of a disabling mental illness. It is unclear why this is the case, and legislative history provides little guidance on the origins of the statute’s phrasing.

236. *Id.*

ness” and bodily injury items. This approach allows for parity in crime victim injury: criminal liability attaches when a defendant causes either sufficiently bad mental injury or sufficiently bad physical injury. Determination of sufficiently bad injuries is accomplished through the adjectives in the statute, e.g., *disabling* mental illness, *serious permanent* disfigurement, and so forth.<sup>237</sup>

The issue of severity in the context of mental injury has been the subject of debate in the context of torture. The United Nations Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment defines torture as “any act by which severe pain or suffering, whether physical or mental, is intentionally inflicted on a person for such purposes as obtaining from him or a third person information or a confession.”<sup>238</sup> The operative word is “severe”—how should it be defined? In 2002, the Department of Justice defined severe pain as that which reaches “to the level of death, organ failure, or the permanent impairment of a significant body function.”<sup>239</sup> They went on to define mental pain or suffering as “significant psychological harm of significant duration, e.g., lasting for months or even years,” and also required it to be the interrogator’s “precise objective.”<sup>240</sup> This definition has been criticized as under-inclusive.<sup>241</sup>

It is well beyond the scope of this Article to enter the debate about how to define torture, and in particular how to draw the line distinguishing really bad (but not “severe”) mental harm from that mental harm that is truly “severe.” But the torture discussion becomes more relevant when we look at state statutes defining torture.<sup>242</sup> Connecticut, for instance, finds cruelty to persons when someone “intentionally tortures, torments or cruelly or unlawfully punishes another person . . . .”<sup>243</sup>

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237. *Id.*

238. Ronald L. Nelson, *Torture in the Law of the Fifty American States: Searching for Definition*, 4 WAR CRIMES, GENOCIDE & CRIMES AGAINST HUMANITY 1, 5 (2010).

239. Memorandum from Jay S. Bybee to Alberto R. Gonzales, Counsel to the President 1 (Aug. 1, 2002), *available at* [www.washingtonpost.com/wp-srv/nation/documents/dojinterrogationmemo20020801.pdf](http://www.washingtonpost.com/wp-srv/nation/documents/dojinterrogationmemo20020801.pdf).

240. *Id.*

241. Vincent Iacopino, Scott A. Allen & Allen S. Keller, *Bad Science Used to Support Torture and Human Experimentation*, 331 SCI. 34 (2011).

242. See Nelson, *supra* note 238, at 25 (finding five states that have a statutory definition of torture).

243. CONN. GEN. STAT. § 53-20(a)(1) (2012).



There is no distinction here between mental and physical—ought we to read one into the definition? And if we do (or do not) do so here, would we do the same in the criminal context? Such questions are ripe for further investigation.

#### Option 5. Develop Crime-Specific Criteria for Bodily Injury

A fifth option is to develop crime-specific criteria for bodily injury. This is the path that the states and the federal sentencing guidelines have taken with regard to sexual assault crimes. Courts have been faced with this question: has a rape victim, whose body is functioning normally, experienced serious bodily (or physical) injury?

In an Arizona case in which a female college student was raped, the court found that the convicted assailant could *not* be charged with aggravated assault because an element of aggravated assault is “serious physical injury” and “the plain meaning of the statute does not include injuries which are solely mental or emotional.”<sup>244</sup>

Similarly, in *United States v. Rivera*, a case that ultimately led to congressional action, a twenty-four-year-old mother was carjacked and raped at gunpoint.<sup>245</sup> A question on appeal, after a sentencing enhancement, was whether the victim had experienced serious bodily injury.<sup>246</sup> A three-judge panel—reasoning that there was only evidence of “protracted . . . impairment of . . . mental faculty” and—citing the rule of lenity—found that the answer was no.<sup>247</sup> The dissent argued forcefully that this outcome could not have been intended by Congress, as it would create a sentencing enhancement for the loss of a finger, but not a rape at gunpoint.<sup>248</sup>

244. *State v. Garcia*, 673 P.2d 955, 958 (1983). Other state courts also arrived at the same conclusion in similar cases in this earlier era. *See, e.g., State v. Rossier*, 397 A.2d 110 (1978).

245. *United States v. Rivera*, 83 F.3d 542, 544 (1st Cir. 1996).

246. *Id.* The carjacking statute defines “serious bodily injury” as bodily injury that involves either: “(A) a substantial risk of death; (B) extreme physical pain; (C) protracted and obvious disfigurement; or (D) protracted loss or impairment of the function of a bodily member, organ, or mental faculty . . .” *Id.* at 547 (citing 18 U.S.C. § 1365(g)(3)).

247. *Id.* at 548 (emphasis added).

248. *See* Phillip M. Spector, *The Sentencing Rule of Lenity*, 33 U. TOL. L. REV. 511, 576–77 (2001) (detailing the unpublished dissent in *U.S. v. Rivera*).

In response to this case, Congress amended the carjacking statute to include sexual abuse and aggravated sexual abuse under the definition of bodily injury.<sup>249</sup>

This approach—in which the legislature explicitly deems a particular criminal act to cause a type of injury—could be used in other places throughout the criminal code, should a legislature wish to be more precise in determining where infliction of mental injury will be criminalized.<sup>250</sup> Indeed, there are examples of legislators doing precisely this in the context of bodily injury.

In Wisconsin in 2011, State Senator Joe Leibham proposed SB 109, the Law Enforcement Injury Bill.<sup>251</sup> The Bill would “allow suspects who, while knowingly resisting or obstructing arrest, cause an officer to suffer a soft tissue injury to be charged with a Class H felony.”<sup>252</sup> The State Senator introduced the Bill to directly amend the bodily injury definition by adding a new category in order to expand liability.<sup>253</sup>

#### Option 6. Focus Solely on Offender Conduct

Finally, legislatures can address the bodily injury definitional challenge by avoiding it altogether through construction of crimes without a bodily injury element. Although I have emphasized in this Article that many crimes against the person

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249. See Carjacking Correction Act of 1996, H.R. 3676 (1996) (amending 18 U.S.C. § 2119 (2006)).

250. If legislatures sought to attempt such precision for more than a handful of crimes, such an enumeration might lead, as has been observed in the context of judicial use of dictionaries, to infinite regress: “Requiring terms to be defined, like requiring all premises to be proven, leads to infinite regression. It replaces a short story with an infinitely long one.” A. Raymond Randolph, *Dictionaries, Plain Meaning, and Context in Statutory Interpretation*, 17 HARV. J.L. & PUB. POL’Y 71, 78 (1994).

251. WIS. LEGISLATURE, <http://docs.legis.wisconsin.gov/2011/proposals/SB109> (last visited Feb. 28, 2013).

252. *Constituent Ideas Turn into New Laws*, WEBSITE OF JOE LEIBHAM, <http://legis.wisconsin.gov/senate/leibham/PressReleases/Pages/pa-show.aspx?id=Constituent+Ideas+Turn+Into+New+Laws> (last visited Feb. 28, 2013).

253. The Senator’s websites explains:

SB 109 adds soft tissue injuries as defined as “an injury that requires medical attention to a tissue that connects, supports, or surrounds other structures and organs of the body and includes tendons, ligaments, fascia, skin, fibrous tissues, fat, synovial membranes, muscles, nerves and blood vessels” to the list of injuries that would result in the commission of a felony.

*Id.*

include an injury element, this is not always (and of course need not be) the case.

A useful example of a crime against the person that does include an injury element—bodily or otherwise—is the so called “Peeping Tom” law. The Nevada peeping law, to illustrate, states that “A person shall not knowingly enter upon the property or premises of another . . . with the intent to surreptitiously conceal himself . . . and peer, peep or spy through a window, door or other opening of a building or structure that is used as a dwelling on the property or premises.”<sup>254</sup> Written in this way, the legal inquiry focuses entirely on the offender’s actions and the law does not need to reach the question of the actual effects on the victim. Other crimes could similarly be defined without requiring evidence of infliction of an actual harm or injury.

#### D. ACCORDANCE WITH HARM THEORY

The options just enumerated include several paths by which infliction of mental injury could serve as a potential trigger for criminal liability and punishment. Given that this trigger would fundamentally expand liability, it is important to ask: is such an expansion consistent with leading criminal law theory on harm? In this sub-Part, I argue that it is.

Although criminal law theorists disagree about whether the harm must be realized in order to justify punishment, both retributivists and utilitarians agree that the criminal law is centrally concerned about harms that are intended and/or inflicted by defendants.<sup>255</sup> The basic harm principle, first laid out by John Stuart Mill in *On Liberty*, states “that the only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others.”<sup>256</sup> While Mill’s claim has been modified much over the years in the enactment of criminal statutes, the spirit of the

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254. NEV. REV. STAT. § 200.603 (2011).

255. LARRY ALEXANDER & KIMBERLY KESSLER FERZAN, *CRIME AND CULPABILITY: A THEORY OF CRIMINAL LAW* 171–96 (2009) (discussing the debate in criminal law theory over the salience of resulting harm). This Article takes no side in the debate over moral luck and resulting harm, as the present inquiry is concerned only with those acts that clearly result in a (possibly “bodily injury”) harm.

256. JOHN STUART MILL, *ON LIBERTY* 80 (David Bromwich & George Kateb eds., 2003) (1859). The harm principle has of course been analyzed and re-analyzed over the centuries, for instance in how to best regulate speech. *See, e.g., Freedom of Speech*, STAN. ENCYCLOPEDIA PHIL., <http://plato.stanford.edu/entries/freedom-speech/#JohStuMilHarPri> (last updated July 1, 2012).

harm principle still lives on.<sup>257</sup> The philosopher Joel Feinberg put forth, in a four-volume treatise, the most systematic treatment of harm in the modern criminal context.<sup>258</sup> It is thus instructive to review Feinberg's work in order to answer the question: does a mental/physical divide necessarily emerge from the harm principle?

Feinberg takes as his starting point the harm principle, and recognizes that "the harm principle must be made sufficiently precise to permit the formulation of a criterion of 'seriousness,' and also, if possible, some way of grading types of harms in terms of their seriousness."<sup>259</sup>

Feinberg's technical discussion of harms, hurts, and offenses recognizes that "[n]ot everything that we dislike or resent, and wish to avoid, is harmful to us."<sup>260</sup> In listing examples of such unpleasant, but not "harmful" experiences, Feinberg includes "unhappy mental states" such as "disappointment[] . . . hurt feelings . . . and shame."<sup>261</sup> But he also includes physical pain "at a readily tolerable level" and "bodily discomfort," amongst others.<sup>262</sup> Thus, Feinberg's principle for line drawing is in one sense not coterminous with a physical/mental divide.<sup>263</sup>

That said, Feinberg writes at times with a mental/physical distinction in mind. He recognizes that "mental pains" are

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257. For instance, in laying out their proposed culpability-based criminal code, Alexander and Ferzan note that the starting point is to determine which harmful impositions should be made criminal. The authors follow Mill and Feinberg in identifying "preventing harm to others" as the "clearest justification for state interference," and then specifically flag "fear and other emotional injuries" as a difficult harm category to assess. ALEXANDER & FERZAN, *supra* note 255, at 269–70.

258. 1 FEINBERG, *supra* note 171; 2 JOEL FEINBERG, *THE MORAL LIMITS OF THE CRIMINAL LAW: OFFENSE TO OTHERS* (1985); 3 JOEL FEINBERG, *THE MORAL LIMITS OF THE CRIMINAL LAW: HARM TO SELF* (1986); 4 JOEL FEINBERG, *THE MORAL LIMITS OF THE CRIMINAL LAW: HARMLESS WRONGDOING* (1988). Feinberg's treatment of Mill's harm principle has been described as the "most extensive and influential analysis." Frederick Schauer, *On the Relation Between Chapters One and Two of John Stuart Mill's On Liberty*, 39 *CAP. U. L. REV.* 571, 574 n.15 (2011). For a critique of Feinberg's harm principle, see R.A. Duff, *Harms and Wrongs*, 5 *BUFFALO CRIM. L. REV.* 13 (2001).

259. 1 Feinberg, *supra* note 171, at 12.

260. *Id.* at 45.

261. *Id.*

262. *Id.*

263. Feinberg goes on to distinguish between harms and offense, noting that some mental states can be "lumped together with physical pains as forms of physical discomfort," while others are best thought of as "forms of offendedness." *Id.* at 46.

“hurts” but “only by courtesy of metaphor.”<sup>264</sup> Feinberg later addresses the question head on: whether, “in applying the harm principle, we should permit coercion designed to prevent mental stress merely, when the distress is not likely to be followed by hurt or harm of any other kind?”<sup>265</sup> Feinberg’s answer is that “the hurt is serious enough if and only if it is either a symptom of a prior or concurrent harm of another order (as a pain in the arm may be the result and sign of a broken bone) or else it is in itself the cause of a consequential harm (e.g., mental breakdown) of another order.”<sup>266</sup> Notably, Feinberg’s answer emphasizes the *order* (i.e., severity) of the harm, not necessarily the type of harm. The legislative challenge is where to draw the line of seriousness, not the (non-coterminous) lines between bodily and non-bodily injury.

Feinberg later emphasizes that there are legally protected *interests*, and that we can think of criminal law as prohibiting certain types of impairments of interest. He gives, as an illustrative example, the case of a child who was kidnapped but soon rescued. Feinberg notes that we might say at that time, “‘X was found unharmed,’ the implication being that he suffered no *bodily* harm.”<sup>267</sup> We might also later say that “‘X was not harmed by the experience,’ by which it is at least implied that X has suffered no *psychological* harm.”<sup>268</sup> Feinberg goes on to note how—even in this case where no “harm” may have occurred (at least as defined a certain way)—there has been an impairment of the child’s ability to pursue his welfare interests.<sup>269</sup> For our purposes here, the important point is that the notion of “interest” is even less constrained than the categories “bodily” and “psychological.” It would seem that one could consistently adhere to Feinberg’s rule that criminal law prohibit only impairments of interest, while modifying the construction of bodily injury. Whether we in fact make this modification depends on whether and when we view purely mental injuries as significant impairments to interest. And answering that question in future years may be increasingly informed by our growing understanding of how the mind works.

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264. *Id.*

265. *Id.* at 48.

