

Fairness and Uncertainty in Torts: A Theoretical and Empirical Inquiry

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INTRODUCTION

Is torts ready for a revolution? Momentous changes in law are exceedingly rare. In torts, one such change was the advent of comparative fault. Originally codified in the early twentieth century, comparative fault represented a revolutionary shift away from all-or-nothing recovery. For the first time, a plaintiff's recovery need not be either her full damages or zero—it might be somewhere in between.¹

¹ In 1908, Congress passed the Federal Employers Liability Act, 45 U.S.C. §§ 51–60. FELA was the first comparative fault statute in the United States. According to it, “contributory negligence shall not bar a recovery, but the damages shall be diminished by the jury in proportion to the amount of negligence attributable to such employee.” *Id.* § 53; see John W. Wade, *Comparative Negligence—Its Development in the United States and Its Present Status in Louisiana*, 40 LA. L. REV. 299, 301 (1980).

Another revolutionary doctrine lurks in tort law. We call this doctrine *Probabilistic-Proportional Recovery*, or PPR.² Like comparative fault, PPR provides for the possibility of partial recovery. It does so, however, in a way that is arguably a more profound break from prior law than that wrought by comparative fault. According to PPR, a plaintiff's recovery should be proportional to the likelihood that she has established all the elements necessary for liability. In this way, PPR can be thought of as either rejecting tort law's traditional requirement that the plaintiff establish all the elements of a tort by a preponderance of evidence, recognizing risk itself as an entirely new category of harm, or both.

To illustrate the revolutionary character of PPR, consider a brief example. Assume that at trial, Plaintiff introduces evidence that conclusively establishes that Defendant acted negligently, and that Plaintiff suffered a \$1,000 property loss. Further, assume that the evidence establishes only a 30% chance that Defendant, through his negligent conduct, caused Plaintiff's loss, and there is a 70% chance that some lawful act, natural force, or preexisting condition was the cause of Plaintiff's loss. How might tort law respond to this uncertainty?

The traditional response, what we call *Single Most Likely Scenario Recovery*, or SMSR,³ combines tort's familiar preponderance of evidence standard of proof and its long-standing conception of harm as injury to a physical, property, economic, reputational, or other similar interest. Under SMSR, Plaintiff in the case above would be unable to establish causation by a preponderance of the evidence, and she would not recover anything.⁴ The "single most likely scenario" is that Defendant's negligent conduct does not meet the conditions necessary for recovery.

In contrast, under PPR, Plaintiff would recover \$300. Plaintiff's total loss is \$1,000, and she would be entitled to full compensation of \$1,000 if Defendant's negligence caused the loss, but there is only a 30% chance Defendant's negligence caused the loss (30% of \$1,000 is

² PPR is sometimes referred to as "the expected value rule." See, e.g., Neil Orloff & Jerry Stedinger, *A Framework for Evaluating the Preponderance-of-the-Evidence Standard*, 131 U. PA. L. REV. 1159, 1160 (1983); David Kaye, *The Limits of the Preponderance of the Evidence Standard: Justifiably Naked Statistical Evidence and Multiple Causation*, 7 AM. BAR FOUND. RSCH. J. 487 (1982).

³ SMSR is sometimes referred to as "the $p > 0.5$ rule" or the "maximum likelihood rule." See, e.g., Ariel Porat & Alex Stein, *Liability for Uncertainty: Making Evidential Damage Actionable*, 18 CARDOZO L. REV. 1891, 1942 (1997).

⁴ See DAN B. DOBBS ET AL., *LAW OF TORTS* § 22 (2d. ed. 2022).

\$300). As stated, under PPR, a plaintiff's recovery should be proportional to the likelihood that all the elements necessary for liability are present.

Currently, PPR has established a small but undeniable foothold in medical malpractice.⁵ How far will PPR expand? How far *should* it expand? The answer to these questions, we believe, turns in significant part on fairness. Tort law can be conceived of as a legal institution for advancing corrective justice.⁶ Accordingly, tort theorists have engaged in a robust debate about whether PPR or SMSR more successfully advances the end of corrective justice—that is, about which produces fairer outcomes.⁷

This Article, however, goes farther than merely engaging in the theoretical debate surrounding PPR. A core function—if not *the* core function—of law is settling disputes in a manner acceptable to both the parties to the dispute and the community at large.⁸ Consequently, the attitude of the public toward the relative fairness of SMSR and PPR is highly relevant to the choice between them. To date, however, there has been no empirical data regarding the public's attitude regarding the comparative fairness of PPR and SMSR.

