

IMPLICATIONS OF NEUROSCIENCE ADVANCES IN TORT LAW: A GENERAL OVERVIEW

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If you look at tort decisions in the last couple of decades and ask what role neuroscience had, the answer is almost none. But we are getting closer to the point at which advances in neuroscience will inform various issues involved in tort law. In this essay, I will focus on four issues. The first two examine the broad outlines of judging non-accidental (intentional) and accidental behavior, including the concepts of choice and duty. The second two focus more specifically on two negligence torts – inflicting emotional harm and requiring psychotherapists to report a dangerous patient to others – to illustrate how advances in neuroscience may influence those torts. Assuming that science can inform these legal issues, the question remains whether removing or reducing the significance of science or empirical questions will (or should) change the legal landscape in tort law, or whether other values or moral judgments are at stake in the area. The legal issues in tort law are normative ones, addressing how we should regulate our lives in a complex society. As advances occur, we will need to address whether the new neuroscience will shift paradigms in tort law.¹ At the very least, a step forward in

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¹ Other commentators, such as Jean Eggen, Eric Laury and Adam Kolber, have explored these issues in the context of tort law, and I draw on their work, as well as my own, in raising some of these issues. *See*

empirical science might enable the law to be clearer about its normative views.

We use various theoretical justifications to support tort law, but most trace to two basic ideas: instrumentalist concerns and corrective justice concerns.² With the former, we try to encourage the most economically efficient way for individuals and entities to behave in a given situation.³ We look beyond the two parties involved in the lawsuit and towards promoting the social good generally.⁴ With the latter, we try to rectify the inequity resulting from one actor wrongfully harming another.⁵ Justice here means shifting the loss suffered by the injured party to the party responsible for the injury.⁶ To promote both these goals, we empower individuals or entities to sue another person or entity in a civil suit and receive monetary compensation if they are successful.

As is commonly known, tort law divides into three areas of liability: negligence, strict liability and intentional torts.

Betsy J. Grey, *Neuroscience and Emotional Harm in Tort Law: Rethinking the American Approach to Free-Standing Emotional Distress Claims*, in 13 LAW AND NEUROSCIENCE, CURRENT LEGAL ISSUES 203 (Michael Freeman ed., Oxford U. 2011); Betsy J. Grey, *Neuroscience, Emotional Harm, and Emotional Distress Tort Claims*, 7 AM. J. BIOETHICS 65 (2007); Jennifer Macchiaroli Eggen & Eric J. Laury, *Toward a Neuroscience Model of Tort Law: How Functional Neuroimaging Will Transform Tort Doctrine*, 13 COLUM. SCI. & TECH. L. REV. 235 (2012); Adam J. Kolber, *Will There Be a Neurolaw Revolution*, 89 IND. L.J. 807 (2014).

² See DAN B. DOBBS, THE LAW OF TORTS 12-20 (W. Academic Pub. 2000).

³ See Richard A. Posner, *A Theory of Negligence*, 1 J. LEGAL STUD. 29, 32 (1972).

⁴ MARK A. GEISTFELD, ESSENTIALS OF TORT LAW 68 (Aspen 2008) (“[e]fficiency analysis assumes that the objective of tort liability is to minimize the social costs of accidents [which] increases social wealth and . . . welfare”).

⁵ DOBBS, *supra* note 2, at 15.

⁶ Yale Philosophy Professor Jules L. Coleman is a leading proponent of the corrective justice theory of tort law. See e.g., Jules L. Coleman, *Tort Law and the Demands of Corrective Justice*, 67 IND. L.J. 349 (1992); Jules L. Coleman, *The Mixed Conception of Corrective Justice*, 77 IOWA L. REV. 427 (1992); Jules L. Coleman, *Justice and Reciprocity in Tort Theory*, 14 U. W. ONT. L. REV. 105 (1975).

These reflect different ways that we judge behavior and our basic theoretical justifications are adjusted depending on the regime under which we are operating. But all are premised on the ability to make a choice with regard to how to behave. Tort law determines when to make people accountable for those choices. If neuroscience redefines what we mean by “choice” – if it is much more determined by neural activity in our brains than previously appreciated – we will need to examine how that affects the operation of tort law and its theoretical underpinnings. I turn to examine this question in the context of non-accidental and accidental behavior, the two areas most affected by the determination of “choice.”

I. INTENTIONAL ACTS

Only one theory of liability in tort law examines the mental state of the actor – when we judge non-accidental or intentional behavior.⁷ Intentional torts are the closest theory of liability to criminal law and although the two systems have different goals, the law evaluates the state of mind of the actor in a similar fashion. Typically, we ask the factfinder to determine the state of mind by using circumstantial evidence – both background information of the actor as well as direct evidence of behavior at the time of the incident.

We judge this state of mind differently from criminal law in the sense that we are not looking for mens rea (“guilty mind”).⁸ In tort law, the defendant does not need to understand that his or her actions were wrong. Instead, to determine intent, we look for purpose and knowledge.⁹ Battery, for example, involves purposefully and knowingly – intentionally – acting to make an unconsented to touching

⁷ See GEISTFELD, *supra* note 4, at 114 (“All intentional torts share the common element of intent. . .”).

⁸ See DOBBS, *supra* note 2, at 49-50 (“A defendant whose conduct is intentional is not necessarily a defendant who has a bad motive or who is conscious that he is committing a legal wrong”).