266. *Id.*

267. *Id.* at 52 (quoting John Kleinig, *Crime and the Concept of Harm*, 15 AM. PHIL. Q. 27, 32 (1978)).

268. *Id.*

269. *Id.* at 53.

## V. CONCLUSION

How “bodily injury” is defined and interpreted has important implications in a variety of criminal law contexts. Although courts routinely write that bodily injury is a concept commonly understood, this Article has been the first to empirically test that assertion. The results of the studies reported in this Article suggest three empirical conclusions.

First individuals do not hold a common understanding of whether mental injuries such as PTSD should be considered bodily. Rather than uniform responses, subjects demonstrated rich and varied understandings of the concept of bodily injury. The variation in the data does not allow it to be neatly packaged as a robust “common understanding” of the concept of bodily injury.

Second, and even without an explicit brain-based argument made by the prosecution, jury instructions (communicating different definitions of bodily injury) are effective at channeling the fluid bodily injury concept. Subjects given a definition of bodily injury that enumerates a series of injuries were significantly more likely to find PTSD as bodily injury. Exposure to the definitions found in *Black’s Law Dictionary*, by contrast, dampened the likelihood of subjects finding PTSD to be bodily.

Third, brain-based definitions and evidence of bodily injury was persuasive to subjects—but not when a restrictive definition was also provided. On one hand, when the brain-inclusive instructions were combined with the prosecution’s argument and a brain scan to support it, over 70% of subjects found that PTSD in the burglary scenario constituted bodily injury. But this percentage dropped precipitously when subjects were instructed with the restrictive *Black’s Law Dictionary* definition.

Taken together, these three findings cast new light on the current and possible future interpretation of bodily injury in criminal law. Conventional wisdom is that the bodily injury result element does not include pure “mental” injury. But society may, spurred in part by exposure to neuroscience research, increasingly recognize that “bodily” injury is not a priori more serious or more devastating than “non-bodily” injury. And if this shift occurs, the fundamental separation of mind and body in the criminal law might similarly change.

As emphasized throughout the Article, the initial proof-of-concept experiments presented here are a beginning, not an end. Additional empirical study is required to validate the findings to date, and the implications that flow from them. In par-

ticular, it is important to see whether the results hold when subjects are presented with different fact patterns, and when they receive more information about the case and the relevant science. It also remains to be seen how the issue of intent will play out in a legal world in which bodily injury increasingly is determined by employing the technology and expertise of neuroscience. It is not too early, however, for legislatures to carefully revisit and debate the role of bodily injury in determining criminal culpability and punishment.

## APPENDIX A. BODILY INJURY IN NON-CRIMINAL CONTEXTS

This Appendix provides additional discussion of bodily injury in non-criminal legal contexts. Litigation over the definition of bodily injury arises occasionally in the context of injuries resulting from car accidents, either through claims against a driver's insurance policy or claims for uninsured motorist benefits.<sup>270</sup> The plaintiffs in these cases typically assert that they have suffered mental harm as a result of being involved in or witnessing a car accident. Another context where this issue arises is real estate; for example, in Alabama the buyers of apartment complexes asserted claims of bodily injury, alleging that they suffered mental harm as a result of misrepresentations by the seller.<sup>271</sup>

Other cases involve claims on an individual's homeowners' insurance that provides coverage for bodily injury inflicted by the insured. In *Trinity Universal Insurance Co. v. Cowan*, the Texas Supreme Court heard a claim for mental distress against a photo lab clerk's insurer after the clerk publicly distributed provocative pictures of the plaintiff.<sup>272</sup> A New Jersey case involved a teacher's claim against a parent for the parent's allegedly false and misleading public statements about the teacher's competency.<sup>273</sup>

A related issue arises with regard to the 2010 BP oil spill in the Gulf of Mexico. The Louisiana health commissioner reports that there is an increase in anxiety, depression, stress, grief, substance abuse, and suicide ideation in the affected are-

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270. *E.g.*, *Haralson v. State Farm Mut. Auto. Ins. Co.*, 564 F. Supp. 2d 616, 619 (N.D. Tex. 2008); *Angel v. Metro. Prop. & Cas. Ins. Co.*, No. 2007-CA-001521-MR, 2008 WL 2468873, at \*2-3 (Ky. Ct. App. 2008); *Garvis v. Emp'rs Mut. Cas. Co.*, 497 N.W.2d 254, 256-57 (Minn. 1993); *Derousse v. State Farm Mut. Auto. Ins. Co.*, 298 S.W.3d 891, 893 (Mo. 2009) (en banc); *Tucker v. Farmers Ins. Exch.*, 215 P.3d 1, 5-6 (Mont. 2009); *Allstate Ins. Co. v. Wagner-Ellsworth*, 188 P.3d 1042, 1046 (Mont. 2008); *see Bell, supra* note 6 (illustrating the massive recent increase in insurance claims for bodily injury in the United Kingdom); M. Jane Goode, *Bodily Injury and Personal Injury*, in 1 LAW AND PRACTICE OF INSURANCE COVERAGE LITIGATION § 6:11 (2011) (explaining the evolution of the definition of the term "bodily injury" in the insurance law context).

271. *Am. States Ins. Co. v. Cooper*, 518 So. 2d 708, 708-09 (Ala. 1987). In another case, residents asserted bodily injury claims for their mental distress from their landlord's negligence in the demolition and renovation of the brownstones in which they lived. *Lavanant v. General Accident Ins. Co. of Am.*, 561 N.Y.S.2d 164, 165 (N.Y. App. Div. 1990).

272. *Trinity Universal Ins. Co. v. Cowan*, 945 S.W.2d 819, 821 (Tex. 1997).

273. *Voorhees v. Preferred Mut. Ins. Co.*, 607 A.2d 1255, 1261 (N.J. 1992).



as since the disaster.<sup>274</sup> The American Psychiatric Association has stated that BP should compensate those affected people for their mental health claims, explaining in a news release that “an entire way of life has been destroyed,” and this is causing the increase in mental health issues, including PTSD.<sup>275</sup> Nonetheless, the BP claims administrator, Kenneth Feinberg, testified to a House Judiciary Committee that mental health claims without accompanying physical injury probably will not be included in the claims that BP will pay.<sup>276</sup>

Much litigation has arisen under the Warsaw Convention, an international instrument that provides liability for the international carriage of persons, luggage, and goods.<sup>277</sup> The Supreme Court has ruled that purely emotional harm does not meet the bodily injury requirement of Article 17 of the Convention,<sup>278</sup> and the United States Court of Appeals for the Ninth Circuit held that physical manifestations of emotional harm are not sufficient to prove the bodily injury requirement under the Convention.<sup>279</sup> Although a district court found that a passenger’s PTSD should be covered, the decision was later vacated.<sup>280</sup>

Tort determinations of what counts as bodily injury often turn on whether the court first finds that the term “bodily injury” is ambiguous. The majority of courts find that the term is not ambiguous, and follow the rule of contractual interpretation that undefined terms should be interpreted according to their plain and ordinary meaning, if one is available. Ultimately, these courts conclude that mental harm does not fall within the plain and ordinary meaning of “bodily.” The courts primarily use two lines of reasoning to reach this conclusion: looking to dictionary definitions of the word “bodily,” and versions of a reasonable lay person test. For example, the Texas Supreme

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274. Sasha Chavkin, *Mental Health Claims from Oil Spill Probably Won't Be Paid*, PROPUBLICA (July 27, 2010, 10:53 AM), <http://www.propublica.org/article/mental-health-claims-from-oil-spill-probably-wont-be-paid>.

275. Rosemary Black, *Oil Spill Related Mental Health Claims: Should BP Have to Pay Up?*, N.Y. DAILY NEWS (Aug. 18, 2010, 4:00 AM), [http://articles.nydailynews.com/2010-08-18/news/27072910\\_1\\_oil-spill-health-claims-gulf-of-mexico-oil](http://articles.nydailynews.com/2010-08-18/news/27072910_1_oil-spill-health-claims-gulf-of-mexico-oil).

276. Chavkin, *supra* note 274.

277. 49 U.S.C. § 40105 hist. n. (2006); Convention for the Unification of Certain Rules Relating to International Transportation by Air, Oct. 12, 1929, 49 Stat. 3000, T.S. No. 876 (1934).

278. *E. Airlines, Inc. v. Floyd*, 499 U.S. 530, 534 (1991).

279. *Carey v. United Airlines*, 255 F.3d 1044, 1052 (9th Cir. 2001).

280. *Weaver v. Delta Airlines, Inc.*, 56 F. Supp. 2d 1190, 1192 (D. Mont. 1999), *vacated*, 211 F. Supp. 2d 1252 (D. Mont. 2002) (mem.).

Court utilized both lines of reasoning in *Trinity Universal Insurance Co. v. Cowan*.<sup>281</sup> First, the court concluded that excluding purely mental harm “comports with the commonly understood meaning of ‘bodily,’ which implies a physical, and not purely mental, emotional, or spiritual harm.”<sup>282</sup> The court further supported its conclusion with the definitions of “bodily” from both *Webster’s* (“having a body or a material form: physical, corporeal”) and *Black’s Law Dictionary* (“pertaining to or concerning the body; of or belonging to the body or the physical constitution; not mental, but corporeal”).<sup>283</sup>

A few courts, however, have held that “bodily injury” is ambiguous, and that the term can encompass mental and emotional harm. Sometimes additional language in a policy or statute allows the court to make such a finding. The Missouri Supreme Court interpreted a statute that allowed the recovery of damages from uninsured motorists for “bodily injury, sickness or disease.”<sup>284</sup> The court found this language to be ambiguous as to whether “bodily” modified only “injury” or also “sickness or disease.”<sup>285</sup> The court relied on the comma following “bodily injury” to determine that the “bodily” modified only “injury” and that the statute created three distinct categories of harm: (1) bodily injury, (2) sickness, and (3) disease.<sup>286</sup> The court looked to the dictionary definitions of “sickness” and “disease” and ultimately concluded that emotional harm alone, even without physical manifestations, was compensable under the “sickness or disease” prong.<sup>287</sup>

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281. *Trinity Universal Ins. Co. v. Cowan*, 945 S.W.2d 819, 823–24 (Tex. 1997).

282. *Id.* at 823.

283. *Id.* at 824; *see also* *Aim Ins. Co. v. Culcasi*, 229 Cal. App. 3d 209, 219 (1991) (concluding from seven dictionary definitions that “bodily” does not reasonably encompass mental harm).

284. *Derousse v. State Farm Mut. Auto. Ins. Co.*, 298 S.W.3d 891, 894 (Mo. 2009) (en banc).

285. *Id.* at 895.

286. *Id.*

287. *Id.* Other courts have made the same finding to allow coverage for mental harm. In *Morrison Assurance Co. v. North American Reinsurance Corp.*, the court analyzed a policy definition of “bodily injury” that included “sickness” and “disease.” 588 F. Supp. 1324, 1327 (N.D. Ala. 1984), *aff’d*, 760 F.2d 279 (11th Cir. 1985). The court held that bodily injury, sickness, and disease were distinct categories and that mental anguish is necessarily included in the terms “sickness” and “disease.” *Id.* Citing *Morrison*, the Alabama Supreme Court later also held that the language “sickness or disease” includes mental anguish. *Am. States Ins. Co. v. Cooper*, 518 So. 2d 708, 710 (Ala. 1987).

Other courts have introduced a reasonable person test into this analysis as well, finding that it is reasonable to conclude that “bodily injury” or “sickness” includes mental anguish.<sup>288</sup> That courts can use the same mode of analysis, some version of a reasonable/ordinary person standard, and arrive at different outcomes is further indication that the standard itself is in need of re-examination.

While few courts have found that mental harm alone is a “bodily injury,” most seem to agree that mental harm accompanied by physical manifestations can be sufficient to trigger insurance coverage.<sup>289</sup> Courts arrive at this conclusion in various ways. In some cases, courts have found that the issue of physical manifestations of mental harm creates an ambiguity in contract or statutory language regarding bodily injuries. According to these courts, while the definitions of bodily injury clearly exclude purely mental harm, it is unclear from the plain meaning of the term whether physical manifestations of mental harm should be included. For instance, physical manifestations of PTSD may include weight loss, hair loss, stomach pains, and muscle aches.<sup>290</sup> The courts then rely on a well-established rule that ambiguities must be resolved in favor of the insured party, in other words, in favor of extending coverage, to conclude that mental harm accompanied by physical manifestations can constitute “bodily injury.”<sup>291</sup>

Other courts include mental harm with physical manifestations on policy grounds, making a comparison to tort law. The Minnesota Supreme Court determined that it is appropriate to include mental harm with physical manifestations because insurance policies are “designed to protect the insured against tortious conduct” and “there is tort law recognizing infliction of emotional distress as a viable cause of action if accompanied by physical manifestations.”<sup>292</sup> Some courts have used a reasonable

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288. *Hill v. Shelter Mut. Ins. Co.*, 935 So. 2d 691, 694 (La. 2006); *Lavanant v. Gen. Accident Ins. Co. of Am.*, 561 N.Y.S.2d 164, 168 (N.Y. App. Div. 1990).

289. *E.g.*, *Admiral Ins. Co. v. Hosler*, 626 F. Supp. 2d 1105, 1114 (D. Colo. 2009); *Haralson v. State Farm Mut. Auto. Ins. Co.*, 564 F. Supp. 2d 616, 622–25 (N.D. Tex. 2008); *Garvis v. Emp’rs Mut. Cas. Co.*, 497 N.W.2d 254, 257 (Minn. 1993); *Allstate Ins. Co. v. Wagner-Ellsworth*, 188 P.3d 1042, 1051 (Mont. 2008); *Voorhees v. Preferred Mut. Ins. Co.*, 607 A.2d 1255, 1261 (N.J. 1992); *Trinh v. Allstate Ins. Co.*, 37 P.3d 1259, 1264 (Wash. Ct. App. 2002).

290. *Trinh*, 37 P.3d at 1264.

291. *Haralson*, 564 F. Supp. 2d at 625; *Wagner-Ellsworth*, 188 P.3d at 1051; *Voorhees*, 607 A.2d at 1261.