This Article seeks to rectify that. This Article presents a pair of large-scale public opinion surveys we conducted in 2022. These surveys polled over 1,300 persons and collected approximately 4,000 individual survey responses. The surveys illuminate people's judgments about the relative fairness of SMSR and PPR and related topics. We situate and analyze these surveys as follows:

In Part I of this Article, we examine three areas in tort law where courts have recognized PPR as a potentially viable theory of recovery. Part I shows that PPR has gained at least a foothold in the law, which makes expanding its scope a realistic possibility.

In Part II, we present and evaluate existing arguments in the academic literature for and against the fairness of PPR. Part II shows that while scholars have identified some plausible arguments for PPR

⁵ See discussion *infra* Section I.C.

⁶ See, e.g., JULES L. COLEMAN, *THE PRACTICE OF PRINCIPLE: IN DEFENCE OF A PRAGMATIST APPROACH TO LEGAL THEORY* 13–24 (2001); JULES L. COLEMAN, *RISKS AND WRONGS* 361 (1992); ERNEST J. WEINRIB, *CORRECTIVE JUSTICE* 9–37 (2012); ERNEST J. WEINRIB, *THE IDEA OF PRIVATE LAW* 56–83 (1995); Martin Stone, *The Significance of Doing and Suffering*, in *PHILOSOPHY AND THE LAW OF TORTS* 131, 137–38 (Gerald J. Postema ed., 2001).

⁷ See discussion *infra* Part II.

⁸ See, e.g., Christopher J. Peters, *What Are Constitutional Rights For? The Case of the Second Amendment*, 68 *OKLA. L. REV.* 433, 478 (2016).

or SMSR being the fairer approach, none of the arguments are decisive. There is room for reasonable disagreement.

Part III is the heart of this Article. It explains the surveys' methodology, presents a detailed statement of the findings, and summarizes the results.

In Part IV, we provide policy recommendations for expanding the use of PPR based on our analysis of the survey data. We identify four areas of torts where the introduction or expansion of PPR is warranted: medical malpractice, cases of uncertain causation, cases of multiple tortfeasors, and damage valuation. We also recommend against the introduction of PPR in cases of uncertain breach. Following Part IV, we briefly conclude and suggest avenues for further empirical research.

I

EXISTING LAW REGARDING PPR

Probabilistic-Proportional Recovery (PPR) is the exception rather than the rule in American tort law.⁹ Nonetheless, PPR has had its moments, having been discussed and occasionally applied in some circumstances. This section surveys the existing law regarding the use of PPR. Section (A) presents the general rule of SMSR. Section (B) considers the consistency of existing law and PPR in the context of multiple tortious actors. Section (C) examines PPR in the context of the breach of an assumed duty, e.g., medical malpractice. Section (D) discusses case law where the extent of harm is uncertain and courts have employed PPR.

A. The General Rule

The general rule is that to prevail in a tort action, the plaintiff must establish all the elements of the tort by a preponderance of the evidence.¹⁰ In particular, the plaintiff must show that (1) the defendant engaged in conduct that either breached a duty of care or intentionally

⁹ We focus on courts in the United States. Courts in the British Commonwealth have developed the doctrine differently, see David A. Fischer, *Tort Recovery for Loss of Chance*, 36 WAKE FOREST L. REV. 605, 608–13 (2001), as have courts in Canada and Israel, see ARIEL PORAT & ALEX STEIN, TORT LIABILITY UNDER UNCERTAINTY 164 (2002). Cf. Ken Oliphant, *Causation in Cases of Evidential Uncertainty: Juridical Techniques and Fundamental Issues*, 91 CHI.-KENT L. REV. 587 (2016) (discussing approaches taken in civil law and a range of other jurisdictions); Ken Oliphant, *Uncertain Factual Causation in the Third Restatement: Some Comparative Notes*, 37 WM. MITCHELL L. REV. 1599 (2011) (same).

¹⁰ See DOBBS ET AL., *supra* note 4.

interfered with a protected interest, (2) the conduct caused a protected interest to be violated, and (3) the conduct did so in a foreseeable manner.¹¹ If the plaintiff proves each element by a preponderance of the evidence, the plaintiff is entitled to recover full damages; if not, she is entitled to none.

Consider a typical case: *D* backs up his car, negligently failing to look behind him, and hits *P*. *P* sues *D*. There is conflicting evidence about whether, even if *D* had looked, he would have seen *P* and would have been able to avert the accident. In a case like this, the fact finder would apply the preponderance of the evidence rule to the disputed issue of causation. If the jury determined it was more probable than not that the accident would have been averted had *D* looked, *P* would recover 100% of the damages necessary to compensate him; if the jury determined it was less probable than a preponderance, *P* would not recover at all.¹² In no case would *P* recover an intermediary amount.