⁹ RESTATEMENT (THIRD) OF TORTS: PHYS. AND EMOT. HARM § 1 (2010).

or offensive contact.¹⁰ The plaintiff must show that the defendant has the requisite intent – the desire to cause the offensive contact or the understanding that the consequence is substantially certain to occur. We are concerned with the specific aim to carry out an act. This is a subjective test.¹¹ The defendant must have the capacity to form the intent, but mental limitations are not taken into account except at the most extreme levels, constituting legal incapacity.¹² Similar concerns come into play with regard to the privilege of consent – we examine whether the plaintiff consented to the harmful act and whether the plaintiff had the capacity to consent.¹³

Advances in neuroscience technology may help us to evaluate these states of mind. Most relevant here is the study of brain processes that are involved in moral reasoning and judgment.

Philosophy and legal scholars have been engaged in a heated debate about the application of advances in neuroscience to determining states of mind and responsibility. This stems from a longstanding debate – argument about phrenology goes back centuries – and the debate reflects our continuous efforts to reconcile biology with philosophy. It boils down to asking how much choice we make when we act. Most of the debate examines the impact of neuroscience in the courtroom in the context of criminal law, both for guilt and for sentencing. Stephen Morse has led the argument resisting the notion that behavior is completely determinative, which would be a movement away from the “folk psychology” explanation of human behavior.¹⁴ Under the folk psychology view,

¹⁰ *Id.* at § 5.

¹¹ *See* DOBBS, *supra* note 2, at 49 (as a state of mind, intent is necessarily subjective).

¹² *See* GEISTFELD, *supra* note 4, at 118 (liability can be imposed on persons with mental conditions who had a delusional reason to commit tort).

¹³ *See* DOBBS, *supra* note 2, at 224 (individuals who may not be able to give effective consent include minors, persons who are intoxicated or insane).

¹⁴ *See* Stephen J. Morse, *Determinism and the Death of Folk Psychology: Two Challenges to Responsibility from Neuroscience*, 9

although biology and sociological factors can play a causal role, mental states are fundamental to a full causal explanation of human action. Behavior is explained “in terms of desires, beliefs and intentions”¹⁵ and virtually everything is a product of mental causation. Only people, not the machinery of a brain, can intend to do wrong under this view. Michael Gazzaniga similarly argues that moral responsibility is a normative and legal concept that is distinguishable from physical measurements in the brain.¹⁶ Joshua Greene and others support a more determinative view of human behavior, using advances in neuroscience to suggest that the choice or decision to act in a certain way is much more complicated than the law originally understood.¹⁷

The argument on neural determinism became sharply focused with the work of Benjamin Libet in the 1980s.¹⁸ Libet measured brain activity during voluntary hand

MINN. J. L. SCI. & TECH. 1 (2008). Morse rejects “hard determinism” (a position which holds determinism is true and therefore necessarily no one can rightly be said to be responsible for their actions), but rather takes the “compatibilist” position, which holds that determinism is *not* inconsistent but compatible with common notions of agency and responsibility. *Id.* at 15-19.

¹⁵ *Id.* at 2-3.

¹⁶ See MICHAEL S. GAZZANIGA, THE ETHICAL BRAIN 101 (2005); Michael S. Gazzaniga & Megan S. Steven, *Free Will in the Twenty-first Century, A Discussion of Neuroscience and the Law*, in NEUROSCIENCE AND THE LAW, BRAIN MIND AND THE SCALES OF JUSTICE 51, 66 (Brent Garland ed., Dana Press 2004); Benedict Carey, *Profiles in Science: Michael S. Gazzaniga, Decoding the Brain's Cacophony*, N.Y. TIMES, Nov. 1, 2011 at D1, available at <http://www.nytimes.com/2011/11/01/science/telling-the-story-of-the-brains-cacophony-of-competing-voices.html?pagewanted=all&r=0> (Gazzaniga views attempts at defining judgment and free will in terms of biological processes as a “fool’s game”).

¹⁷ See Joshua Greene & Jonathan Cohen, *For the Law, Neuroscience Changes Nothing and Everything*, 359 PHIL. TRANSACTIONS ROYAL SOC’Y BIOLOGICAL SCI. 1775 (2004). Greene and Cohen deem free will “an illusion generated by our cognitive architecture.” *Id.* at 1784. The authors embrace “hard determinism” and, in light of this, suggest retributivist notions of criminal responsibility are misguided and ought give way to consequentialist ones. *Id.*

¹⁸ See BENJAMIN LIBET, MIND TIME: THE TEMPORAL FACTOR IN IN CONSCIOUSNESS (Harv. U. Press 2004).

movements. He found that between 500 and 1000 milliseconds before we actually move our hand there is a wave of brain activity.¹⁹ He called this period the readiness potential.²⁰ Libet set out to determine the time between that 500 and 1000 milliseconds when we make the conscious decision to move our hand. He found that the time between the readiness potential and the moment of conscious decision making was about 300 milliseconds.²¹ If the readiness potential of the brain is initiated before we are aware of making the decision to move our hand, it would appear that our brains know our decisions before we ever become conscious of them.

Studies like Libet's and others that it has spawned show promise in using functional magnetic resonance imaging ("fMRI") technology to indicate the intention to perform a task before the choice to act was finalized by the actor. This may help us understand and perhaps one day document the brain processes involved in choosing one course of conduct over another, which is precisely the issue that intentional torts address. Although that day is a long way off, studies of brain processes associated with decision making based on averages potentially could be used to help a jury determine whether an individual has a brain impairment that would interfere with the ability to form the requisite intent or consent even if it does not rise to the level of total incapacity.