292. *Garvis*, 497 N.W.2d at 257. On the other hand, the Texas Supreme Court declined to make such a comparison to tort law when it would have af-

lay person test, finding that such a reasonable person would expect insurance coverage for bodily injury to include physically-manifested emotional harm.<sup>293</sup>

A final, useful illustration comes from asbestos litigation in the context of the comprehensive general liability (CGL) policy. Insurers first developed the CGL in the 1960s, and in it they defined bodily injury as “bodily injury, sickness or disease sustained by any person.”<sup>294</sup> In cases such as asbestos-induced abestosis, insurance coverage under CGL policies is triggered when an occurrence of the disease causes bodily injury.<sup>295</sup> The problem, which has been identified by commentators and litigated in courts, is that “the CGL policy does not define ‘bodily injury’ in a way to make clear exactly (1) what counts as such injury, i.e., what is the proper definition of the term ‘bodily injury,’ and (2) when it occurs.”<sup>296</sup>

How do courts resolve this issue? There are competing rationales to be found in the opinions. Based on public policy considerations, for example, “finding an administratively manageable interpretation, honoring the reasonable expectations of the parties, and construing the policies to promote coverage,”<sup>297</sup> some courts have ruled that the microscopic tissue damage caused by asbestos exposure constitutes bodily injury.<sup>298</sup> Similarly, although coming to a different conclusion on the facts in front of it, another court found that because the scientific evidence and contractual language were not definitive, public policy considerations should rule.<sup>299</sup>

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forded coverage for purely emotional harm. *Trinity Universal Ins. Co. v. Cowan*, 945 S.W.2d 819, 823 (Tex. 1997) (citation omitted) (“That Texas tort law allows for recovery of mental anguish damages unaccompanied by physical manifestations in some circumstances does not mean that insurance coverage for bodily injury necessarily encompasses purely emotional injuries.”); see also *Hosler*, 626 F. Supp. 2d at 1114 (“[T]ort cases are of limited value in guiding consideration of the insurance law issues in the instant case. ‘Tort law and insurance law are not coextensive’” (quoting *SL Indus. Inc. v. Am. Motorists Ins. Co.*, 607 A.2d 1266, 1275 (1992))).

293. *Voorhees*, 607 A.2d at 1261; *Trinh*, 37 P.3d at 1264.

294. James E. Scheuermann, *The Injury in Fact Theory as a Solution to the Trigger of Coverage Issue*, 24 TORT & INS. L.J. 763, 767–68 (1989).

295. *Id.*

296. *Id.* at 768.

297. *Id.* at 774 n.53.

298. See, e.g., *Ins. Co. of N. Am. v. Forty-Eight Insulations, Inc.*, 633 F.2d 1212, 1217–18 (6th Cir. 1980).

299. *Keene Corp. v. Ins. Co. of N. Am.*, 667 F.2d 1034, 1045 (D.C. Cir. 1981).

An alternative approach is that this type of microscopic tissue damage is *not* bodily injury because it does not fall under “the common ordinary meaning” of the term, where such common ordinary meaning is defined as “an injury, sickness, or disease when her sense of well-being is adversely affected or impaired.”<sup>300</sup>

In practice, courts in the asbestos context have tried to articulate a principle of severity, rather than type. In a leading case in this area, *American Home Products Corp. v. Liberty Mutual Insurance Co.*, the trial court ruled that to be covered by the policy, the plaintiff’s injuries must be “diagnosable and compensable.”<sup>301</sup>

Analyzing this body of case law on injury in fact in tort suits, attorney and philosopher James Scheuermann has argued “[t]here is no principle—metaphysical, linguistic, hermeneutical, or other—by which physical facts alone determine meanings.”<sup>302</sup> Thus, Scheuermann recognizes that there is a reasonable person standard being applied to identify those injuries that a reasonable person would find non-trivial.<sup>303</sup> The problem is that “the definition of bodily injury in terms of the counterfactual beliefs of a reasonable person . . . [is] an idea which itself is little more than an ad hoc empirical generalization.”<sup>304</sup> This Article has attempted to move beyond ad hoc generalizations in the criminal context.

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300. Scheuermann, *supra* note 294, at 774 n.56; *see, e.g.*, *Eagle-Picher Indus., Inc. v. Liberty Mut. Ins. Co.*, 682 F.2d 12, 19 (1st Cir. 1982).

301. *Am. Home Prods. Corp. v. Liberty Mut. Ins. Co.*, 565 F. Supp. 1485, 1489 (S.D.N.Y. 1983), *aff’d as modified*, 748 F.2d 760 (2d Cir. 1984). The appellate court affirmed the decision in general but rejected its interpretation of “injury in fact” to mean that an injury was diagnosable and compensable. *Id.* at 764.

302. Scheuermann, *supra* note 294, at 776. Scheuermann goes on to argue that the bodily injury definitional question “is always to be solved by an appeal to criteria of meaning such as the intentions of the parties, their reasonable expectations, course of performance, or the like.” *Id.*

303. Scheuermann argues that “the law is not concerned with trivialities and no one insures against them (i.e., trivialities such as the initial microscopic injuries to lungs that follow upon exposure to and inhalation of asbestos, but which very often do not result in asbestosis), and no one seriously believes that substantial injury in progressive disease cases occurs only upon manifestation.” *Id.* at 780.

304. *Id.* at 782.

**Table A1**  
**Selected Definitions of Bodily Injury Used in Tort  
and Insurance Law**

Source	Definition
Warsaw Convention (Convention for the Unification of Certain Rules Relating to International Transportation by Air) <sup>305</sup>	Not defined (has led to much litigation, including the U.S. Supreme Court's ruling in <i>Eastern Airlines, Inc. v. Floyd</i> , 499 U.S. 520 (1991).
Trinity Universal Insurance Company standard homeowner's insurance policy <sup>306</sup>	Bodily harm, sickness or disease. This includes required care, loss of services and death that results.
State Farm uninsured motorist policy <sup>307</sup>	Bodily injury to a person and sickness, disease or death which results from it.
Morrison Assurance Company basic liability insurance policy <sup>308</sup>	Bodily injury, sickness or disease . . . including death at anytime resulting therefrom.
American States Insurance Company Comprehensive General Liability Coverage <sup>309</sup>	Bodily injury, sickness or disease.
Shelter Mutual Insurance Company Policy <sup>310</sup>	Bodily injury to a person and sickness, disease or death which results from it.
General Accident Insurance Company multi-peril policy <sup>311</sup>	Bodily injury, sickness or disease.
Pekin Insurance Company underinsured motorist policy <sup>312</sup>	Bodily harm, sickness or disease including death that results.
Allstate auto insurance policy <sup>313</sup>	Physical harm to the body, sickness, disease, or death.
Employers Mutual Casualty Company comprehensive gen-	Bodily injury, sickness, or Disease sustained by a person.

305. Convention for the Unification of Certain Rules Relating to International Transportation by Air, *supra* note 277.

306. Trinity Universal Ins. Co. v. Cowan, 945 S.W.2d 819, 822 (Tex. 1997).

307. Deroisse v. State Farm Mut. Auto. Ins., 298 S.W.3d 891, 894 (Mo. 2009) (en banc).

308. Morrison Assurance Co. v. N. Am. Reinsurance Corp., 588 F. Supp. 1324, 1327 (N.D. Ala. 1984).

309. Am. States Ins. Co. v. Cooper, 518 So. 2d 708, 710 (Ala. 1987).

310. Hill v. Shelter Mut. Ins. Co., 935 So. 2d 691, 694 (La. 2006).

311. Lavanant v. Gen. Accident Ins. Co. of Am., 561 N.Y.S.2d 164, 167 (N.Y. App. Div. 1990).

312. Pekin Ins. Co. v. Hugh, 501 N.W.2d 508, 510 (Iowa 1993).

313. Allstate Ins. Co. v. Wagner-Ellsworth, 188 P.3d 1042, 1051 (Mont. 2008).

eral liability policy <sup>314</sup>	
Preferred Mutual Insurance Company homeowner's insurance policy <sup>315</sup>	Bodily harm, sickness or disease to a person including required care, loss of services and death resulting therefrom.
Allstate uninsured motorist policy <sup>316</sup>	Bodily injury, sickness, disease, or death.
Farmers Insurance Exchange <sup>317</sup>	Bodily injury to or sickness, disease or death of any person.

**Table A2**  
**Definitions of Bodily Injury, Serious Bodily Injury, and Assault, by State**

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
Alabama	Physical Injury. Impairment of physical condition or substantial pain. ALA. CODE § 13A-1-2(12) (2012).	Serious Physical Injury. Physical injury which creates a substantial risk of death, or which causes serious and protracted disfigurement, protracted impairment of health, or protracted loss or impairment of the function of any bodily organ. ALA. CODE § 13A-1-2(14) (2012).	(a) A person commits the crime of assault in the third degree if: (1) With intent to cause physical injury to another person, he causes physical injury to any person; or (2) He recklessly causes physical injury to another person. ALA. CODE § 13A-6-22 (2012).

314. *Garvis v. Emp'rs Mut. Cas. Co.*, 497 N.W.2d 254, 257 (Minn. 1993).  
 315. *Vorhees v. Preferred Mut. Ins. Co.*, 607 A.2d 1255, 1258 (N.J. 1992).  
 316. *Trinh v. Allstate Ins. Co.*, 37 P.3d 1259, 1261 (Wash. Ct. App. 2002).  
 317. *Tucker v. Farmers Ins. Exch.*, 215 P.3d 1, 5 (Mont. 2009).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
Alaska	<p>“[P]hysical injury” means a physical pain or an impairment of physical condition. ALASKA STAT. § 11.81.900(46) (2012).</p>	<p>“[S]erious physical injury” means (A) physical injury caused by an act performed under circumstances that create a substantial risk of death; or (B) physical injury that causes serious and protracted disfigurement, protracted impairment of health, protracted loss or impairment of the function of a body member or organ, or that unlawfully terminates a pregnancy. ALASKA STAT. § 11.81.900(56) (2012).</p>	<p>Assault in the Fourth Degree. (a) A person commits the crime of assault in the fourth degree if (1) that person recklessly causes physical injury to another person; (2) with criminal negligence that person causes physical injury to another person by means of a dangerous instrument; or (3) by words or other conduct that person recklessly places another person in fear of imminent physical injury. (b) Assault in the fourth degree is a class A misdemeanor. ALASKA</p>



State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			STAT. § 11.41.230 (2012).
Arizona	“Physical injury” means the impairment of physical condition. ARIZ. REV. STAT. § 13-105(33) (2012).	“Serious physical injury” includes physical injury that creates a reasonable risk of death, or that causes serious and permanent disfigurement, serious impairment of health or loss or protracted impairment of the function of any bodily organ or limb. ARIZ. REV. STAT. § 13-105(39) (2012).	A person commits assault by: 1. Intentionally, knowingly or recklessly causing any physical injury to another person; or 2. Intentionally placing another person in reasonable apprehension of imminent physical injury; or 3. Knowingly touching another person with the intent to injure, insult or provoke such person. ARIZ. REV.

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			STAT. § 13-1203 (2012).
Arkansas	“Physical injury” means the: (A) Impairment of physical condition; (B) Infliction of substantial pain; or (C) Infliction of bruising, swelling, or a visible mark associated with physical trauma. ARK. CODE ANN. § 5-1-102 (14) (2010).	“Serious physical injury” means physical injury that creates a substantial risk of death or that causes protracted disfigurement, protracted impairment of health, or loss or protracted impairment of the function of any bodily member or organ. ARK. CODE ANN. § 5-1-102 (21) (2010).	(a) A person commits assault in the third degree if he or she purposely creates apprehension of imminent physical injury in another person. ARK. CODE ANN. § 5-13-207 (2010). <sup>318</sup>
California	The term “bodily injury” shall include sickness or disease, including death resulting therefrom. CAL. INS. CODE § 11580.06(c) (2012).	“Serious bodily injury” means a serious impairment of physical condition, including, but not limited to, the following: loss of consciousness; concussion; bone fracture; protracted loss or impairment of function of any bodily member or organ; a wound requiring extensive suturing; and	An assault is an unlawful attempt, coupled with a present ability, to commit a violent injury on the person of another. CAL. PENAL CODE § 240 (2012).

318. ARK. CODE § 5-13-203 (2010) (“A person commits battery in the third degree if: (1) With the purpose of causing physical injury to another person, the person causes physical injury to any person; (2) The person recklessly causes physical injury to another person.”).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
		serious disfigurement. CAL. PENAL CODE § 243(f)(4) (2012).	
Colorado	“Bodily injury” means physical pain, illness, or any impairment of physical or mental condition. COLO. REV. STAT. § 18-1-901(3)(c) (2012).	“Serious bodily injury” means bodily injury which, either at the time of the actual injury or at a later time, involves a substantial risk of death, a substantial risk of serious permanent disfigurement, a substantial risk of protracted loss or impairment of the function of any part or organ of the body, or breaks, fractures, or burns of the second or third degree. COLO. REV. STAT. § 18-1-901(3)(p) (2012).	(1) A person commits the crime of assault in the third degree if: (a) The person knowingly or recklessly causes bodily injury to another person or with criminal negligence the person causes bodily injury to another person by means of a deadly weapon. COLO. REV. STAT. § 18-3-204 (2012).
Connecticut	“Physical injury” means impairment of physical condition or pain. CONN. GEN. STAT. § 53a-3(3) (2012).	“Serious physical injury” means physical injury which creates a substantial risk of death, or which causes serious disfigurement, serious impairment of health or serious loss or impairment of the function of any bodily organ. CONN. GEN. STAT. § 53a-3(4) (2012).	(a) A person is guilty of assault in the third degree when: (1) With intent to cause physical injury to another person, he causes such injury

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			to such person or to a third person; or (2) he recklessly causes serious physical injury to another person; or (3) with criminal negligence, he causes physical injury to another person by means of a deadly weapon, a dangerous instrument or an electronic defense weapon. CONN. GEN. STAT. § 53a-61 (2012).
Delaware	“Physical injury” means impairment of physical condition or substantial pain. DEL. CODE ANN. tit. 11, § 222(24) (2012).	“Serious physical injury” means physical injury which creates a substantial risk of death, or which causes serious and prolonged disfigurement, prolonged impairment of health or prolonged loss or impairment of the function of any bodily organ, or which causes the unlawful	A person is guilty of assault in the third degree when: (1) The person intentionally or recklessly causes physical injury to another person; or (2) With crimi-

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
		termination of a pregnancy without the consent of the pregnant female. DEL. CODE ANN. tit. 11, § 222(26) (2012).	nal negligence the person causes physical injury to another person by means of a deadly weapon or a dangerous instrument. DEL. CODE ANN. tit. 11, § 611 (2012).
Florida	(1) "Bodily injury" means: (a) A cut, abrasion, bruise, burn, or disfigurement; (b) Physical pain; (c) Illness; (d) Impairment of the function of a bodily member, organ, or mental faculty; or (e) Any other injury to the body, no matter how temporary. FLA. STAT. § 914.21 (2012).	"Serious bodily injury" means a physical condition that creates a substantial risk of death, serious personal disfigurement, or protracted loss or impairment of the function of any bodily member or organ. FLA. STAT. § 790.155 (2012).	(1) An "assault" is an intentional, unlawful threat by word or act to do violence to the person of another, coupled with an apparent ability to do so, and doing some act, which creates a well-founded fear in such other person that such violence is imminent. FLA. STAT. § 784.011 (2012). <sup>319</sup>

319. See also FLA. STAT. § 784.045 (2012) ("A person commits aggravated battery who, in committing battery: 1. Intentionally or knowingly causes great

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
Georgia	Not defined.	Not defined.	(a) A person commits the offense of battery when he or she intentionally causes substantial physical harm or visible bodily harm to another. (b) As used in this Code section, the term "visible bodily harm" means bodily harm capable of being perceived by a person other than the victim and may include, but is not limited to, substantially blackened eyes, substantially swollen lips or other facial or body parts, or substantial bruises to body parts.

bodily harm, permanent disability, or permanent disfigurement; or 2. Uses a deadly weapon.").