Courts have thus far recognized an exception to the general rule only in establishing causation, but even in this limited context, it is still uncommon. As shown below, PPR may arise—or at least cannot be definitively excluded—in three areas in torts: cases involving causal uncertainty among multiple tortious actors, cases involving causal uncertainty where an assumed duty has been breached, and cases involving uncertainty regarding the existence and extent of harm. Tort law has treated these sets of cases separately, creating different doctrinal schemes for handling them. In all of them, however, the law has left some room for PPR.

B. Causal Uncertainty Among Multiple Tortious Actors

The first set of cases raising the possibility of PPR involves multiple actors engaged in tortious conduct where there is uncertainty about

¹¹ See *id.* at II.A. and III.A. We gloss over the debate whether to establish a prima facie case a plaintiff must merely show that each element is more likely than not satisfied or whether a plaintiff must show that it is more likely than not that all the elements, considered in aggregate, are satisfied. See, e.g., David S. Schwartz & Elliott Sober, *The Conjunction Problem and the Logic of Jury Findings*, 59 WM. & MARY L. REV. 619 (2017).

¹² DOBBS ET AL., *supra* note 4, § 184. Some courts have advocated shifting the burden of production or persuasion with respect to establishing factual causation in cases where a plaintiff has established that the defendant's conduct increased the risk of the injury that actually occurred. See *Gemmink v. Jay Peak Inc.*, 807 F.3d 46, 48–51 (2d Cir. 2015); *Zuchowicz v. United States*, 140 F.3d 381, 390–91 (2d Cir. 1998). Even in such courts, however, a plaintiff would not be entitled to recovery if the defendant could establish that, all things considered, it was more likely than not that her conduct was not a factual cause of the plaintiff's injury. It is not clear that such plaintiff-friendly proof standards make much difference in practice.

which of the actors caused the injury at issue. The paradigmatic case in this category is *Summers v. Tice*.¹³ In *Summers*, two hunters (*A* and *B*) negligently shot in the direction of a third hunter (*V*), and a pellet fired by one of them hit *V* in the eye. Because *V* lacked any evidence regarding whether the pellet was fired by *A* or *B*, he could not establish either defendant's liability by a preponderance of the evidence.¹⁴ The court held that in such a case, the burden of proof with respect to factual causation should be shifted from *V* to *A* and *B*.¹⁵ If *A* and *B* could offer no evidence regarding whose shot hit *V*, they would be jointly and severally liable, and, assuming neither was judgment-proof, each would be liable for 50% of *V*'s loss.¹⁶ While some literature refers to such cases as "alternative liability,"¹⁷ we shall refer to them as "alternative causation" to distinguish them from cases where there are two or more actors, only one of whom breached a tort duty ("alternative breach").

Alternative causation, which is now well-accepted, avoids the manifest unfairness of declaring that *V* can recover nothing when he indisputably suffered a tortiously caused injury. In this respect, alternative causation departs from the traditional rules of recovery and proof. As noted, if the preponderance of the evidence standard applied, *V* would recover nothing. The evidence being equally balanced regarding whether *A*'s or *B*'s shot hit *V*, *V* would not be able to show by a *preponderance* of the evidence who tortiously injured him. More importantly for our purposes, the result in *Summers v. Tice* is consistent with PPR: there was a 50% chance that the conduct of *A* was the factual cause of *V*'s loss, a 50% chance the conduct of *B* was the factual cause of *V*'s loss, and each is presumptively required to pay 50% of *V*'s damages. Granted, the doctrine of alternative causation is not PPR. Where the other tortious actor is judgment-proof, under alternative causation, the first is fully liable;¹⁸ under PPR, the first is only 50% liable. Nevertheless, the result tracks PPR in the typical case of financially viable or well-insured actors.

¹³ *Summers v. Tice*, 199 P.2d 1 (Cal. 1948).

¹⁴ *Id.* at 3–4.

¹⁵ *Id.* (citing 1 JOHN HENRY WIGMORE, SELECT CASES ON THE LAW OF TORTS § 153 (1912)).

¹⁶ *Id.* at 5.

¹⁷ See DOBBS ET AL., *supra* note 4, § 193.

¹⁸ This is only so in jurisdictions that recognize joint and several liability. In those that do not, each actor's liability would be capped at 50%.