Even more intriguing is the possibility that neuroimaging evidence could be used to show the defendant's state of mind at a particular level of development. With this evidence, defendants in a civil case potentially could argue that they never had the purpose or knowledge to commit the act in question. In *Roper v. Simmons*,²² the Supreme Court accepted that at least on average persons under the age of eighteen are unable to appreciate the nature of their crimes and take moral

¹⁹ Benjamin Libet et al., *Time of Conscious Intention To Act In Relation To Onset of Cerebral Activity*, 106 BRAIN 623 (1983).

²⁰ *Id.*

²¹ *Id.* at 636.

²² 543 U.S. 551 (2005).

responsibility for their actions, and found that those individuals cannot constitutionally be subjected to the death penalty.²³ This holding was partially based on fMRI evidence suggesting that adolescents do not have fully developed brains, in particular with regard to the frontal cortex – the area associated with impulse control.²⁴ The same evidence demonstrated that adolescents rely more heavily than adults on the amygdala – the emotional center of the brain – for decision making in certain areas.²⁵ Perhaps based on similar evidence, a comparable paradigm shift will occur with regard to intentional torts, even though there is no constitutional overlay.

A major obstacle is that the neuroscience evidence must be relevant to the mental processes involved at the time the act was undertaken as opposed to the time the data were collected. This was precisely the problem presented in the *Semrau* case in Tennessee.²⁶ There, the defendant was trying to show lack of intent to defraud the Medicare system at the time he submitted the paperwork, years before the trial. He wanted to use fMRI test results as lie detector/brain fingerprinting evidence to demonstrate his knowledge and intent at the time of the act.²⁷ This was deemed inadmissible.²⁸

The ability of neuroscience to look at brain activity retroactively may always be limited.²⁹ And, even if we had

²³ *Id.* at 569.

²⁴ Numerous parties filed amicus briefs proffering arguments based on neuroimaging on behalf of respondent, including the American Psychological Association, the American Psychiatric Association, and the American Medical Association. *See e.g.* Brief of the American Medical Association et al. as Amici Curiae in Support of Respondent at 18, *Roper v. Simmons*, 543 U.S. 551 (2005) (No. 03-633) 2004 WL 1633549.

²⁵ *Id.* at 11. *See* Richard A. Friedman, *Why Teenagers Act Crazy*, Sunday Review, N.Y. TIMES, June 29, 2014, at SR 1 (discussing neurological underpinnings of the greater capacity of the adolescent brain for negative emotion but lesser capacity for rationality).

²⁶ *United States v. Semrau*, 693 F.3d 510 (6th Cir. 2012).

²⁷ *Id.* at 515.

²⁸ *Id.* at 516.

²⁹ *See, e.g.*, Teneille Brown & Emily Murphy, *Through a Scanner Darkly: Functional Neuroimaging as Evidence of a Criminal*

some insight into prior brain activity, brains change over time. So if a person were capable of forming intent at one point in time, that showing does not mean that the same capability exists at another point in time.³⁰ Further, brain studies are averages, and an individual may vary from the average scan but still be well within some “normal” range.³¹ Improvements in brain fingerprinting technology and brain wave tests may potentially help determine the knowledge of the defendant at the time of the tort, but we are far from this point.

Although it is unlikely that functional imaging will replace the conventional types of external, circumstantial evidence in determining whether the requisite intentional state has been met, it is entirely plausible that it may at least supplement this evidence. Further, even if individualized proof is not possible, or admissible, it may still force us to reexamine the broader implications of tort law in this area based on averages.

II. NEGLIGENT ACTS AND THE REASONABLE PERSON

Turning to accidental behavior, the largest area of focus in torts, we judge what we call negligence based on objective

Defendant's Past Mental States, 62 STAN. L. REV. 1119, 1167 (2010); Owen D. Jones et al., *Brain Imaging for Legal Thinkers: A Guide for the Perplexed*, 2009 STAN. TECH. L. REV. 5 (2009). Aside from establishing the plaintiff's baseline, other major stumbling blocks with regard to practical applications of neuroimaging persist. Extrapolating information gleaned in generalized studies to a specific instance (individuation) will likely remain a difficulty. Brown & Murphy, *supra*, at 1149-50. Another practical problem is dealing with the different paces at which science will document different disorders. If we can offer neuroscientific support for some claims but not for others, should we disallow the claim for the scientific laggards?

³⁰ As there is no way to recreate an individual's exact emotional and cognitive state at a given time, it is difficult to draw conclusions about past mental states from images taken in the present. See Brown & Murphy, *supra* note 29, at 1167.

³¹ *Id.* at 1182-83. An “average” brain is an inadequate point of reference for drawing conclusions about a given individual brain. What would be needed is an average brain from a population who share all the relevant characteristics with the individual being studied; perhaps, characteristics such as race, gender, and intelligence, among others. *Id.*

and external behavior, in contrast to the subjective state of mind involved in intentional torts. We judge that behavior based on what a reasonable person would do under similar circumstances and call that reasonable or due care.³²

The reasonable person's conduct varies according to the circumstances; it is a situational view. We assume that the reasonable person will take into account certain criteria when deciding how to act, such as the seriousness and likelihood of the risk involved and the burden of taking remedial measures.³³ The standards applied to the reasonable person, according to Justice Holmes, are "standards of general application. The law takes no account of the infinite varieties of temperament, intellect, and education which make the internal character of a given act so different in different men."³⁴

There are various explanations of why we settled on this objective standard, but the most significant ones are that it offers the ease of application, an accessible translation of community expectations, and the avoidance of arbitrary interpretation.³⁵ If we used a subjective standard instead, and tried to take into account everyone's individual characteristics and capabilities, then we would be left with no rule at all, since the idea of exercising judgment would vary infinitely among individuals. As a result, tort law takes very few individual characteristics into account – not even mental capacity or old age – when trying to judge accidental behavior.³⁶ A notable exception to this general

³² See DOBBS, *supra* note 2, at § 127. ("The duty owed by all people generally . . . is the duty to exercise the care that would be exercised by a reasonable and prudent person under the same or similar circumstances to avoid or minimize risks of harm to others.") (footnote omitted) (citations omitted).