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			GA. CODE ANN. § 16-5-23.1 (2012).
Hawaii	<p>“Bodily injury” means physical pain, illness, or any impairment of physical condition. HAW. REV. STAT. § 707-700 (2012).</p>	<p>“Serious bodily injury” means bodily injury which creates a substantial risk of death or which causes serious, permanent disfigurement, or protracted loss or impairment of the function of any bodily member or organ. HAW. REV. STAT. § 707-700 (2012).</p>	<p>(1) A person commits the offense of assault in the third degree if the person: (a) Intentionally, knowingly, or recklessly causes bodily injury to another person; or (b) Negligently causes bodily injury to another person with a dangerous instrument. HAW. REV. STAT. § 707-712 (2012).</p>

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
Idaho	“Bodily injury” means any bodily injury, sickness, disease or death sustained by any person and caused by an occurrence. IDAHO CODE ANN. § 6-902 (2012).	(2) As used in this section, “great bodily injury” means a significant or substantial physical injury. IDAHO CODE ANN. § 19-2520B(2) (2012).	An assault is: (a) An unlawful attempt, coupled with apparent ability, to commit a violent injury on the person of another; or (b) An intentional, unlawful threat by word or act to do violence to the person of another, coupled with an apparent ability to do so, and doing some act which creates a well-founded fear in such other person that such violence is imminent. IDAHO CODE ANN. § 18-901 (2012).



State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
Illinois	Not defined.	§ 2.19a. “Serious physical injury” means a physical injury that creates a substantial risk of death or that causes death, serious disfigurement, protracted impairment of health, impairment of the function of any bodily organ, or plastic surgery. 510 ILL. COMP. STAT. 5 / 2.19a (2012).	(a) A person commits an assault when, without lawful authority, he or she knowingly engages in conduct which places another in reasonable apprehension of receiving a battery. 720 ILL. COMP. STAT. 5 / 12-1 (2012). <sup>320</sup>
Indiana	“Bodily injury” means any impairment of physical condition, including physical pain. IND. CODE § 35-31.5-2-29 (2012).	“Serious bodily injury” means bodily injury that creates a substantial risk of death or that causes: (1) serious permanent disfigurement; (2) unconsciousness; (3) extreme pain; (4) permanent or protracted loss or impairment of the function of a bodily member or organ; or (5) loss of a fetus. IND. CODE § 35-31.5-2-292 (2012).	(a) A person who knowingly or intentionally touches another person in a rude, insolent, or angry manner commits battery, a Class B misdemeanor. However, the offense is: (1) a Class A misdemeanor or if: (A) it

320. 720 ILL. COMP. STAT. 5 / 12-3 (2012) (“(a) A person commits battery if he or she knowingly without legal justification by any means (1) causes bodily harm to an individual or (2) makes physical contact of an insulting or provoking nature with an individual.”).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			results in bodily injury to any other person; IND. CODE § 35-42-2-1 (2012).
Iowa	Not defined.	<p>“Serious injury” means any of the following: a. Disabling mental illness. b. Bodily injury which does any of the following: (1) Creates a substantial risk of death. (2) Causes serious permanent disfigurement. (3) Causes protracted loss or impairment of the function of any bodily member or organ. c. Any injury to a child that requires surgical repair and necessitates the administration of general anesthesia. 2. “Serious injury” includes but is not limited to skull fractures, rib fractures, and metaphyseal fractures of the long bones of children under the age of four years. IOWA CODE § 702.18 (2012).</p>	<p>An assault as defined in this section is a general intent crime. A person commits an assault when, without justification, the person does any of the following: 1. Any act which is intended to cause pain or injury to, or which is intended to result in physical contact which will be insulting or offensive to another, coupled with the apparent ability to execute the act. 2. Any act</p>

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			which is intended to place another in fear of immediate physical contact which will be painful, injurious, insulting, or offensive, coupled with the apparent ability to execute the act. IOWA CODE § 708.1 (2012).
Kansas	Not defined.	(4) “[S]erious bodily injury” means an injury as described in subsection (h)(3) of section 1365 of title 18 of the United States Code. KAN. STAT. ANN. § 72-991a(g)(4) (2012). <sup>321</sup>	Assault is knowingly placing another person in reasonable apprehension of immediate bodily harm. KAN. STAT. ANN. § 21-5412 (2012).

321. See 18 U.S.C. § 1365(h)(3) (2006) (“The term ‘serious bodily injury’ means bodily injury which involves: (A) a substantial risk of death; (B) extreme physical pain; (C) protracted and obvious disfigurement; or (D) protracted loss or impairment of the function of a bodily member, organ, or mental faculty.”).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
Kentucky	<p>“Physical injury” means substantial physical pain or any impairment of physical condition. KY. REV. STAT. ANN. § 500.080(13) (West 2012).</p>	<p>“Serious physical injury” means physical injury which creates a substantial risk of death, or which causes serious and prolonged disfigurement, prolonged impairment of health, or prolonged loss or impairment of the function of any bodily organ. KY. REV. STAT. ANN. § 500.080(15) (West 2012).</p>	<p>A person is guilty of assault in the fourth degree when: (a) He intentionally or wantonly causes physical injury to another person; or (b) With recklessness he causes physical injury to another person by means of a deadly weapon or a dangerous instrument. KY. REV. STAT. ANN. § 508.030 (West 2012).</p>
Louisiana	Not defined.	<p>B. For purposes of this Section [Second Degree Battery] . . . “Serious bodily injury” means bodily injury, which involves unconsciousness, extreme physical pain or protracted and obvious disfigurement, or protracted loss or impairment of the function of a bodily member, organ, or mental faculty, or a</p>	<p>Assault is an attempt to commit a battery, or the intentional placing of another in reasonable apprehension of receiving a battery. LA. REV. STAT.</p>

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
		substantial risk of death. LA. REV. STAT. ANN. § 14:34.1 (2012).	ANN. § 14:36 (2012). <sup>322</sup>
Maine	“Bodily injury” means physical pain, physical illness or any impairment of physical condition. ME. REV. STAT. tit. 17-A, § 2 (2012).	“Serious bodily injury” means a bodily injury which creates a substantial risk of death or which causes serious, permanent disfigurement or loss or substantial impairment of the function of any bodily member or organ, or extended convalescence necessary for recovery of physical health. ME. REV. STAT. tit. 17-A, § 2 (2012).	A person is guilty of assault if: A. The person intentionally, knowingly or recklessly causes bodily injury or offensive physical contact to another person. Violation of this paragraph is a Class D crime; or B. The person has attained at least 18 years of age and intentionally, knowingly or recklessly causes bodily injury to another person

322. LA. REV. STAT. § 14:33 (2012) (“Battery is the intentional use of force or violence upon the person of another; or the intentional administration of a poison or other noxious liquid or substance to another.”).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			who is less than 6 years of age. Violation of this paragraph is a Class C crime. ME. REV. STAT. tit. 17-A, § 207 (2012).
Maryland	“[P]hysical injury” means any impairment of physical condition, excluding minor injuries. MD. CODE, CRIM. LAW § 3-203(c)(1) (2012).	“Serious physical injury” means physical injury that: (1) creates a substantial risk of death; or (2) causes permanent or protracted serious: (i) disfigurement; (ii) loss of the function of any bodily member or organ; or (iii) impairment of the function of any bodily member or organ. MD. CODE., CRIM. LAW § 3-201(d) (2012).	“Assault” means the crimes of assault, battery, and assault and battery, which retain their judicially determined meanings. MD. CODE, CRIM. LAW § 3-201(b) (2012).
Massachusetts	Not defined.	“Serious bodily injury” shall mean bodily injury that results in a permanent disfigurement, loss or impairment of a bodily function, limb or organ, or a substantial risk of death. MASS. GEN. LAWS ch. 265, § 13A(c) (2012).	“[D]efinition of assault is an attempt or threat to do bodily harm.” <sup>323</sup>

323. Commonwealth v. Gorassi, 733 N.E.2d 106, 110 (Mass. 2000) (quoting Commonwealth v. Shaffer, 326 N.E.2d 880, 885 (Mass. 1975)).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
Michigan	Not defined.	(8) For purposes of subsection (3), “serious bodily injury” means each of the following: (a) Bodily injury that involves a substantial risk of death. (b) Unconsciousness. (c) Extreme physical pain. (d) Protracted and obvious disfigurement. (e) Protracted loss or impairment of the function of a bodily member, organ, or mental faculty. MICH. COMP. LAWS § 324.11151 (2012).	“[A] simple criminal assault is made out from either an attempt to commit a battery or an unlawful act which places another in reasonable apprehension of receiving an immediate battery.” <sup>324</sup>
Minnesota	“Bodily harm” means physical pain or injury, illness, or any impairment of physical condition. MINN. STAT. § 609.02(7) (2012).	“Great bodily harm” means bodily injury which creates a high probability of death, or which causes serious permanent disfigurement, or which causes a permanent or protracted loss or impairment of the function of any bodily member or organ or other serious bodily harm. MINN. STAT. § 609.02(8) (2012).	Whoever does any of the following commits an assault and is guilty of a misdemeanor: (1) commits an act with intent to cause fear in another of immediate bodily harm or death; or (2) intentionally inflicts or attempts to inflict bodily harm upon

324. *People v. Johnson*, 284 N.W.2d 718, 718 (Mich. 1979) (quoting *People v. Sanford*, 265 N.W.2d 1, 7 (Mich. 1978)).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			another. MINN. STAT. § 609.224 (2012).
Mississippi	Not defined.	“Serious bodily harm,” within the meaning of the felony child abuse statute, means bodily injury which creates a substantial risk of death, or permanent or temporary disfigurement, or impairment of any function of any bodily organ or function. MISS. CODE ANN. § 97-5-39 (2012). <sup>325</sup>	(1)(a) A person is guilty of simple assault if he (i) attempts to cause or purposely, knowingly or recklessly causes bodily injury to another; (ii) negligently causes bodily injury to another with a deadly weapon or other means likely to produce death or serious bodily harm; or (iii) attempts by physical menace to put another in fear of imminent serious bodi-

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325. From Child Neglect Section.



State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			ly harm. MISS. CODE ANN. § 97-3-7 (2012).
Missouri	“Physical injury” means physical pain, illness, or any impairment of physical condition; MO. REV. STAT. § 556.061(20) (2012).	“Serious physical injury” means physical injury that creates a substantial risk of death or that causes serious disfigurement or protracted loss or impairment of the function of any part of the body. MO. REV. STAT. § 565.002(6) (2012).	1. A person commits the crime of assault in the third degree if: (1) The person attempts to cause or recklessly causes physical injury to another person; or (2) With criminal negligence the person causes physical injury to another person by means of a deadly weapon; or (3) The person purposely places another person in apprehension of im-

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			physical injury; or (4) The person recklessly engages in conduct which creates a grave risk of death or serious physical injury to another person; or (5) The person knowingly causes physical contact with another person knowing the other person will regard the contact as offensive or provocative. MO. REV. STAT. § 565.070 (2012).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
Montana	<p>“Bodily injury” means physical pain, illness, or an impairment of physical condition and includes mental illness or impairment. MON. CODE ANN. § 45-2-101(5) (2011).</p>	<p>“Serious bodily injury” means bodily injury that: (i) creates a substantial risk of death; (ii) causes serious permanent disfigurement or protracted loss or impairment of the function or process of a bodily member or organ; or (iii) at the time of injury, can reasonably be expected to result in serious permanent disfigurement or protracted loss or impairment of the function or process of a bodily member or organ. (b) The term includes serious mental illness or impairment. MON. CODE ANN. § 45-2-101(66) (2011).</p>	<p>A person commits the offense of assault if the person: (a) purposely or knowingly causes bodily injury to another; (b) negligently causes bodily injury to another with a weapon; (c) purposely or knowingly makes physical contact of an insulting or provoking nature with any individual; or (d) purposely or knowingly causes reasonable apprehension of bodily injury in another. MON. CODE ANN. § 45-5-201(1) (2011).</p>

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
Nebraska	Bodily injury shall mean physical pain, illness, or any impairment of physical condition; NEB. REV. STAT. § 28-109(4) (2012).	Serious bodily injury shall mean bodily injury which involves a substantial risk of death, or which involves substantial risk of serious permanent disfigurement, or protracted loss or impairment of the function of any part or organ of the body; NEB. REV. STAT. § 28-109(20) (2012).	(1) A person commits the offense of assault in the third degree if he: (a) Intentionally, knowingly, or recklessly causes bodily injury to another person; or (b) Threatens another in a menacing manner. NEB. REV. STAT. § 28-310 (2012).
Nevada	“Physical injury” includes, without limitation: 1. A sprain or dislocation; 2. Damage to cartilage; 3. A fracture of a bone or the skull; 4. An intracranial hemorrhage or injury to another internal organ; 5. A burn or scalding; 6. A cut, laceration, puncture or bite; 7. Permanent or temporary disfigurement; or 8. Permanent or temporary loss or impairment of a part or organ of the body. NEV. REV. STAT. § 432B.090 (2011).	Unless the context otherwise requires, “substantial bodily harm” means: 1. Bodily injury which creates a substantial risk of death or which causes serious, permanent disfigurement or protracted loss or impairment of the function of any bodily member or organ; or 2. Prolonged physical pain. NEV. REV. STAT. § 0.060 (2011).	(a) “Assault” means: (1) Unlawfully attempting to use physical force against another person; or (2) Intentionally placing another person in reasonable apprehension of immediate bodily harm. NEV. REV. STAT. § 200.471 (2011).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
New Hampshire	Not defined.	“Serious bodily injury” means any harm to the body which causes severe, permanent or protracted loss of or impairment to the health or of the function of any part of the body. N.H. REV. STAT. ANN. § 625:11 (2012).	I. A person is guilty of simple assault if he: (a) Purposely or knowingly causes bodily injury or unprivileged physical contact to another; or (b) Recklessly causes bodily injury to another; or (c) Negligently causes bodily injury to another by means of a deadly weapon. N.H. REV. STAT. ANN. § 631:2-a (2012).
New Jersey	“Bodily injury” means physical pain, illness or any impairment of physical condition; N.J. REV. STAT. § 2C:11-1(a) (2012).	“Serious bodily injury” means bodily injury which creates a substantial risk of death or which causes serious, permanent disfigurement, or protracted loss or impairment of the function of any bodily member or organ. N.J. REV. STAT. § 2C:11-1(b) (2012).	A person is guilty of assault if he: (1) Attempts to cause or purposely, knowingly or recklessly causes bodily injury to another; or (2) Negligently causes bodily injury to another.