Might PPR-consistent results appear more broadly in this category of uncertainty? Imagine a case—let us call it “*Summers v. Thrice*”—in which three hunters (*A*, *B*, and *C*) fire in the direction of *V*, and *V* is hit. Clearly, in such a case, the burden of proof with respect to factual causation would shift to *A*, *B*, and *C*.¹⁹

At this point, the case might proceed in three ways. First, *A* might establish that there is, for example, a 60% chance that only the shot from *C*'s gun struck *V*. Here, *A* would have carried his burden of proving by a preponderance that his shot did not hit *V*. Assuming no further evidence, the claim against *A* (as well as the claim against *B*) presumably would be dismissed, and *C* would be held fully, and solely, liable. This result follows from traditional tort rules of recovery and standards of proof.

Alternatively, none of the defendants might introduce any evidence relevant to the question of whose shot hit *V*. Here, *A* clearly cannot argue, based on the existing evidence, that the likelihood that he shot *V* is approximately 33%, the likelihood of *B* or *C* having shot *V* is approximately 66%, and he has thereby carried his burden of showing by a preponderance of the evidence that he did not cause *V*'s injury. If such an argument were sufficient to carry his burden of proof, *B* and *C* could make similar arguments, leaving *V* uncompensated. This result—no recovery by a plaintiff indisputably harmed by a defendant's negligence—would be as unjust as the result that the *Summers v. Tice* court sought to avoid through the adoption of alternative causation. It seems highly unlikely that a court would go that route. Instead, if *A*, *B*, and *C* can offer no additional evidence, they should be jointly and severally liable, each presumptively paying approximately 33% of *V*'s loss. This result, too, would be equivalent to recovery in proportion to the probability of liability—another instance of PPR.

Finally, *A* might introduce evidence proving that *B* is more likely than *A* to have shot *V*, and *C* is more likely still to have shot *V*, but it is not more likely than not that *C* caused the harm. To make this case more concrete, consider a case we will call *Summers v. Thrice II*. The

¹⁹ See RESTATEMENT (THIRD) OF TORTS § 28(b) (AM. L. INST. 2000) (shifting burden where multiple actors engage in tortious conduct exposing the plaintiff to risk of harm). As the Restatement notes, “Courts, since the Second Restatement, continue to apply alternative liability to those cases in which there are more than two tortious defendants.” § 28, cmt. k. Nonetheless, there is likely a limit to how far courts will go. See RESTATEMENT (SECOND) OF TORTS § 433B cmt. e (AM. L. INST. 1965) (noting that, if there are many actors, “each of whom contributes a relatively small and insignificant part to the total harm, . . . to hold each of them liable for the entire damage because he cannot show the amount of his contribution may perhaps be unjust”).

facts are identical to *Summers v. Thrice I*, but ballistic evidence establishes a 20% chance that *A* shot *V*, a 35% chance that *B* shot *V*, and a 45% chance that *C* shot *V*. If *A* provides such evidence, has *A* carried his burden of proof, entitling him to a dismissal of the claim against him? If so, should the claim against *B* also be dismissed, leaving *C* fully liable?

The law here is unsettled. No case law addresses this precise issue, and there appears to be no scholarly commentary on this point. On one hand, the court could apply PPR. Under PPR, defendant *A* would be liable for 20% of *V*'s damages, *B* for 35%, and *C* for 45%. This approach is, at least, consistent with the outcome in *Summer v. Tice* and the likely outcome of *Summers v. Thrice I*.

Alternatively, a court might hold that *C* is fully liable, and *A* and *B* bear no liability. For example, if there are only two shooters, *A* and *B*, and the evidence established that there was a 60% chance that *A* shot *V* and a 40% chance that *B* did, *A* would be found fully liable on the principle that *A*'s shooting of *B* is the single most likely scenario. Applying that principle to *Summers v. Thrice II*, even though a preponderance of the evidence does not support the conclusion that *C* is responsible, *C*'s shooting of *V* is still the single most likely scenario. If *C* were held fully liable, it would be an example of SMSR (Single Most Likely Scenario Recovery).