³³ Posner, *supra* note 3, at 32.

³⁴ OLIVER WENDALL HOLMES, *THE COMMON LAW* 108 (1881).

³⁵ See DOBBS, *supra* note 2, at 286 ("One justification for objective standards in law generally is that they are essential if the judicial process is to remain accessible and accountable. Lawyers and litigants cannot evaluate judges or the legal process itself if judges could decide cases by what they felt in their heart or on the basis of messages from the Deity without reference to any standards. . . .").

³⁶ *Id.* at 284-85.

rule addresses physical characteristics that we can objectify easily, such as blindness and deafness.³⁷

Although physical disabilities may offer an exception to the objective standard, mental disabilities have never been treated the same way.³⁸ This is perhaps in fear of determining who is “normal” or not; out of fairness to the plaintiff, who may not be able to refute defendant’s claim of mental disabilities; or perhaps because once those with mental disabilities are permitted to live in the world, they should be held to conform to reasonable behavior – even without the capacity to do so – or put pressure on their caretakers to increase their supervision of the individual party.³⁹ These same reasons may also account for the way we treat old age, which we generally do not take into account to determine the reasonable person standard.

Neuroscience advances have begun to give us the ability to objectify mental characteristics, however. If that occurs, these advances will challenge the difference in treatment in negligence for physical and mental characteristics and the reasons for bifurcating treatment of physical and mental capacity may no longer be supportable. We may treat a mental disability like a physical disability and a party’s individual mental capabilities could be taken into account by transforming the test of reasonableness to one that compared the defendant’s actions to a reasonable person with this mental condition. This potentially would create a big inroad into the objective reasonable person standard, or at the very least, it would challenge us to determine whether there are other public policy reasons that drive the distinction between treatment of mental and physical characteristics.

We have begun to recognize that physical and mental disabilities may be closely related, such as dementia in old

³⁷ *Id.* at 281-82.

³⁸ RESTATEMENT (THIRD) OF TORTS: PHYS. & EMOT. HARM § 11(c)(2010) ([a]n actor’s mental or emotional disability is not considered in determining whether conduct is negligent”).

³⁹ DOBBS, *supra* note 2, at 284-85.

age and post-traumatic stress disorder (“PTSD”).⁴⁰ With this insight, we will need to reexamine how we should treat individuals who are affected in this way – as physically disabled, and thus potentially held to an individual capacity, subjective standard, or as mentally disabled, in which case we would not take it into account in judging the reasonableness of behavior. Other policy reasons may be driving the distinction, however. The Restatement (Third) of Torts acknowledges that “many mental disabilities have organic causes” but does not advocate treating mental and physical disabilities the same.⁴¹ Instead, it points to policy reasons for maintaining the distinction similar to those noted above: the problems of administrability for both less severe and more severe mental disorders; problems with causation determinations; as well as questioning whether the person should be allowed to engage in the normal range of activities within society.⁴² At the same time, scholars, including myself, have begun to call for an abandonment of the bifurcated rule in tort doctrine as neuroscience closes the gap between the two.⁴³

A very interesting common law exception to the general rule of applying objective criteria to judge negligence is

⁴⁰ See e.g. Li Wang et al., *Performance-Based Physical Function and Future Dementia in Older People*, 166(10) ARCHIVES INTERNAL MED. 1115 (2006) (finding lower performance on physical tests correlated with greater risk of dementia); Lisa Shin et al., *Regional Cerebral Blood Flow in the Amygdala and Medial Prefrontal Cortex During Traumatic Imagery in Male and Female Vietnam Veterans with PTSD*, 61 ARCHIVES GEN. PSYCHIATRY 168 (2004) (documenting physiological changes to brain after experiencing trauma).

⁴¹ RESTATEMENT (THIRD) OF TORTS: PHYS. & EMOT. HARM § 11 cmt. e (2010).

⁴² *Id.*

⁴³ See Grey, *Neuroscience and Emotional Harm in Tort Law: Rethinking the American Approach to Free-Standing Emotional Distress Claims*, *supra* note 1, at 203; see also Adam J. Kolber, *The Experiential Future of the Law*, 60 EMORY L.J. 585, 622 (2011) (“From a theoretical perspective, there are no good grounds for these [additional tests regarding emotional harm claims, i.e., “zone of danger” or “physical impact,” etc.] unless they are understood as inaccurate proxies for the measurement of the intensity of a plaintiff’s emotional distress. In the experiential future, such proxies should become less and less important).

children. We try to judge the behavior of a child against the standard of an ordinary child of like age, experience and intelligence.⁴⁴ This is more subjective than the general reasonable person standard; we do take individual capacity into account. It is provocative to explore why we do this – it may be because we have a social view of what children ought to do, what ought to be childhood activities, and so we do not hold children responsible for the consequences of their behavior so long as they exercise ordinary care of a like child. Perhaps we assume that others in the community will take care to avoid consequences of children’s activities, like the driver avoiding the child who runs into the road to chase his ball. Or perhaps we want to give children eighteen years to develop at their own pace, but after that, they will be held to an objective, community standard. And yet, as noted above, we do not make the same accommodations with regard to age and infirmity when judging behavior. We may think that the pace at which people move from adulthood to old age is less uniform than the pace at which people move from childhood to adulthood. Neuroscience advances may confirm or challenge these assumptions.