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			other with a deadly weapon; or (3) Attempts by physical menace to put another in fear of imminent serious bodily injury. N.J. REV. STAT. § 2C:12-1 (2012).
New Mexico	A. “[B]odily injury” means an injury to a person that is not likely to cause death or great bodily harm to the person, but does cause painful temporary disfigurement or temporary loss or impairment of the functions of any member or organ of the person’s body; N.M. STAT. ANN. § 66-13-2 (2012).	“[G]reat bodily harm” means an injury to the person which creates a high probability of death; or which causes serious disfigurement; or which results in permanent or protracted loss or impairment of the function of any member or organ of the body. N.M. STAT. ANN. § 30-1-12(A) (2012).	Assault consists of either: A. an attempt to commit a battery upon the person of another; B. any unlawful act, threat or menacing conduct which causes another person to reasonably believe that he is in danger of receiving an immediate battery; or C. the use of insulting language toward another impugn-

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			ing his honor, delicacy or reputation. N.M. STAT. ANN. § 30-3-1 (2012).
New York	“Physical injury” means impairment of physical condition or substantial pain. N.Y. PENAL LAW § 10.00(9) (McKinney 2012).	“Serious physical injury” means physical injury which creates a substantial risk of death, or which causes death or serious and protracted disfigurement, protracted impairment of health or protracted loss or impairment of the function of any bodily organ. N.Y. PENAL LAW § 10.00(10) (McKinney 2012).	A person is guilty of assault in the third degree when: 1. With intent to cause physical injury to another person, he causes such injury to such person or to a third person; or 2. He recklessly causes physical injury to another person; or 3. With criminal negligence, he causes physical injury to another person by means of a deadly weapon or a dangerous

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			instrument. N.Y. PENAL LAW § 120.00 (McKinney 2012).
North Carolina	Not defined.	“Serious bodily injury” is defined as bodily injury that creates a substantial risk of death, or that causes serious permanent disfigurement, coma, a permanent or protracted condition that causes extreme pain, or permanent or protracted loss or impairment of the function of any bodily member or organ, or that results in prolonged hospitalization. N.C. GEN. STAT. § 14-32.4 (2012).	“An assault is an intentional attempt, by violence, to do injury to the person of another.” <sup>326</sup>
North Dakota	“Bodily injury” means any impairment of physical condition, including physical pain. N.D. CENT. CODE § 12.1-01-04 (2011).	“Serious bodily injury” means bodily injury that creates a substantial risk of death or which causes serious permanent disfigurement, unconsciousness, extreme pain, permanent loss or impairment of the function of any bodily member or	A person is guilty of an offense if that person: a. Willfully causes bodily injury to another human being; or b. Negligently causes bodily

326. *State v. Britt*, 154 S.E.2d 519, 521 (N.C. 1967) (citing *State v. Davis*, 23 N.C. (1 Ired.) 125, 127 (N.C. 1840)).



State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
		organ, a bone fracture, or impediment of air flow or blood flow to the brain or lungs. N.D. CENT. CODE § 12.1-01-04 (2011).	injury to another human being by means of a firearm, destructive device, or other weapon, the use of which against a human being is likely to cause death or serious bodily injury. N.D. CENT. CODE § 12.1-17-01 (2011).
Ohio	“Physical harm to persons” means any injury, illness, or other physiological impairment, regardless of its gravity or duration. OHIO REV. CODE ANN. § 2901.01(3) (West 2012).	“Serious physical harm to persons” means any of the following: (a) Any mental illness or condition of such gravity as would normally require hospitalization or prolonged psychiatric treatment; (b) Any physical harm that carries a substantial risk of death; (c) Any physical harm that involves some permanent incapacity, whether partial or total, or that involves some temporary, substantial incapacity; (d) Any physical harm that involves some permanent disfigurement or that involves some temporary,	(A) No person shall knowingly cause or attempt to cause physical harm to another or to another’s unborn. (B) No person shall recklessly cause serious physical harm to another or to another’s unborn. OHIO REV. CODE ANN. § 2903.13 (West 2012).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
		serious disfigurement; (e) Any physical harm that involves acute pain of such duration as to result in substantial suffering or that involves any degree of prolonged or intractable pain. OHIO REV. CODE ANN. § 2901.01(5) (West 2012).	
Oklahoma	Not defined.	“[G]reat bodily injury” means bone fracture, protracted and obvious disfigurement, protracted loss or impairment of the function of a body part, organ or mental faculty, or substantial risk of death. OKLA. STAT. tit. 21, § 646(B) (2012).	An assault is any willful and unlawful attempt or offer with force or violence to do a corporal hurt to another. OKLA. STAT. tit. 21, § 641 (2012). <sup>327</sup>
Oregon	“Physical injury” means impairment of physical condition or substantial pain. OR. REV. STAT. § 161.015(7) (2012).	“Serious physical injury” means physical injury which creates a substantial risk of death or which causes serious and protracted disfigurement, protracted impairment of	A person commits the crime of assault in the fourth degree if the person: (a) Intentional-

327. OKLA. STAT. tit. 21, § 642 (2012) (“A battery is any willful and unlawful use of force or violence upon the person of another.”).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
		health or protracted loss or impairment of the function of any bodily organ. OR. REV. STAT. § 161.015(8) (2012).	ly, knowingly or recklessly causes physical injury to another; or (b) With criminal negligence causes physical injury to another by means of a deadly weapon. OR. REV. STAT. § 163.160(1) (2012).
Pennsylvania	“Bodily injury.” Impairment of physical condition or substantial pain. 18 PA. CONS. STAT. § 2301 (2012).	“Serious bodily injury.” Bodily injury which creates a substantial risk of death or which causes serious, permanent disfigurement, or protracted loss or impairment of the function of any bodily member or organ. 18 PA. CONS. STAT. § 2301 (2012).	(a) Offense defined.—A person is guilty of assault if he: (1) attempts to cause or intentionally, knowingly or recklessly causes bodily injury to another; (2) negligently causes bodily injury to another with a deadly weapon; (3) attempts by physical menace to put another

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			in fear of imminent serious bodily injury. 18 PA. CONS. STAT. § 2701 (2012).
Rhode Island	Not defined.	“Serious bodily injury” means physical injury that: (1) Creates a substantial risk of death; (2) Causes protracted loss or impairment of the function of any bodily part, member or organ; or (3) Causes serious permanent disfigurement or circumcises, excises or infibulates the whole or any part of the labia majora or labia minora or clitoris of a person. R.I. GEN. LAWS § 11-5-2(c) (2012).	“An assault, as ordinarily defined, is any unlawful attempt or offer, with force or violence, to do a corporal hurt to another, whether from malice or wantonness. The offence may consist, also, in putting another in fear of violence.” <sup>328</sup>
South Carolina	“Physical injury” means death or permanent or temporary disfigurement or impairment of any bodily organ or function. S.C. CODE ANN. § 63-7-20(18) (2012).	“Great bodily injury” means bodily injury which causes a substantial risk of death or which causes serious, permanent disfigurement or protracted loss or impairment of the function of a bodily member or organ. S.C.	A person commits the offense of assault and battery in the third degree if the person unlawfully injures another.

328. *State v. Jeremiah*, 546 A.2d 183, 186 (R.I. 1988) (citing *State v. Baker*, 38 A. 653, 654 (R.I. 1897)).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
		CODE ANN. § 16-3-600(A)(1) (2012).	er person, or offers or attempts to injure another person with the present ability to do so. S.C. CODE ANN. § 16-3-600(E)(1) (2012).
South Dakota	Not defined.	“Serious bodily injury,” such injury as is grave and not trivial, and gives rise to apprehension of danger to life, health, or limb. S.D. CODIFIED LAWS § 22-1-2(44A) (2012).	Any person who: (1) Attempts to cause bodily injury to another and has the actual ability to cause the injury; (2) Recklessly causes bodily injury to another; (3) Negligently causes bodily injury to another with a dangerous weapon; (4) Attempts by physical menace or credible threat to put another in fear of imminent bodily harm,

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			with or without the actual ability to harm the other person. S.D. CODIFIED LAWS § 22-18-1 (2012).
Tennessee	“Bodily injury” includes a cut, abrasion, bruise, burn or disfigurement, and physical pain or temporary illness or impairment of the function of a bodily member, organ, or mental faculty; TENN. CODE ANN. § 39-11-106(2) (2012).	“Serious bodily injury” means bodily injury that involves: (A) A substantial risk of death; (B) Protracted unconsciousness; (C) Extreme physical pain; (D) Protracted or obvious disfigurement; (E) Protracted loss or substantial impairment of a function of a bodily member, organ or mental faculty; or (F) A broken bone of a child who is eight (8) years of age or less. TENN. CODE ANN. § 39-11-106(34) (2012).	A person commits assault who: (1) Intentionally, knowingly or recklessly causes bodily injury to another; (2) Intentionally or knowingly causes another to reasonably fear imminent bodily injury; or (3) Intentionally or knowingly causes physical contact with another and a reasonable person would regard the contact as extremely offensive or

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			provocative. TENN. CODE ANN. § 39-13-101(a) (2012).
Texas	“Bodily injury” means physical pain, illness, or any impairment of physical condition. TEX. PENAL CODE § 1.07(8) (2011).	“Serious bodily injury” means bodily injury that creates a substantial risk of death or that causes death, serious permanent disfigurement, or protracted loss or impairment of the function of any bodily member or organ. TEX. PENAL CODE § 1.07(46) (2011).	(a) A person commits an offense if the person: (1) intentionally, knowingly, or recklessly causes bodily injury to another, including the person’s spouse; (2) intentionally or knowingly threatens another with imminent bodily injury, including the person’s spouse; or (3) intentionally or knowingly causes physical contact with another when the person knows or

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			should reasonably believe that the other will regard the contact as offensive or provocative. TEX. PENAL CODE § 22.01 (2011).
Utah	“Bodily injury” means physical pain, illness, or any impairment of physical condition. UTAH CODE ANN. § 76-1-601(3) (West 2012).	“Serious bodily injury” means bodily injury that creates or causes serious permanent disfigurement, protracted loss or impairment of the function of any bodily member or organ, or creates a substantial risk of death. UTAH CODE ANN. § 76-1-601(11) (West 2012).	Assault is: (a) an attempt, with unlawful force or violence, to do bodily injury to another; UTAH CODE ANN. § 76-5-102 (West 2012).
Vermont	“Bodily injury” means physical pain, illness or any impairment of physical condition. VT. STAT. tit. 13, § 3251(5) (2012).	“Serious bodily injury” means: (A) bodily injury which creates any of the following: (i) a substantial risk of death; (ii) a substantial loss or impairment of the function of any bodily member or organ; (iii) a substantial impairment of health; or (iv) substantial disfigurement; or (B) strangulation by intentionally impeding normal breathing or circula-	(a) A person is guilty of simple assault if he or she: (1) attempts to cause or purposely, knowingly or recklessly causes bodily injury to another; or (2) negligently causes bodily injury to an-



State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
		tion of the blood by applying pressure on the throat or neck or by blocking the nose or mouth of another person. VT. STAT. tit. 13, § 1021(2) (2012).	other with a deadly weapon; or (3) attempts by physical menace to put another in fear of imminent serious bodily injury. VT. STAT. tit. 13, § 1023 (2012).
Virginia	Not defined.	Not defined.	“An assault requires an overt act or an attempt, or the unequivocal appearance of an attempt, with force and violence, to do physical injury to the person of another. There is no requirement that a victim be physically touched to be assaulted.” <sup>329</sup>

329. *Zimmerman v. Commonwealth*, 585 S.E.2d 538, 539 (Va. 2003) (citations omitted).