The jurisprudential problems raised by *Summers v. Thrice II* are similar to, but distinct from, those associated with market share liability. Market share liability is a doctrine employed in product liability cases by some jurisdictions.²⁰ Market share liability might be applied in a case where, for example, three manufacturers produce a single drug that causes harm to a large group of consumers. It may be impractical or impossible for a given plaintiff to establish which manufacturer produced the token of the drug that injured her. In such cases, courts may divide damages among the manufacturers in proportion to their market share. Thus, if Manufacturer *A* produced 20% of the total amount of the drug produced, Manufacturer *B* produced 35%, and Manufacturer *C* produced 45%, they would be liable for 20%, 35%, and 45% of the plaintiff's loss, respectively. Market share liability and PPR are, therefore, quite similar in application. The proportion of a harmful drug produced by a given

²⁰ See, e.g., *Smith v. Cutter Biological, Inc.* 823 P.2d 717, 727–29 (Haw. 1991); *Conley v. Boyle Drug Co.*, 570 So. 2d 275, 283–87 (Fla. 1990); *Sindell v. Abbott Laboratories*, 607 P.2d 924, 936–38 (Cal. 1980). See generally DOBBS ET AL., *supra* note 4, § 194 (describing the history and application of market share liability).

manufacturer is a good proxy for the likelihood that, in each case, the loss was caused by that manufacturer.

PPR, however, differs from market share liability in at least one important respect. In market share liability cases, there is a high statistical likelihood that a given manufacturer caused a percentage of the overall harm attributable to the drug. In other words, what is uncertain is not *whether* the defendant caused harm but *to whom* the defendant caused harm. In the long run,²¹ a defendant manufacturer in a market share liability case will be liable for an amount that approximates the losses it caused. Thus, there can be no claim of unfairness to the manufacturers. In contrast, in the case of *Summers v. Thrice I and II*, discussed above, two defendants did not, in fact, cause any harm. “Objectively”—that is, in a strictly normative sense, if perfect information were available—they should not pay anything to anyone.

Therefore, despite the clear overlap in application and rationale between market share liability and PPR, the two are distinguishable on significant fairness grounds. While the fact that tort law recognizes market share liability in some cases is suggestive, it is not conclusive that it would accept PPR in the context of multiple persons engaging in discrete negligent acts, such as in *Summers v. Thrice II*. The issue is open.²²

C. Causal Uncertainty Where an Assumed Duty Has Been Breached

As we have noted, when there is uncertainty that a defendant’s tortious conduct caused the harm suffered by the plaintiff, the traditional rule generally applies to the action: to recover, the plaintiff must prove the causal relationship by a preponderance of the evidence.²³ However, an exception is sometimes made in medical malpractice actions depending on which of three approaches the court takes. As discussed below, the first two approaches may be understood as instances of SMSR, and the third approach may be understood as an

²¹ As a practical matter, the “long run” may be based on the plausible assumption that many plaintiffs, either as a class or as individuals, will bring actions.

²² There is also the issue of the indeterminate plaintiff. An example of such would be when, as a result of a toxic release, there is a statistically significant increase in the number of cancer cases in a community, but no particular case can be causally connected to the release. See David Rosenberg, *The Causal Connection in Mass Exposure Cases: A “Public Law” Vision of the Tort System*, 97 HARV. L. REV. 849 (1984). Courts have not yet embraced the use of proportional liability for indeterminate plaintiff situations. See *Cottle v. Superior Court*, 5 Cal. Rptr. 2d 882, 905–06 (Ct. App. 1992) (Johnson, J., dissenting).

²³ See *supra* Section I.A.

instance of PPR. In such cases, and perhaps in similar tort suits, PPR has a role to play.

In a typical action that may prompt a court to look for a PPR-like solution, a doctor breaches her duty of care to a patient by failing to diagnose and treat the patient's malady according to customary medical practice. The malady culminates in some adverse health outcome, like physical impairment or death. In such a case, there may be uncertainty as to whether the patient would still have suffered the adverse outcome even if the doctor had not breached her duty of care and treated the patient appropriately. After all, not all treatments will be effective. Sometimes, there is no causal relationship between a doctor's breach of a duty of care and the harm suffered by a patient.

Jurisdictions in the United States handle these cases in three ways. According to the "traditional approach,"²⁴ the critical question is whether the preponderance of the evidence establishes that, *but for* the failure to provide the proper treatment, the patient would not have suffered the adverse outcome. In other words, the question is whether the treatment, properly applied, would have been effective. If a preponderance of the evidence supports this conclusion, the patient recovers an amount the jury finds is sufficient to compensate for the patient's loss; otherwise, the plaintiff recovers nothing. Approximately eighteen jurisdictions follow this approach.²⁵

The second approach used in such cases has been called the "relaxed causation approach."²⁶ This approach entitles the patient to recover full compensation if the plaintiff establishes that the doctor's failure to provide the proper treatment was a "substantial factor" contributing to the patient's suffering the adverse outcome.²⁷ The term "substantial factor" is generally not defined for juries but presumably applies to situations where the omission of the proper treatment is not a *but-for* cause of the adverse outcome; some logically weaker causal connection would suffice.²⁸ Approximately eight jurisdictions follow this approach.²⁹

²⁴ Estate of Frey v. Mastroianni, 463 P.3d 1197, 1209 (Haw. 2020) (explaining the approach).