At bottom, we assume that children are less able than adults to exercise reasonable care. As noted previously, the Supreme Court is willing to acknowledge differences in child development in criminal law and sentencing. Neuroscience evidence may make the objective developmental cognitive stage of children more accessible as well as the subjective developmental cognitive stage of the child in question. This will push us to reexamine the standards for children when judging accidental behavior in civil cases. What if neuroscience could tell us that an individual who is eighteen actually has the brain development of a fifteen-year-old? Or the fourteen-year-old has the brain development of an eighteen-year-old? These findings would challenge our bright lines of majority and

⁴⁴ RESTATEMENT (THIRD) OF TORTS: PHYS. & EMOT. HARM § 10 cmt. a (“A child’s conduct is negligent if it does not conform to that of a reasonable careful person of the same age, intelligence, and experiences. . . .”)

minority, and would force us to adjust our rules to apply developmental tests to both.⁴⁵

Skill is another interesting exception to the objective rule. Generally, we hold persons of higher skill to the level of their capacity in determining breach of duty.⁴⁶ We use external measures to show this. The archetype is doctors: brain surgeons are held to a higher standard of skill when they operate.⁴⁷ If we could measure the individual capacity for decision making through neuroscience advances, we may as a normative matter expect “better” or more careful decisions from individuals with more developed decision-making processes.

Finally, one potential of neuroscience advances is, instead of individualizing, we can make “community standards” more objective, without needing to rely on the subjective view of a jury of six, eight, or twelve people. We could possibly determine general normative standards of reasonable care. Neuroscientists have been studying how people make choices and how brain processes respond to different problem sets involving moral, emotional and utilitarian problems.⁴⁸ Neuroscience is beginning to identify the parts of the brain involved in moral decision making, and finding that emotions play some role.⁴⁹ Some

⁴⁵ Related issues will likely arise in the context of concussive injuries and youth sports. Although defendants (potentially sports organizations, schools, or equipment manufacturers) are likely to charge plaintiffs with comparative fault, it may be difficult to determine at what point brain development has been impaired and whether that impact has affected judgment. Neuroscience advances may help us determine consent and assumption of risk in those settings.

⁴⁶ RESTATEMENT (THIRD) OF TORTS: PHYS. AND EMOT. HARM § 12 (2010) (“If an actor has skills or knowledge that exceed those possessed by most others, these skills or knowledge are circumstances to be taken into account in determining whether the actor has behaved as a reasonably careful person.”).

⁴⁷ See DOBBS, *supra* note 2, at 290.

⁴⁸ See Joshua D. Greene, *The Cognitive Neuroscience of Moral Judgment*, in MICHAEL S. GAZZANIGA, *THE COGNITIVE NEUROSCIENCES* 987, 990-91 (MIT Press 4th ed. 2009). Greene observed fMRI images while participants responded to questions in relation to moral dilemmas such as the “Trolley Problem.” *Id.*

⁴⁹ The amygdala is typically implicated in these findings. See *id.* at 990-94 (offering an overview of the relevant studies).

scholars criticize this research as suffering from methodological flaws,⁵⁰ casting doubt on any conclusions drawn from the studies. Nevertheless, it is believed these issues can be resolved⁵¹ and even critics of the studies are optimistic as to the efficacy of this avenue of research,⁵² which will presumably lead to better information on the brain processes of the reasonable person. Right now, we do not couch our studies in terms of the “reasonable” person, but at some point these averaged results could offer some useful generalized information.

Two negligence-based torts provide examples of the impact that neuroscience advances may have on specific torts: the tort involving infliction of emotional harm and the duty of a psychotherapist to warn a third party of the dangerous tendencies of his patient.

III. SUBSTANTIATING EMOTIONAL HARM

The general rule at common law is that a negligent actor is not responsible for conduct that causes only mental distress.⁵³ Slowly, certain exceptions developed to this

⁵⁰ See G. Kahane & N. Shackel, *Methodological Issues in the Neuroscience of Moral Judgment*, 25 MIND & LANGUAGE 561, 565-72 (2010) (criticizing Joshua Greene’s work [*supra* note 48] for imprecise question framing in relation to the moral dilemmas, the lack of inquiry into the moral reasoning which lead to the participants responses, and for equating a response to a given moral dilemma to a belief in a certain moral theory generally); J.F. Christensen & A. Gomila, *Moral Dilemmas in Cognitive Neuroscience of Moral Decision-Making: A Principled Review*, 36 NEUROSCIENCE AND BIOBEHAVIORAL REV. 1249 (2012) (noting various issues with the formation of the dilemmas and the framing of the corresponding questions in Joshua Greene’s [*supra* note 48] and others’ similar studies).

⁵¹ See *e.g.* Christensen, *supra* note 50, at 1262 (suggesting the methodological pitfalls of these studies can be remedied through greater care in identifying and controlling independent variables).

⁵² See *id.* (concluding “moral dilemmas in Neuroethics has much to contribute to our understanding of human moral psychology. . . . and “are a highly valuable tool for assessing human moral cognition”).

⁵³ RESTATEMENT (THIRD) OF TORTS: PHYS. & EMOT. HARM § 47 cmt b (2012) (citing exceptions to general rule that an actor is not liable for negligent conduct that causes only emotional harm); Robert J. Rhee, *A Principled Solution for Negligent Infliction of Emotional Distress*

general rule, but it has never been given equal status with other tort claims. At bottom, this difference in treatment reflects the fundamental belief that the free standing claims of “emotional harm” are “less deserving” than those for physical consequences.