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
Washington	“Bodily injury,” “physical injury,” or “bodily harm” means physical pain or injury, illness, or an impairment of physical condition. WASH. REV. CODE § 9A.04.110(4a) (2012).	“Great bodily harm” means bodily injury which creates a probability of death, or which causes significant serious permanent disfigurement, or which causes a significant permanent loss or impairment of the function of any bodily part or organ. WASH. REV. CODE § 9A.04.110(4c) (2012).	“An assault is an attempt, with unlawful force, to inflict bodily injury upon another, accompanied with the apparent present ability to give effect to the attempt if not prevented.” <sup>330</sup>
West Virginia	“Bodily injury” means substantial physical pain, illness or any impairment of physical condition. W. VA. CODE § 61-2-9a(f)(1) (2012). <sup>331</sup>	“Serious bodily injury” means bodily injury which creates a substantial risk of death, which causes serious or prolonged disfigurement, prolonged impairment of health or prolonged loss or impairment of the function of any bodily organ. W. VA. CODE § 61-8B-1(10) (2012). <sup>332</sup>	Assault.—If any person unlawfully attempts to commit a violent injury to the person of another or unlawfully commits an act which places another in reasonable apprehension of immediately receiving a violent injury, he

330. *State v. Sample*, 757 P.2d 539, 540 (Wash. Ct. App. 1988).

331. Within the stalking statute; *see also* W. VA. CODE § 61-8B-1(9) (2012) (within the Sexual Offenses section).

332. Within the Sexual Offenses section.

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
			<p>shall be guilty of a misdemeanor and, upon conviction, shall be confined in jail for not more than six months, or fined not more than one hundred dollars, or both such fine and imprisonment. W. VA. CODE § 61-2-9(b) (2012).</p>
Wisconsin	<p>“Bodily harm” means physical pain or injury, illness, or any impairment of physical condition. WIS. STAT. § 939.22(4) (2012).</p>	<p>“Great bodily harm” means bodily injury which creates a substantial risk of death, or which causes serious permanent disfigurement, or which causes a permanent or protracted loss or impairment of the function of any bodily member or organ or other serious bodily injury. WIS. STAT. § 939.22(14) (2012).</p>	<p>Battery: Whoever causes bodily harm to another by an act done with intent to cause bodily harm to that person or another without the consent of the person so harmed is guilty of a Class A misdemeanor. WIS. STAT. § 940.19(1) (2012).</p>

State	Bodily (or Physical) Injury	Serious (or Great) Bodily Injury	Simple Assault
Wyoming	“Bodily injury” means physical pain, illness or any impairment of physical condition. WYO. STAT. ANN. § 6-1-104(a)(i) (2012).	“Serious bodily injury” means bodily injury which creates a substantial risk of death or which causes mis-carriage, severe disfigurement or protracted loss or impairment of the function of any bodily member or organ. WYO. STAT. ANN. § 6-1-104(x) (2012).	A person is guilty of simple assault if, having the present ability to do so, he unlawfully attempts to cause bodily injury to another. WYO. STAT. ANN. § 6-2-501(a) (2012).

#### APPENDIX B. POST-TRAUMATIC STRESS DISORDER AS A BRAIN INJURY

In this Appendix, I present one way to understand PTSD as a brain-based disorder.<sup>333</sup> Since its official recognition in 1980 by the American Psychiatric Association (APA) in the *Diagnostic and Statistical Manual of Mental Disorders*, PTSD has become central to many types of personal injury litigation and has spawned a cottage industry of lawyers and scientists working at this intersection.<sup>334</sup>

The growth of PTSD civil litigation raised a number of challenges, including whether PTSD exists to begin with, what a valid PTSD diagnosis is, the causal link to the traumatic event, and how to tell if an individual is “malinger” (i.e., deliberately faking one’s symptoms).<sup>335</sup> These are just a few of the

333. There is ongoing research on the relationship between brain function and PTSD, thus the discussion in this Appendix should not be viewed as a definitive statement on the relationship between brain function and PTSD. Rather, this is a non-technical summary of one view of that relationship. See Landy F. Sparr & Roger K. Pitman, *PTSD and the Law*, in HANDBOOK OF PTSD: SCIENCE AND PRACTICE 449 (Matthew J. Friedman et al. eds., 2007) for additional discussion.

334. *Id.* at 449.

335. Erin D. Bigler, *Mild Traumatic Brain Injury: Causality Considerations from a Neuroimaging and Neuropathology Perspective*, in PSYCHOLOGICAL KNOWLEDGE IN COURT: PTSD, PAIN, AND TBI 308, 324 (Gerald Young et

many concerns that skeptics raise about PTSD.<sup>336</sup> Indeed, some argue that PTSD is actually prolonged by the litigation process, stating that “ongoing litigation acts as an artificial reinforcing factor for unpleasant memories and their accompanying affect.”<sup>337</sup>

Yet, despite the scientific concerns voiced since its inception, PTSD has only grown in terms of its practical legal importance. In 1993 Dr. Alan Stone, professor of law and psychiatry at Harvard Law School, observed “no diagnosis in the history of American psychiatry has had a more dramatic and pervasive impact on law and social justice than . . . PTSD.”<sup>338</sup>

Stress-related mental injuries, especially those accrued due to exposure to military combat, have long been scrutinized, though PTSD was officially recognized by the APA for the first time in 1980 in the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III).<sup>339</sup> Due in large part to concerns about veterans upon their return from the battlefield, since the 1980s PTSD has been and continues to be well studied.<sup>340</sup> The National Center for PTSD, established in 1989 within the Department of Veterans Affairs, has invested tens of millions of dollars to improve PTSD research, clinical practice, and awareness.<sup>341</sup>

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al. eds., 2006); Melissa A. Polusny & Paul A. Arbisi, *Assessment of Psychological Distress and Disability After Sexual Assault in Adults*, in *PSYCHOLOGICAL KNOWLEDGE IN COURT*, *supra*, at 97, 111.

336. See generally C. R. BREWIN, *POSTTRAUMATIC STRESS DISORDER: MALADY OR MYTH?* 11–15 (2003) (discussing the challenges to the PTSD diagnosis since its formal recognition in 1980).

337. L.H. Field, *Post-Traumatic Stress Disorder: A Reappraisal*, 92 *J. ROYAL SOC'Y MED.* 35, 36 (1999). But see *Review of Veterans' Disability Compensation: Expert Reports on PTSD and Other Issues: Hearing Before the Comm. on Veterans' Affairs*, 110th Cong. 24 (2008) (statement of Dean G. Kilpatrick, Distinguished Univ. Professor & Director of Nat'l Crime Victims Research Ctr., Med. Univ. S.C.) (concluding that “compensation does not in general serve as a disincentive to seeking treatment”).

338. Alan A. Stone, *Post-Traumatic Stress Disorder and the Law: Critical Review of the New Frontier*, 21 *BULL. AM. ACAD. PSYCHIATRY & L.* 23, 23 (1993).

339. *AM. PSYCHIATRIC ASS'N, DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS-III* 236 (3d ed. 1980).

340. Matthew J. Friedman et al., *PTSD: Twenty-Five Years of Progress and Challenges*, in *HANDBOOK OF PTSD*, *supra* note 333, at 3.

341. See *NAT'L CTR. PTSD, About Us*, U.S. DEPT VETERANS AFFAIRS (2013), <http://www.ptsd.va.gov/about/index.asp>. As the research base on PTSD has grown, so too have criticisms. The controversies include debates about whether PTSD is a legitimate diagnosis, PTSD's failure to account for cross-cultural variation, and concerns about the reliability of verbal reports and traumatic

PTSD is “a favored diagnosis in tort law because it is incident-specific, easy to understand, and tends to rule out other factors potentially involved in causation.”<sup>342</sup> PTSD is also defined and diagnosed exclusively through *behavioral* measures.<sup>343</sup> The diagnostic criteria for PTSD make no explicit mention of the brain.<sup>344</sup> Compensation is tied to deficits in behavioral outcomes, caused by the specific event at issue, both for personal injury cases and for veterans’ PTSD claims.<sup>345</sup> It is not enough for a client’s brain to change from a traumatic event; if those brain changes do not lead to the behavioral outcomes specified in the diagnostic criteria, then there is no PTSD diagnosed and no successful claim to file.

If behavior is front-and-center in PTSD litigation, what does neuroscience research add to the legal landscape? Neuroscientific evidence may play a critical role in determining whether PTSD is a “mental” or a “bodily” injury. To see how, we can start by thinking of PTSD as an inability to properly regulate fear response and memory formation.<sup>346</sup> The three brain regions of most interest for understanding PTSD are the amygdala, prefrontal cortex, and hippocampus.<sup>347</sup> Setting aside for the moment a myriad of complexities and individual differences, one story emerging from neuroimaging research on PTSD is one of “exaggerated responsivity in the amygdala, diminished responsivity in medial prefrontal cortex (PFC), and an inverse relationship between these two brain regions” along

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memories. *See generally* POSTTRAUMATIC STRESS DISORDER: ISSUES AND CONTROVERSIES (Gerald M. Rosen ed., 2004) (providing a compilation of debates about PTSD as a diagnosis).

342. Sparr & Pitman, *supra* note 333, at 449.

343. AM. PSYCHIATRIC ASS’N, DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS-IV 463, 463–68 (4th ed. 2000) (providing the diagnostic criteria for PTSD).

344. *Id.*

345. *See, e.g.*, Shen, *Monetizing Memory Science*, *supra* note 4, at 333–40 (discussing PTSD, neuroscience, and the conceptualization of injury in tort law, noting the difficulties with putting a price on mental and emotional harms); Sparr & Pitman, *supra* note 333, at 460–61 (noting the legal system’s traditional “hostility toward claims for mental distress damages”).

346. *See, e.g.*, Steven M. Southwick et al., *Neurobiological Alterations Associated with PTSD*, in HANDBOOK OF PTSD, *supra* note 333, at 166, 180–81 (noting that “stress sensitization” that often occurs with PTSD can cause an individual to “overreact to even minor stresses”).

347. Lisa M. Shin et al., *Structural and Functional Anatomy of PTSD: Findings from Neuroimaging Research*, in NEUROPSYCHOLOGY OF PTSD: BIOLOGICAL, COGNITIVE, AND CLINICAL PERSPECTIVES 59 (Jennifer J. Vasterling & Chris R. Brewin eds., 2005).

with “diminished volumes, neuronal integrity, and functional integrity of the hippocampus.”<sup>348</sup>

Crime victims with PTSD will typically exhibit either hyperactive or disassociative fear reactions, correlating with distinct neural activation patterns in the prefrontal cortex, anterior cingulate cortex (ACC), and amygdala.<sup>349</sup> The amygdala has an important role in fear responses, letting us know “when we should genuinely be frightened and behave accordingly, and when the coast is clear.”<sup>350</sup> Activity in the amygdala, as in all brain structures, is “mediated by neurotransmitters that carry signals from one neuron to the next.”<sup>351</sup>

Understood in this neurobiological way, we can see why, from a neuroscience perspective, the processes would be readily labeled “bodily” or “physical,” just as the biological processes underlying the functioning of other organs in the body would be similarly labeled.

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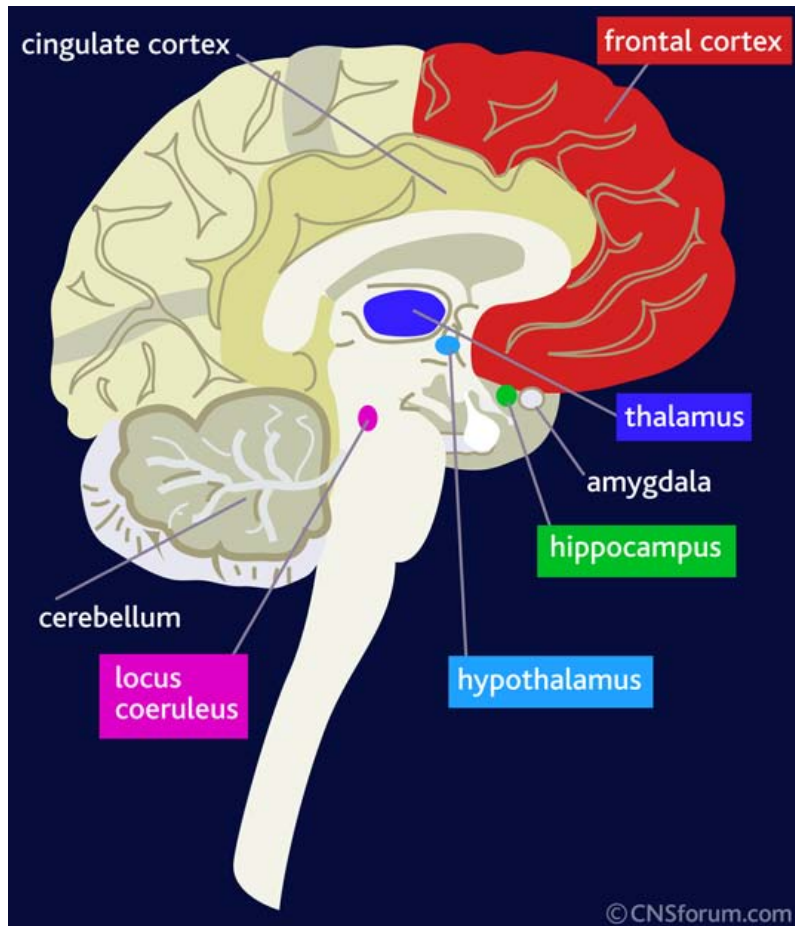
348. *Id.* at 74.

349. R.A. Lanius et al., *A Review of Neuroimaging Studies in PTSD: Heterogeneity of Response to Symptom Provocation*, 40 *J. PSYCHIATRIC RES.* 709, 711–14 (2006). For those individuals experiencing hyperarousal, one interpretation is that reduced activity in the prefrontal cortex—a part of the brain responsible for much executive function—can be interpreted as a failure “to inhibit subcortical limbic, especially amygdala, reactivity.” James W. Hopper et al., *Neural Correlates of Reexperiencing, Avoidance, and Dissociation in PTSD: Symptom Dimensions and Emotion Dysregulation in Responses to Script-Driven Trauma Imagery*, 20 *J. TRAUMATIC STRESS* 713, 714 (2007). Lanius and others note that activation patterns differ for those whose PTSD manifests itself in disassociation rather than hyperarousal. Lanius et al., *supra* at 714.