²⁵ See *infra* Appendix A.

²⁶ Delaney v. Cade, 873 P.2d 175, 184 (Kan. 1994) (recognizing the term "substantial chance approach" is also used).

²⁷ See Mohr v. Grantham, 262 P.3d 490, 494 (Wash. 2011).

²⁸ See DOBBS ET AL., *supra* note 4, § 189 (discussing substantial factor test).

²⁹ See *infra* Appendix A. It is debatable whether a causal connection weaker than *but-for* causation should suffice for tort liability unless the alternative causal factors are also tortiously produced. See Richard W. Wright, *Causation in Tort Law*, 73 CALIF. L. REV.

The final approach in medical malpractice cases like this is the “loss of chance” approach.³⁰ As it is commonly formulated, this approach employs both the traditional preponderance of evidence standard of proof and the but-for test for factual causation. It differs from the traditional and the relaxed causation approaches by recognizing a novel form of compensable harm: the loss of some chance of avoiding the adverse outcome. According to the loss of chance approach, a patient is entitled to recovery where the preponderance of evidence establishes that, but for the omitted treatment, the patient would have enjoyed a greater chance of avoiding the adverse outcome.³¹

Under a loss of chance approach, the patient’s compensation is the value of the lost chance. The value of the lost chance may be defined—typically an amount equivalent to full compensation multiplied by the likelihood that the proper treatment would have resulted in the patient not experiencing the adverse outcome—or it may be left to the jury to determine.³² To illustrate, imagine the jury in such a case determines that, had the doctor provided the required treatment, the patient, more probably than not, would have had a 30% chance of surviving the cancer that afflicted him. If the loss to the patient’s estate due to his death was \$100,000, the estate would be entitled to recover either \$30,000 or an amount less than \$100,000 to be determined by the jury as the value of the lost chance. Approximately eighteen jurisdictions follow the loss of chance approach.³³

The loss of chance doctrine also has a flip side. Most loss of chance cases involve a plaintiff who failed to establish causation by a preponderance of evidence. In such cases, the doctrine works to the plaintiff’s advantage, as they receive a partial recovery where, using the traditional approach, they would receive none at all. In a few cases, however, where the plaintiff has successfully established causation by a preponderance of evidence, courts have reduced the plaintiff’s recovery to a percentage of damages in proportion to the likelihood that

1735, 1798 (1985) (“Courts generally absolve the defendant from liability if he proves that the injury would have occurred anyway as a result of independent nontortious conditions.”); RESTATEMENT (SECOND) OF TORTS § 27 cmt. d (recognizing liability but declining to specify damages “if any”). The case is even weaker when the first factor is an omission and the second is itself a but-for cause, as in many medical malpractice cases. The present Article, however, shall not further examine the merits of the relaxed causation approach.

³⁰ *Delaney*, 873 P.2d at 184.

³¹ See *DOBBS ET AL.*, *supra* note 4, § 178.

³² *Id.*

³³ See *infra* Appendix A.

the defendant's conduct was a factual cause.³⁴ Applying PPR in cases where the chance of factual causation is greater than 50% has the support of Judge Richard Posner and Joseph King, the academic writer most closely associated with the loss of chance approach.³⁵ In these cases, the loss of chance doctrine works to the disadvantage of the plaintiff, who would fully recover under the traditional approach.

Finally, some jurisdictions have either declared the issue open, have not addressed it in any depth, or have not spoken clearly regarding their position on the issue.³⁶ Approximately seven jurisdictions fall within this category. In addition, the Restatement (Third) of Torts takes no position on the loss of chance theory.³⁷

These approaches directly relate to the debate over PPR and SMSR. Both the traditional and relaxed causation approaches can be described as forms of SMSR. The jury must determine whether the most likely scenario, based on the preponderance of evidence, is that the doctor's breach of duty was either a but-for cause of or a "substantial factor" in the patient's adverse outcome. On that basis, the jury must either award all or nothing.