Courts moved slowly and cautiously for several reasons. Validity has always been a primary concern, with the fear that the claim may be untrustworthy.⁵⁴ In addition, courts expressed concern that the claim was trivial, or might give rise to the proverbial floodgates to claims for money damages, or might provide an easy way to make false claims.⁵⁵ Thus, rather than rely solely on foreseeability of harm as a prerequisite to recover for emotional harm accidentally inflicted, courts developed a series of limiting tests, such as the “physical impact” test, evidence of some physical manifestation of the shock or fright that has occurred, or a showing that the plaintiff was in the “zone of physical danger” by virtue of the defendant’s negligence.⁵⁶

From an instrumentalist viewpoint, the limitations reflect the concern of opening the floodgates of litigation as well as the related concern of potentially crushing liability. The courts recognized the need to prioritize claims in a pool of limited funds and decided to prioritize physical and property damage claims over emotional harm claims.⁵⁷ And

Claims, 36 ARIZ. ST. L. J. 805, 813 (2004) (“common law did not recognize claims for mental injuries from negligent acts”).

⁵⁴ JOHN L. DIAMOND ET AL., UNDERSTANDING TORTS 146 (LexisNexis 3d ed. 2007) (“Because of general skepticism of emotional distress as an injury, and fear that permitting emotional distress recovery will lead to fraudulent claims, much judicial effort has gone toward constraining this cause of action.”); See RESTATEMENT (THIRD) OF TORTS: PHYS. & EMOT. HARM § 47 cmt. 1 (2012) (“the seriousness threshold assists in ensuring that claims are genuine. . .”).

⁵⁵ See e.g., John J. Kircher, *The Four Faces of Tort Law: Liability for Emotional Harm*, 90 MARQ. L. REV. 789, 808 (2007).

⁵⁶ See *id.* at 810-15 (discussing the history of the “physical impact,” “physical manifestation,” and “zone of danger” requirements and identifying jurisdictions that make use of these gatekeeping tests).

⁵⁷ See Robert L. Rabin, *Emotional Distress in Tort Law: Themes of Constraint*, 44 WAKE FOREST L. REV. 1197, 1200 (2009). Professor Rabin, in reference to asbestos litigation, explains:

they are also concerned that liability for emotional harms would be disproportionate to the tort involved, since a single tort could cause a large number of people to suffer some degree of distress.⁵⁸ These themes reflect a commitment to curtail widespread litigation rights.

Underlying much of this is the assumption that physicians who treat disorders of the body can point to empirical evidence whereas those who treat disorders of the mind cannot. This is true. We cannot point to the underlying biological bases of most psychiatric disorders. We do not understand them as well as we understand disorders of the heart or the stomach. But this is beginning to change.

The advances in research with regard to depression provide a good example. We are beginning to understand the outlines of the neural circuit that is involved in depression. Dr. Helen Mayberg is using brain scanning to identify this circuit. Her research suggests that two are particularly important: Area 25 (the subcallosal cingulate region), which mediates unconscious and motor responses to emotional distress; and the right anterior insula, a region where we experience self-awareness and awareness of others.⁵⁹

Dr. Mayberg gave people with diagnosed depression one of two types of treatment: cognitive behavioral therapy, which is a form of psychotherapy; or an antidepressant

Not too far into the tidal wave of bankruptcies, it became apparent that prioritizing claims was an absolute necessity if depletion of the limited pool of available funds was to reflect fairness considerations, namely, recognizing the compelling claims for ‘most deserving’ on the part of those suffering the most serious physical consequences.

Id.

⁵⁸ *Id.* at 1203 (discussing a “fairness concern about disproportionality between responsibility for accidentally imposed harm and ‘stacked claims’—that is, multiple claims by distressed family members in virtually every case of negligently caused serious injury or death of a primary victim”).

⁵⁹ Helen S. Mayberg et al., *Toward a Neuroimaging Treatment Selection Biomarker for Major Depressive Disorder*, 70(8) JAMA PSYCHIATRY 821 (2013).

medication. She found that people with below-average baseline activity in the right anterior insula responded well to the psychotherapy but did not respond well to the medication.⁶⁰ People with above average activity in the right anterior insula responded to the medication but not to the psychotherapy.⁶¹ She thus found that she could predict a depressed person's response to specific treatments by their baseline activity in the right anterior insula.⁶²

These results suggest that we can identify measurable specific markers of a mental disorder. And we can use those biomarkers to predict the outcome of two different treatments, psychotherapy and medication. It also suggests that the effects of psychotherapy are biological and detectable and can be measured empirically. That is a very significant advance in the way we look at the biology of mental disorders.

Another interesting example involves the research on the neural circuit that is involved in PTSD, which is a highly studied area. On a most basic level, it seems that two key structures are involved: the amygdala and prefrontal cortex.⁶³ The amygdala is considered the emotional center of the brain, which stimulates the "arousal system" when trauma and stress are experienced.⁶⁴ The pre-frontal cortex is considered the controlling mechanism to keep our emotions in check.⁶⁵ The prefrontal cortex regulates our experience of emotion, and it naturally compensates for aversive events.⁶⁶ When allowed to

⁶⁰ *Id.* at 826-27.

⁶¹ *Id.*

⁶² *Id.* at 827.

⁶³ Michael Koenigs & Jordan Grafman, *Post-traumatic Stress Disorder: The Role of Medial Prefrontal Cortex and Amygdala*, 15 *NEUROSCIENTIST* 540, 547 (2009).