350. Shen, *Monetizing Memory Science*, *supra* note 4, at 331.

351. *Id.*

**Figure B.1**  
**The Areas of the Brain Affected in Post-Traumatic Stress Disorder**<sup>352</sup>



The CNSforum provides the following caption to this image: “Sensory input, memory formation and stress response mechanisms are affected in patients with post-traumatic stress disorder (PTSD). The regions of the brain involved in memory processing that are implicated in PTSD include the hippocampus, amygdala and frontal cortex. While the heightened stress

<sup>352</sup>. *Image Bank: The Areas of the Brain Affected in Post-Traumatic Stress Disorder*, LUNDBECK INST., [http://www.cnsforum.com/imagebank/item/Neuro\\_biol\\_PTSD/default.aspx](http://www.cnsforum.com/imagebank/item/Neuro_biol_PTSD/default.aspx) (last visited Feb. 22, 2013).



response is likely to involve the thalamus, hypothalamus and locus coeruleus.”

At this cellular level, all mental states, for healthy and distressed individuals alike, are produced by “neurotransmitter/neuroendocrine systems . . . characterized by complex interactions with one another and with multiple brain regions, including the amygdala, [locus coeruleus], dorsal raphe nucleus, hippocampus and [prefrontal cortex].”<sup>353</sup> In the case of a crime victim with PTSD, these complex systems function abnormally, and the abnormal functioning of the brain’s biochemistry results in the victim’s inability to live life as they normally would, e.g., experiencing fear at moments when (but for the traumatic event) they normally would not.<sup>354</sup>

Because of a victim’s preexisting vulnerabilities, the nature of the traumatic event, and subsequent events, the victim’s brain has been re-wired (through altered neuronal connections and firing patterns). PTSD involves dysregulation of several neurotransmitter/neurohormone systems: the noradrenergic system, serotonergic system, and hypothalamic-pituitary-adrenal (HPA) axis.<sup>355</sup> Increased levels of catecholamine and cortisol “enhance the functioning of the amygdala, promoting fear conditioning and the consolidation of emotionally relevant memories.”<sup>356</sup> At the same time, the release of these hormones “impair[s] the cognitive functioning of the PFC.”<sup>357</sup> In short, the neurochemical environment during a stressful moment sets the stage for the encoding that may eventually lead to observed PTSD behavioral outcomes.

The relationship between memory and trauma plays an important role in PTSD as well.<sup>358</sup> Experimental research on memory for trauma-relevant and -irrelevant words, as well as tests of autobiographical memory, have found that PTSD may

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353. Steven M. Southwick et al., *Neurobiological Alterations Associated with PTSD*, in HANDBOOK OF PTSD, *supra* note 346, at 166, 180.

354. *Id.* at 180–81.

355. Steven M. Southwick et al., *Neurobiological and Neurocognitive Alterations in PTSD: A Focus on Norepinephrine, Serotonin, and the Hypothalamic-Pituitary-Adrenal Axis*, in NEUROPSYCHOLOGY OF PTSD, *supra* note 347, at 27.

356. *Id.* at 30.

357. *Id.* at 31.

358. As discussed elsewhere, moderate and extreme stressors may have different effects on memory systems affecting PTSD. The relationship between arousal and performance takes on an inverted-U shape that psychologists have long recognized in a number of performance areas. *See, e.g., id.* at 29.

involve both “unwanted recall of the traumatic event” and “mild impairments in recall of newly acquired information.”<sup>359</sup>

To understand why some memories evoke this fear response, while others do not, we must review the critical role of the hippocampus. The hippocampus is a part of the brain involved in multiple memory systems.<sup>360</sup> Relevant to this discussion of PTSD, “the hippocampus is essential for the acquisition of episode memories with spatiotemporal content.”<sup>361</sup> When a memory is formed in the midst of a traumatic event, the brain’s memory systems are not functioning normally because of the stress. More specifically:

When memories are formed under intense stress, a critical component of normal memory formation—the hippocampus—is disabled, and memories without spatiotemporal content are created. At the same time, another component of normal memory function—the amygdala—can be potentiated, leading to stronger-than-usual memory for highly charged emotional events. When a person retrieves a traumatic event memory, the retrieved information is bereft of spatiotemporal context. Instead of being bound firmly to the past, this “disembodied” event memory is conflated with the ongoing spatio/temporal frame. . . . The memory takes on a quality of the here and now so strongly that the individual may literally *re-experience the event*.<sup>362</sup>

Those who experience PTSD are less able to successfully engage in “context discrimination”—discriminating between a new context that is not threatening versus the old context that was.<sup>363</sup> This, in turn, may lead to an inability to resume the normal course of life.<sup>364</sup> By uncovering the neural mechanisms that cause these behavioral outcomes, memory scientists allow lawyers to speak of mental injuries in the brain-based terminology of the hippocampus, the amygdala, and the biochemical processes by which the hippocampus and amygdala function with each other and with the rest of the brain.<sup>365</sup>

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359. Joseph I. Constans, *Information-Processing Biases in PTSD*, in NEUROPSYCHOLOGY OF PTSD, *supra* note 347, at 105, 116.

360. Lynn Nadel, *Multiple Memory Systems: A New View*, in 1 LEARNING AND MEMORY: A COMPREHENSIVE REFERENCE 41, 43–44 (Randolf Menzel & John H. Byrne eds., 2008).

361. Lynn Nadel & W.J. Jacobs, *The Role of the Hippocampus in PTSD, Panic and Phobia*, in THE HIPPOCAMPUS FUNCTIONS AND CLINICAL RELEVANCE 455, 457 (Nobumasa Kato ed., 1996).

362. *Id.* at 459.

363. See Shen, *Monetizing Memory Science*, *supra* note 4, at 331 (discussing how individuals diagnosed with PTSD experience fear when they otherwise would not).

364. See *id.*

365. See *id.* at 339–40 (suggesting neuroscientific possibilities for monetizing PTSD and how brain data may be used by lawyers to influence jurors’ de-

## APPENDIX C. TECHNICAL DETAILS

This Appendix provides additional detail on the research design employed in the two Experiments, the statistical procedures used to analyze the data, and the results of the statistical analyses.<sup>366</sup>

## A. SUBJECT COMPLIANCE

Concern about subjects' compliance with task instructions are of special interest with online experiments because subjects cannot be monitored while engaged in the experimental tasks.<sup>367</sup> To address this issue, experimental psychologists have developed "attention filters" designed to ascertain whether subjects are in fact following instructions and paying attention to the material being presented to them online.<sup>368</sup> In my experiments, I employed a modified version of the filter developed by psychologist Daniel Oppenheimer and his colleagues.<sup>369</sup> The design of the attention filter question was such that users who did not read carefully would see, in large font, a headline reading "Background Questions on Sources for News" as well as another large, bold question: "From which of these sources have you received information in the past month?" A series of check-box options were provided (e.g., local newspaper, local TV news). Subjects reading carefully, however, were instructed *not* to check any of the boxes, but instead to type "123" into the text box provided. The results presented in this Article are based only on the "good" subjects, i.e., those subjects who were paying attention.<sup>370</sup>

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cisions).

366. Replication data is available by request from the author and online at Harvard Dataverse Network, Harvard Univ., <http://dvn.iq.harvard.edu/dvn/dv/bodilyinjury> (last visited Apr. 21, 2013).

367. *Id.* at 343. In addition, concerns may arise about individuals taking the survey multiple times. To address this concern, a filter employed after data collection allowed for the experiment to exclude from the dataset subjects with duplicate IP addresses. Seventeen observations were dropped to avoid duplicate IP addresses in Experiment Two. Twenty observations were dropped to avoid duplicate IP addresses in Experiment Two.

368. *Id.* at 343–44; *see also* Daniel M. Oppenheimer et al., *Instructional Manipulation Checks: Detecting Satisficing to Increase Statistical Power*, 45 J. EXPERIMENTAL & SOC. PSYCHOL. 867, 867–68 (2009).

369. *See* Oppenheimer et al., *supra* note 368, at 868 (describing a filter in which subjects must carefully read instructions which, counter to the boldface headline above the instructions, tell subjects not to actually click on an answer to the question).

370. In the sample of subjects for Experiment One, 19 out of 200 (10%) did

After filtering out the subjects who did not meet these criteria, I had an N of 180 subjects in Experiment One. In the sample of subjects for Experiment Two, 68 out of 513 (13%) did not complete the attention filter properly, and are excluded from the analysis. This gave me a total N of 425 subjects in Experiment Two.

B. EXPERIMENT ONE: SUBJECT CHARACTERISTICS AND THE DETERMINATION OF BODILY INJURY

In the body of the Article, the figures presenting data from Experiment One illustrated the variance in subject rating of bodily injury.<sup>371</sup> What explains that variance? To examine the question in more depth, here I present additional statistical analysis of the factors related to bodily injury rating. Because the outcome variable is ordinal, ordered logic regression analysis was employed. In addition to exposure to the mental health parity information, these expanded models also include the following measures: the education level of the respondent;<sup>372</sup> whether the respondent previously knew about mental health parity;<sup>373</sup> an index of the subject's political ideology (with 1 being very liberal and 7 being very conservative); a dichotomous variable measuring whether the respondent is female; and a dichotomous variable measuring whether the respondent is non-white.

The results of the regression analysis, reported in Table C1, suggest that when these additional covariates are accounted for, the exposure to Dr. Hyman's testimony significantly affected bodily injury rating only for the sprained wrist, lung tissue, and recurring headaches injuries. The regression results also find that there is a relationship between education levels and bodily injury rating. There is a positive, significant relationship between a respondent's education level and their bodily injury rating for memory loss, recurring headaches, PTSD, and depression. In addition, self-reported previous knowledge of mental health parity was also significantly and positively related to bodily injury rating. The results suggest at least the

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not complete the attention filter properly, and are excluded from the analysis.

371. See *supra* Figures 2.1–2, Tables 1–2.

372. All subjects provided their education level: Less than High School; High School/GED; Some College; 2-year College Degree; 4-year College Degree; Master's Degree; or Doctoral Degree/Professional Degree.

373. All subjects were asked to respond, on a seven-point scale to the following question: Before taking this survey, how knowledgeable—if at all—were you with the concept of mental health parity?

possibility that if there is a “common” understanding of the term, it is to be found within certain population sub-groups.

**Table C1**  
**Explaining Subject Likelihood to Identify Injuries as**  
**“Bodily”: Results of Ordered Logistic**  
**Regression Analysis**

	Broken Leg	Broken Ribs	Concussion	Sprained Wrist	Scratch on Forearm	Torn Lung Tissue	Memory Loss	Recurring Headaches	PTSD	Depression
Brain Info	0.47	0.58	0.50	0.95**	0.45	0.67*	-0.03	0.56*	0.34	0.30
	(0.67)	(0.38)	(0.345)	(0.35)	(0.29)	(0.29)	(0.27)	(0.28)	(0.27)	(0.27)
Education	0.21	-0.11	-0.18	0.04	-0.13	0.15	0.21*	0.29**	0.24**	0.24**
	(0.22)	(0.13)	(0.12)	(0.12)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
Previous Knowledge	0.09	-0.04	-0.15	-0.07	0.10	0.33**	0.14	0.28**	0.13	0.28**
	(0.22)	(0.12)	(0.11)	(0.10)	(0.09)	(0.10)	(0.09)	(0.09)	(0.09)	(0.09)
Conservative	-0.28	-0.14	-0.16	-0.05	0.00	-0.12	-0.05	-0.06	-0.18**	-0.13
	(0.22)	(0.12)	(0.11)	(0.11)	(0.10)	(0.10)	(0.09)	(0.09)	(0.09)	(0.09)
Non-White	-0.25	-0.33	0.13	-0.57	-0.86**	-0.87*	-0.56	-0.63*	-0.66*	-0.61*
	(0.84)	(0.45)	(0.44)	(0.41)	(0.36)	(0.36)	(0.6)	(0.37)	(0.35)	(0.36)
Female	-0.49	0.68*	0.08	0.61*	0.57*	0.06	0.22	-0.28	-0.14	0.15
	(0.72)	(0.37)	(0.35)	(0.34)	(0.29)	(0.29)	(0.28)	(0.28)	(0.27)	(0.28)
N	180	180	180	180	180	180	180	180	180	180

Notes: Significance is denoted as: \*  $p < .10$ ; \*\*  $p < .05$ ; \*\*\*  $p < .01$

### C. EXPERIMENT TWO: FULL TEXT OF DEFINITIONS AND SCENARIOS

The five definitions used in this Experiment were:

- (1) No definition
- (2) *Black’s Law’s Dictionary*: Physical damage to a person’s body<sup>374</sup>

374. BLACK’S LAW DICTIONARY 856 (9th ed. 2009).

(3) *Black's Law Dictionary*: "Bodily: pertaining to or concerning the body; of or belonging to the body or the physical constitution; not mental, but corporeal";<sup>375</sup>

(4) Federal: "(A) a cut, abrasion, bruise, burn, or disfigurement; (B) physical pain; (C) illness; (D) impairment of the function of a bodily member, organ, or mental faculty; or (E) any other injury to the body, no matter how temporary."<sup>376</sup>

(5) Brain-Inclusive: (A) a cut, abrasion, bruise, burn, or disfigurement; (B) physical pain; (C) illness; (D) impairment of the function of a bodily member, organ, or mental faculty; (E) impairment of the brain's normal functioning; or (F) any other injury to the body, no matter how temporary.

The text of the scenarios utilized was:

<b>Text of Burglary Scenario</b>
<p><b>Facts:</b> The facts of the case are as follows. The Defendant (John) is charged with aggravated burglary. John admitted on the stand that he had broken into a private home to steal an expensive TV. He had seen the TV through the home's living room window. He knew that someone was in the home when he broke in. Security cameras on the house confirmed that, at approximately 12:00 noon on a weekday, John broke the lock on the private residence and entered the house. He was not armed. The homeowner was startled by John's entrance into the home, and John yelled "I'm taking the TV!" He quickly took the TV, left the home, and drove off. John was later arrested and now faces this charge at trial. The homeowner testified during the trial that she has recurring nightmares about the break-in, and that she has been diagnosed with Post-Traumatic Stress Disorder (PTSD) due to the event. An expert medical witness testified during the trial that the homeowner suffered from PTSD related to the break-in.</p> <p><b>Defense Argument:</b> John does not contest the facts of the case just presented, nor does he challenge the issue of intent. But John argues that he is only guilty of a reduced charge of burglary because the homeowner's injuries do not constitute "bodily injury" as required by the statute.</p>
<p>[ Variation 1 of 3] No additional information on prosecution argument provided.</p>
<p>[Variation 2 of 3] Prosecution Argument: The prosecution argues that the brain is a part of the body, that the homeowner's PTSD and nightmares are the result of physical, biochemical changes in her brain, and therefore that she has experienced bodily injury as a result of the break-in.</p>
<p>[Variation 3 of 3] Prosecution Argument: The prosecution argues that the brain is a part of the body, that the homeowner's PTSD and nightmares are the result of physical, biochemical changes in her brain, and therefore that she has experienced bodily injury as a result of the break-in. During the trial, an expert witness, in support of the diagnosis of PTSD, testified that the home-</p>

375. BLACK'S LAW DICTIONARY 175 (6th ed. 1990).

376. 18 U.S.C. § 1365(h)(4) (2006).

owner's brain activity was abnormal. A brain scan showing abnormal activity was admitted into evidence.