In contrast, the loss of chance approach is, in some sense, the doctrinal realization of PPR. The loss of chance approach gives unlikely states of affairs, such as the chance that the patient would not have suffered an adverse outcome, legal significance in setting the recovery amount. The ultimate recovery may then fall on the continuum between all and nothing. Thus, courts achieve probabilistic proportional recovery by recognizing a novel form of harm, while

³⁴ See *LaRose v. Wash. Univ.*, 154 S.W.3d 365, 371 (Mo. Ct. App. 2004) (reducing recovery to 57% where plaintiff had a 60% chance of survival and defendant's negligence reduced that chance to 3%); *Scaffidi v. Seiler*, 574 A.2d 398, 408 (N.J. 1990); see also Jonathan P. Kieffer, *The Case for Across-the-Board Application of the Loss-of-Chance Doctrine*, 64 DEF. COUNS. J. 568, 568–69 (1997); John Makdisi, *Proportional Liability: A Comprehensive Rule to Apportion Tort Damages Based Probability*, 67 N.C. L. REV. 1063 (1989). But see *Weymers v. Khera*, 563 N.W.2d 647 (Mich. 1997); *Falcon v. Mem'l Hosp.*, 462 N.W.2d 44, 47 (Mich. 1990); *Smith v. Cutter Biological, Inc.*, 823 P.2d 717 (Haw. 1991) (cases that allow full recovery).

³⁵ Posner has argued "to avoid the opposite evils of overcompensation and overdeterrence" it is essential to apply the lost chance rule "across the board, that is, to high-probability as well as to low-probability cases." *Doll v. Brown*, 75 F.3d 1200, 1206 (7th Cir. 1996). Likewise, King has stated, "If the loss-of-a-chance doctrine is sound in principle, then there seems to be no convincing reason not to also apply the doctrine in the better-than-even settings." Joseph H. King, Jr., "Reduction of Likelihood" *Reformulation and Other Retrofitting of the Loss-of-a-Chance Doctrine*, 28 UNIV. MEM. L. REV. 491, 557 (1998).

³⁶ See *infra* Appendix A.

³⁷ RESTATEMENT (THIRD) OF TORTS, *supra* note 19, § 26 cmt. n.

nominally conforming to traditional all-or-nothing recovery and preponderance of evidence proof.

Commentators have speculated on expanding the loss of chance doctrine to areas outside medical malpractice,³⁸ but only a few cases support this expansion.³⁹ One such case, *Gardner v. National Bulk Carriers, Inc.*,⁴⁰ involved a ship's captain who tortiously failed to search for a seaman who had fallen overboard. In *Gardner*, the shipowner was found liable despite the plaintiff's failure to prove by a preponderance of evidence that the seaman's death would have been averted had the captain searched pursuant to his duty. The court found that the captain's neglect "contribut[ed] to cause" the seaman's death and that causation was established based on the captain's causing the loss of a "reasonable possibility of rescue."⁴¹ In terms of the preceding discussion regarding approaches to uncertainty in malpractice actions, the court in *Gardner* seemed to take a hybrid approach combining relaxed causation and loss of chance.⁴²

What connects cases such as *Gardner* with medical malpractice cases? Like medical malpractice cases where the defendant fails to identify and properly treat a patient's condition, the breach of duty in *Gardner* was a failure to engage in affirmative conduct for the victim's benefit. Having assumed a responsibility—either responsibility for the patient's medical care or responsibility for the well-being of seamen while at sea—an actor must carry out his responsibility in a reasonable manner.

Using a loss of chance theory in cases of assumed duties makes sense from a moral perspective. A voluntarily assumed duty arguably is, in a moral sense, stronger than a duty that exists merely by virtue of passively being a member of the community, such as the duty not to

³⁸ See Fischer, *supra* note 9; Jennifer C. Parker, Note, *Beyond Medical Malpractice: Applying the Lost Chance Doctrine to Cure Causation and Damages Concerns with Educational Malpractice Claims*, 36 UNIV. MEM. L. REV. 373, 374–412 (2006).

³⁹ RESTATEMENT (THIRD) OF TORTS, *supra* note 19, § 26 cmt. n. ("To date, the courts that have accepted lost opportunity as cognizable [harm] have almost universally limited its recognition to medical-malpractice cases.")

⁴⁰ *Gardner v. Nat'l Bulk Carriers, Inc.*, 310 F.2d 284, 286 (4th Cir. 1962); *accord* *Abbott v. U.S. Lines, Inc.*, 512 F.2d 118, 121 (4th Cir. 1975); *see also* Sidney H. Kelsey, *Shipowner's Duty to Rescue Crewmen—the Gardner Case*, 49 VA. L. REV. 492 (1963) (approving decision).

⁴¹ *Gardner*, 310 F.2d at 287.