⁶⁴ J.L. McGaugh, *Memory Consolidation and the Amygdala: A Systems Perspective*, 25 *TRENDS IN NEUROSCIENCE* 465 (2002). The basolateral complex of the amygdala is activated by emotional arousal, helping to consolidate emotionally charged experiences into the long-term memory. *Id.*

⁶⁵ Arthur P. Shimamura, *The Role of the Prefrontal Cortex in Dynamic Filtering*, 28 *PSYCHOBIOLOGY* 207, 213 (2000).

⁶⁶ Benno Roozendaal et al., *Stress, Memory and the Amygdala*, 10 *NATURE REV. NEUROSCIENCE* 423, 423 (2009).

function properly the prefrontal cortex facilitates the formation of new connections that overrides the traumatic memory (a process called extinction).⁶⁷

Scientists now believe that anxiety disorders, including PTSD, result when the circuitry between the amygdala and the pre-frontal cortex is disrupted. In other words, acute stress can impair the pre-frontal cortex function. Our natural response to dealing with stress and trauma does not occur: the amygdala is not inhibited and continues to be hyperactive. Extinction does not occur and we exhibit anxiety symptoms.⁶⁸

This malfunction or dysregulation leads to alterations in the interpretative processes – more precisely, a threat-oriented bias in anxious individuals. This means that individuals with anxiety disorders react with distress and hyperarousal to stimuli that objectively would be interpreted as neutral or only mildly adverse. These individuals attempt to avoid the anxiety-provoking object or situation. Eventually, this dysregulation is reflected on a behavioral level when outward symptoms start to present themselves. We view these as clinically significant symptoms.

These resulting physiological changes in the brain following a trauma – and the advances in science that allow us to study them in greater and greater depth – provide a basis for the theory that it may be possible to quantify the *physical* changes in the brain that underlie what we think of as emotional harm.

Several studies support this theory linking amygdalar dysfunction and anxiety disorders. A 2004 study by Lisa Shin compared the positron emission tomography (“PET”) scans of seventeen Vietnam veterans with diagnosed PTSD to PET scans of nineteen Vietnam veterans without PTSD.⁶⁹

⁶⁷ *Id.* at 427-31.

⁶⁸ *Id.*

⁶⁹ Lisa Shin et al., *supra* note 40, at 168. The researchers used script-driven imagery to conduct the study. All of the male participants had served in combat and all of the female participants had served as nurses in Vietnam. None of the veterans had a history of head injury, neurological disorders, or other major conditions. *Id.* at 169.

Results of the study indicated hyperresponsivity of the amygdala and hyporesponsivity of the medial prefrontal regions of those diagnosed with PTSD.⁷⁰ The more hyper- and hypo-active these regions were, respectively, the more severe the symptoms.⁷¹ While such a relationship between the amygdala and medial prefrontal regions in clinically diagnosed PTSD patients had been suspected, no previous studies in the literature had documented data in support of such a relationship.

A meta-analysis conducted by Etkin and Wager compared fMRI and PET scans of individuals with one of three anxiety disorders, including PTSD, with scans of healthy individuals who had undergone fear conditioning.⁷² The results indicated that patients with the anxiety disorders showed consistently greater activity in the amygdala and insula.⁷³ The most exaggerated dysregulation was in the neural circuitry of PTSD.

These are just two studies, but they indicate that scientists may now begin to document and observe the physiological changes that occur in the brain after experiencing trauma.

They suggest that one day we may be able to use biological markers to determine whether and when individuals suffer from emotional harm. Suffering distress over time may result in physical symptoms or differences in the brain. In other words, neuroscience may lead us to the principle that our mind and our brain are inseparable, at least with regard to what we think of as emotional harm. At the least, these advances suggest that we should not limit the claim because of failure of proof. They should allow us to move away from the more artificial and arbitrary tests in this area and to redraw the sharp distinction between physical and emotional harms drawn in

⁷⁰ *Id.* at 174.

⁷¹ *Id.*

⁷² Amit Etkin & Tor D. Wager, *Functional Neuroimaging of Anxiety: A Meta-Analysis of Emotional Processing In PTSD, Social Anxiety Disorder, and Specific Phobia*, 164 AM. J. PSYCHIATRY 1476 (2007) (The researchers analyzed social anxiety disorder, PTSD, and specific phobia).

⁷³ *Id.* at 1476.

the law, or at least clarify our reasons for allowing or disallowing compensation for this harm.

IV. THE PSYCHOTHERAPIST'S DUTY TO WARN

A second example of how advances in neuroscience may challenge a negligence-based duty involves the duty of psychotherapists. A lot has changed since Justice Tobriner of the California Supreme Court wrote the following in 1976 in the seminal case, *Tarasoff v. Regents of the University of California*:⁷⁴

When a therapist determines, or pursuant to the standards of his profession should determine, that his patient presents a serious danger of violence to another, he incurs an obligation to use reasonable care to protect the intended victim against such danger.⁷⁵

The *Tarasoff* case thus requires psychotherapists sometimes to breach patient confidentiality and move outside their role as care-givers of individual patients, to function as an agent for social protection. Almost every state has accepted and some have extended *Tarasoff*, although a few jurisdictions have rejected it.⁷⁶ Some states have adopted it by case law and others by statute.⁷⁷ New York State enacted legislation in 2013 that moves that state's law from a permissive to a mandatory duty for mental health professionals to report when they believe that

⁷⁴ 551 P.2d 334 (Cal. 1976).

⁷⁵ *Id.* at 340.