### Text of Assault Scenario

**Facts:** The facts of the case are as follows. The Defendant (John) is charged with assault. John was riding a subway train to work in the morning, sitting down because he had recently broken his leg and was not able to stand without crutches. Another passenger (Peter) entered the train car, and stood across from John. Peter was wearing a sports jersey of a rival team that John did not like. John, upset that his team had lost to this rival the night before, began insulting Peter loudly and profanely. John made fun of Peter's weight and growing bald spot, and completely humiliated Peter in front of the other train passengers. Peter exited the train at the next stop and contacted the police. John was later arrested and now faces this assault charge at trial. Peter testified that, seeing that John was on crutches, he was not fearful of being punched. But Peter also testified that since the incident, he has had recurring nightmares and traumatic memories about the experience. Peter now finds it difficult to ride the subway because of these bad memories.

**Defense Argument:** John does not contest the facts of the case just presented, admits to making the insulting statements, and does not challenge the issue of intent. But John argues that he cannot be found guilty of assault because Peter did not experience any "bodily injury," a required element of the statute.

[Variation 1 of 3] No additional information on prosecution argument provided.

[Variation 2 of 3] Prosecution Argument: The prosecution argues that the brain is a part of the body, that Peter's nightmares and traumatic memories are the result of biochemical changes in his brain cells, and therefore that he has experienced bodily injury as a result of John's insults.

[Variation 3 of 3] Prosecution Argument: The prosecution argues that the brain is a part of the body, that Peter's nightmares and traumatic memories are the result of biochemical changes in his brain cells, and therefore that he has experienced bodily injury as a result of John's insults. During the trial, an expert witness testified that the Peter's brain activity was abnormal. A brain scan showing abnormal activity was admitted into evidence.

## D EXPERIMENT TWO: CONFIRMATORY STATISTICAL ANALYSIS

In the body of the Article, I presented a series of graphical figures related to the experiments in Study Two.<sup>377</sup> Here I present the statistical analysis which provides more detail than can be offered in the graphical presentations. Logit regression models were used to examine the effect of jury instructions on the likelihood of a subject to label the crime victim's harm as

377. See *supra* Figures 3–4.

bodily injury. To account for a variety of potential subject-level confounds, I ran models that included controls for: race, age, education level, political ideology, knowledge of law, and knowledge of neuroscience. Table C2 reports the regression results, in odds ratios.<sup>378</sup>

*Burglary Scenario.* Responding to the burglary scenario, within the context of no brain argument from the prosecution, we see that even here there is some differentiation by definition. Post-estimation chi-squared tests find that there is a significant difference between *Black's* definition and the federal definition ( $\chi^2(1) = 4.69$ ,  $p < 0.05$ ); between *Black's* definition and the brain-inclusive definition ( $\chi^2(1) = 9.46$ ,  $p < 0.01$ ); and between *Black's* 1990 definition and the brain-inclusive definition ( $\chi^2(1) = 6.71$ ,  $p < 0.01$ ). Subjects who received the brain-inclusive definition were thus significantly more likely than those who received either of the *Black's* definitions to view the victim's injury as a bodily injury.

Looking next at the condition in which the prosecution makes a brain-based argument, subjects exposed to the federal definition were significantly more likely to define the injury as bodily than *Black's* 1990 definition ( $\chi^2(1) = 5.77$ ,  $p < 0.05$ ). Subjects exposed to the brain-inclusive definition were significantly more likely to choose bodily injury than were those who were exposed to *Black's* 1990 definition ( $\chi^2(1) = 4.18$ ,  $p < 0.05$ ).

When subjects are told that a brain scan is added to the prosecution's case, we again see a significant difference emerge between *Black's* 1990 definition and the federal definition ( $\chi^2(1) = 4.62$ ,  $p < 0.05$ ). We see an even stronger gap emerge between *Black's* 1990 definition and the brain-inclusive definition ( $\chi^2(1) = 13.23$ ,  $p < 0.01$ ). This finding supports the argument made in the text that while brain-based definitions combined with proffered brain evidence can be an effective combination in promoting an expansion of bodily injury,<sup>379</sup> this expansion can be significantly limited with the introduction of the *Black's* 1990 definition. In the brain scan scenarios, there was also a significant difference between the brain-inclusive definition and *Black's* current definition ( $\chi^2(1) = 10.18$ ,  $p < 0.01$ ), as well as between the federal definition and the brain-inclusive definition ( $\chi^2(1) = 3.26$ ,  $p < 0.10$ ).

*Assault Scenario.* Similar, though not identical, patterns

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378. Odds ratios in this context can be understood as the ratio of the odds of choosing bodily injury to the odds of choosing not bodily injury.

379. See *supra* Part II.



emerged from the assault scenarios. With no brain argument from the prosecution, I find that there is a significant difference between *Black's* definition and the federal definition ( $\chi^2(1) = 4.77$ ,  $p < 0.05$ ); and between *Black's* definition and the brain-inclusive definition ( $\chi^2(1) = 5.88$ ,  $p < 0.05$ ). There is also a significant difference between *Black's* 1990 definition and federal definition ( $\chi^2(1) = 3.52$ ,  $p < 0.10$ ), and between *Black's* 1990 and the brain-inclusive definition ( $\chi^2(1) = 4.39$ ,  $p < 0.05$ ).

When the prosecution makes a brain-based argument, but does not yet introduce a brain scan, subjects again diverge based on the definition they are exposed to. There is a significant difference between *Black's* definition and the federal definition ( $\chi^2(1) = 2.71$ ,  $p = 0.10$ ); and between *Black's* definition and the brain-inclusive definition ( $\chi^2(1) = 2.64$ ,  $p < 0.10$ ). There is also a significant difference between *Black's* 1990 definition and federal definition ( $\chi^2(1) = 5.52$ ,  $p < 0.05$ ), and between *Black's* 1990 and the brain-inclusive definition ( $\chi^2(1) = 5.51$ ,  $p < 0.05$ ).

Finally, as with burglary, the patterns in bodily injury determination in the assault scenarios are even more pronounced when the subjects are told that the prosecution introduced a brain scan to support its argument. In this context, there is a significant difference between *Black's* definition and the federal definition ( $\chi^2(1) = 4.77$ ,  $p < 0.05$ ); and between *Black's* definition and the brain-inclusive definition ( $\chi^2(1) = 5.88$ ,  $p < 0.05$ ). There is also a significant difference between *Black's* 1990 definition and federal definition ( $\chi^2(1) = 3.52$ ,  $p < 0.10$ ), and between *Black's* 1990 and the brain-inclusive definition ( $\chi^2(1) = 4.39$ ,  $p < 0.05$ ).

Taken together, the results confirm the primary message emphasized in the Article: definitions matter in shaping subject responses to the bodily injury categorization question. Legislatures thus have a powerful tool at their disposal in shaping the contours of the bodily injury category.<sup>380</sup>

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380. See *supra* Part IV.C.

**Table C2**  
**Comparison of Distribution of Subjects in Experiment Two by State to Overall U.S. Distribution**

State	% of U.S. Population	% Of Study Subjects
Alabama	1.5%	0.7%
Alaska	0.2%	0.0%
Arizona	2.0%	2.4%
Arkansas	0.9%	0.5%
California	11.9%	9.4%
Colorado	1.6%	1.2%
Connecticut	1.1%	0.2%
Delaware	0.3%	0.5%
Washington, DC	0.2%	0.2%
Florida	6.0%	5.9%
Georgia	3.1%	5.2%
Hawaii	0.4%	0.5%
Idaho	0.5%	0.0%
Illinois	4.1%	4.5%
Indiana	2.1%	1.6%
Iowa	1.0%	0.9%
Kansas	0.9%	1.4%
Kentucky	1.4%	1.2%
Louisiana	1.5%	0.7%
Maine	0.4%	0.7%
Maryland	1.8%	2.8%
Massachusetts	2.1%	1.4%
Michigan	3.2%	3.8%
Minnesota	1.7%	3.3%
Mississippi	0.9%	1.6%
Missouri	1.9%	1.9%
Montana	0.3%	0.5%
Nebraska	0.6%	0.7%
Nevada	0.9%	0.5%
New Hampshire	0.4%	0.5%
New Jersey	2.8%	1.9%
New Mexico	0.7%	0.5%
New York	6.2%	6.8%
North Carolina	3.1%	3.1%
North Dakota	0.2%	0.7%

State	% of U.S. Population	% Of Study Subjects
Ohio	3.7%	4.7%
Oklahoma	1.2%	0.5%
Oregon	1.2%	1.9%
Pennsylvania	4.1%	4.7%
Rhode Island	0.3%	0.5%
South Carolina	1.5%	1.9%
South Dakota	0.3%	0.2%
Tennessee	2.0%	1.9%
Texas	8.0%	5.9%
Utah	0.9%	0.5%
Vermont	0.2%	0.2%
Virginia	2.6%	4.9%
Washington	2.2%	2.4%
West Virginia	0.6%	0.5%
Wisconsin	1.8%	1.6%
Wyoming	0.2%	0.2%

*Note:* 2010 Census data was downloaded and analyzed from the American Fact Finder Tool. See *American FactFinder*, U.S. CENSUS BUREAU, <http://factfinder2.census.gov/> (last visited Mar. 30, 2013).

**Table C3**  
**Explaining Subject Likelihood to Identify Injuries as**  
**“Bodily” in Two Hypothetical Criminal Scenarios: Re-**  
**sults of Ordered Logistic Regression Analysis**

	Burglary Scenarios				Assault Scenarios			
	No Brain Information Presented	Prosecutor Presents Brain-Based Argument	Prosecutor Also Presents Brain Scan Image	<i>All Variations</i>	No Brain Information Presented	Prosecutor Presents Brain-Based Argument	Prosecutor Also Presents Brain Scan Image	<i>All Variations</i>
Blacks (Current) Def.	-1.30	0.46	-1.13*	-0.51	0.49	1.47	-2.70**	-0.71
	(0.93)	(0.59)	(0.60)	(0.36)	(1.05)	(1.19)	(0.86)	(0.46)
Blacks	-0.53	-0.22	-1.77**	0.91**	-0.34	0.01	-2.41**	-1.42**

	Burglary Scenarios				Assault Scenarios			
	No Brain Information Presented	Prosecutor Presents Brain-Based Argument	Prosecutor Also Presents Brain Scan Image	<i>All Variations</i>	No Brain Information Presented	Prosecutor Presents Brain-Based Argument	Prosecutor Also Presents Brain Scan Image	<i>All Variations</i>
(1990) Def.								
	(0.81)	(0.64)	(0.70)	(0.39)	(1.30)	(1.47)	(0.86)	(0.60)
Federal Def.	0.78	1.30**	-0.25	0.55	2.10**	2.67**	-0.77	0.74*
	(0.74)	(0.58)	(0.59)	(0.34)	(1.00)	(1.11)	(0.62)	(0.39)
Fed Def. + Brain	1.40**	1.04*	0.86	1.05**	1.36	2.69**	-0.61	0.62
	(0.67)	(0.56)	(0.61)	(0.33)	(0.95)	(1.12)	(0.60)	(0.38)
Non-White	-0.21	-0.37	0.74	0.04	0.46	-0.11	0.20	0.28
	(0.62)	(0.49)	(0.50)	(0.29)	(0.63)	(0.70)	(0.56)	(0.34)
Female	0.76	0.09	0.19	0.22	0.50	0.26	0.35	0.36
	(0.55)	(0.39)	(0.45)	(0.24)	(0.65)	(0.56)	(0.53)	(0.30)
Education	-0.24	-0.12	0.16	-0.07	0.09	-0.41*	-0.31*	-0.23**
	(0.17)	(0.15)	(0.15)	(0.09)	(0.20)	(0.22)	(0.17)	(0.10)
Conservative	-0.03	-0.01	0.15	0.03	0.20	0.16	0.23	0.19**
	(0.16)	(0.11)	(0.15)	(0.07)	(0.18)	(0.15)	(0.18)	(0.09)
Knowledge of Neuro	0.05	-0.28*	0.16	-0.00	0.09	0.16	0.28	0.16
	(0.17)	(0.15)	(0.15)	(0.09)	(0.19)	(0.20)	(0.18)	(0.10)
Knowledge of Law	-0.52**	0.16	-0.23	-0.19**	-0.16	-0.42*	-0.27	-0.23*
	(0.23)	(0.17)	(0.18)	(0.10)	(0.24)	(0.25)	(0.21)	(0.12)
Age	-0.04*	-0.02	-0.02	-0.02**	-0.08**	-0.00	-0.02	-0.02**

	Burglary Scenarios				Assault Scenarios			
	No Brain Information Presented	Prosecutor Presents Brain-Based Argument	Prosecutor Also Presents Brain Scan Image	All Variations	No Brain Information Presented	Prosecutor Presents Brain-Based Argument	Prosecutor Also Presents Brain Scan Image	All Variations
	(0.02)	(0.02)	(0.02)	(0.01)	(0.03)	(0.02)	(0.02)	(0.01)
Brain-Based Argument	-	-	-	0.97** *	-	-	-	0.24
				(0.29)				(0.35)
Plus Brain Scan Image	-	-	-	0.99** *	-	-	-	0.84**
				(0.29)				(0.34)
Constant	2.13	0.44	-0.23	0.18	-1.56	-1.33	0.79	-0.77
	(1.43)	(1.10)	(1.17)	(0.68)	(1.66)	(1.81)	(1.32)	(0.82)
N	144	142	139	425	144	142	139	425