⁷⁶ MARC A. FRANKLIN ET AL., TORT LAW AND ALTERNATIVES: CASES AND MATERIALS 160 n.6 (Foundation Press 9th ed. 2011) ("Most states have accepted and some have extended *Tarasoff*"); Peter F. Lake, *Revisiting Tarasoff*, 58 ALB. L. REV. 97, 98 (1994).

⁷⁷ *See e.g.*, IDAHO CODE ANN. § 6-1903 (2014); MICH. COMP. LAWS § 330.1946 (2015); MONT. CODE ANN. § 27-1-1102 (2014); *Bardoni v. Kim*, 390 N.W.2d 218, 221-22 (Mich. Ct. App. 1986); *Peck v. Counseling Serv.*, 499 A.2d 422, 425 (Vt. 1985); *McIntosh v. Milano*, 403 A.2d 500, 506-07 (N.J. Super. Ct. Law Div. 1979); *Bradley v. Ray*, 904 S.W.2d 302, 306-11 (Mo. Ct. App. 1995).

patients may pose a danger to themselves and others, but protects therapists from both civil and criminal liability for failure to report if they act in “good faith.”⁷⁸

The key question under *Tarasoff* is the psychotherapist’s ability to predict the danger of committing violence to another.

Given the recent history of mass shootings in our country, we are sharply focused on the ability to predict violence before it happens. In the nearly four decades since *Tarasoff*, the field of violence risk assessment has grown tremendously.⁷⁹ These developments in risk assessment research – in particular with regard to neuroimaging – have tremendous implications for the professional standards of conduct for psychotherapists and the imposition of the duty to warn.

One example of research in this area is that of Professor Kent Kiehl, who has been performing brain imaging scans on incarcerated individuals in the New Mexico state prison system.⁸⁰ In the first three years of his testing, more than 1100 inmates volunteered to participate in the fMRI studies, creating a very large database.⁸¹ His findings are fascinating: they show a “robust and persistent pattern of abnormal brain function” in the psychopathic population, “namely decreased neural activity in the paralimbic regions

⁷⁸ N.Y. MENTAL HYGIENE LAW § 9.46 (McKinney 2015). This provision was written in the context of gun control legislation. 2013 N.Y. Sess. Laws Ch. 1 (S. 2230) (McKinney).

⁷⁹ See Jennifer L. Skeem & John Monahan, *Current Directions in Violence Risk Assessment*, 20 CURRENT DIRECTIONS PSYCHOL. SCI. 38, 38 (2011) (noting the increasing development of U.S. law governing the process of violence risk assessment, and discussing the variety of instruments that have recently been published for this task); John Monahan, *Tarasoff at Thirty: How Developments in Science and Policy Shape the Common Law*, 75 U. CIN. L. REV. 497, 497-98 (2006) (describing “vast and vibrant” burgeoning field of violence risk assessment).

⁸⁰ Kent A. Kiehl & Morris B. Hoffman, *The Criminal Psychopath: History, Neuroscience, Treatment, and Economics*, 51 JURIMETRICS J. 355, 384-85 (2011). Roughly 20% of the prison population is psychopathic. *Id.* at 381.

⁸¹ *Id.* at 385.

of the brain.”⁸² His research suggests that the story of the psychopath is largely in the limbic and paralimbic systems rather than the prefrontal cortex.⁸³ Kiehl suggests that this finding dovetails with the central paradox of the psychopath, who is completely rational but morally insane.⁸⁴ If the key to psychopathy lies in these larger regions, then we can understand how the psychopath is able to recruit his higher functions to navigate the world. Kiehl also argues that these results suggest that we may be able to diagnose psychopathy through a neurological condition,⁸⁵ as well as increase our understanding of these traits in ways that might also improve treatment.

Advances such as these might change the science of violent risk assessment and thus have a profound effect on the duty of the psychotherapist or others⁸⁶ to breach confidentiality and warn a third party, whether it be the police or an individual. The implications of this are enormous, as we struggle in society to protect individual rights of privacy and treatment with society’s concern with protection against shootings such as those that have occurred in Sandy Hook, Aurora, Tucson and the Navy Shipyard.

⁸² *Id.*

⁸³ *Id.* at 385-86.

⁸⁴ *Id.* at 390. Kiehl explains:

[Psychopaths] are certainly rational in the narrow sense of being able to determine their best interest and to navigate in the world to achieve that interest. In fact, in some sense they are hyperrational. They consider *only* their self-interest and they are masters, at least in the short run, of manipulating the world to those interests. . . . A psychopath would no more hesitate to rob a victim of \$20 than you or I would hesitate to pick up \$20 dollars sitting on the sidewalk.

Id. at 370 (emphasis in original).

⁸⁵ *Id.* at 390.

⁸⁶ Access to neuroimaging that reveals dangerous psychopathy could conceivably occur in other relationships as well, such as exams for professional licenses or insurance coverage, which may engender new reporting duties.

V. CONCLUSION

Neuroscience has not yet reached the point where it enables us to detect prior intent, quantify mental capacity, validate emotional harm claims or predict a tendency to commit violence. Yet advances in neuroimaging are real, and it is clear that these questions are not the enigma they once were. These advances challenge our traditional tort doctrine and supporting policy reasons, forcing us to clarify our reasons for allowing or disallowing compensation in various areas. They suggest that it may no longer be sufficient to cling to old doctrines because of failures of proof. We need to rethink whether other policy reasons justify maintaining our traditional doctrines on, for example, determining intent, applying objective standards for negligence, treating emotional harm differently from physical injury, or imposing a civil duty to warn on a psychotherapist.