⁴² The court reversed and remanded for a determination of damages without specifying whether damages were to be the full value of the seaman's life, as they would be under the relaxed causation approach, or a lesser value, consistent with the loss of chance approach. *Id.* at 288.

impose unreasonable or nonreciprocal risks.⁴³ Courts have not applied the loss of chance theory except in cases of an assumed duty, and even the staunchest proponents of the loss of chance doctrine do not appear ready to apply the theory to cases of generic uncertain causation involving mere failure to exercise reasonable care.⁴⁴

While the presence of an assumed duty may be necessary for the application of loss of chance theory, it does not seem sufficient. Notably, courts have thus far declined to apply the theory in legal malpractice cases.⁴⁵ Such cases usually involve a tortious failure to provide the legal services owed to the client based on a contractual undertaking—an assumed duty.⁴⁶ Commentators have advocated the extension of the loss of chance theory to legal malpractice.⁴⁷ That courts have not yet allowed loss of chance recovery in these cases, despite clear parallels to medical malpractice, reflects their reluctance to disturb the general rule that all elements of a tort must be established by a preponderance of evidence.⁴⁸

D. Uncertainty Regarding the Existence and Extent of Harm

The final area where proportional recovery may already have a foothold in tort law is where there is uncertainty regarding the existence and extent of harm. This issue can arise in two different stages of litigation: during a plaintiff's prima facie case and when determining damages.

One element of a prima facie negligence case is the existence of harm—more specifically that defendant's wrongful conduct is the

⁴³ See George P. Fletcher, *Fairness and Utility in Tort Theory*, 85 HARV. L. REV. 537 (1972) (arguing tort duty not to create unreasonable risks based on principles of reciprocity). The comparison of assumed duties and nonassumed duties may be likened to the comparison of actual and hypothetical consent, the former being morally stronger.

⁴⁴ See King, *supra* note 35, at 495–96 (“No special preexisting duty should be required, however, when it is proven that the defendant’s active, tortious conduct *probably* caused the victim’s materialized injury”) (emphasis added).

⁴⁵ See DOBBS ET AL., *supra* note 4, § 486.

⁴⁶ See *id.* § 718.

⁴⁷ Polly A. Lord, *Loss of Chance in Legal Malpractice*, 61 WASH. L. REV. 1479, 1480 (1986).

⁴⁸ For additional discussion of the loss of chance doctrine and its relaxation of the causation requirement, see, e.g., Fischer, *supra* note 9; Ralph Frasca, *Loss of Chance Rules and the Valuation of Loss of Chance Damages*, 15 J. LEGAL ECON. 91 (2009); Lauren Guest et al., *The Loss of Chance Rule as a Special Category of Damages in Medical Malpractice: A State-by-State Analysis*, 21 J. LEGAL ECON. 53 (2015).

factual and foreseeable cause of the harm.⁴⁹ In some cases, however, uncertainty regarding whether such harm exists is inherent in the type of alleged injury or conduct. For example, a plaintiff might allege that he was tortiously exposed to toxic chemicals and that, as a result, he will likely develop cancer at some indefinite point in the future. If the evidence established a 30% chance the plaintiff would develop cancer because of the exposure, would recovery—full or partial—be permitted? At least one scholar has argued that courts will deny such claims because the existence of the harm is not established to a reasonable degree of medical certainty.⁵⁰ One possible procedural justification for this result is that denying the claim leaves open the door, at least in theory, for a later lawsuit brought after the future possible harm has occurred. All other things equal, the later lawsuit is preferable because there is no chance of the plaintiff receiving a windfall of an award for an injury that never occurs.

The second context where possible future harm arises is the determination of damages. If the plaintiff has established that the defendant is liable, the next legal issue will be the amount of damages. Uncertainty can arise if a current injury could lead to future damages not yet suffered by the plaintiff. Imagine, for example, a case where the evidence establishes that it is more likely than not that a driver negligently drove his car into a pedestrian. As a result, the pedestrian suffered severe damage to his leg. In such a case, the driver would

⁴⁹ See DAN B. DOBBS ET AL., *TORTS AND COMPENSATION: PERSONAL ACCOUNTABILITY AND SOCIAL RESPONSIBILITY FOR INJURY* ch. 7, § 1 (2009).

⁵⁰ See Christopher H. Schroeder, *Corrective Justice and Liability for Increasing Risks*, 37 UCLA L. REV. 439 (1990). Schroeder cites *Sterling v. Velsicol Chem. Corp.*, 855 F.2d 1188 (6th Cir. 1988) (denying recovery where plaintiff suffered only a 25% to 30% risk of susceptibility to cancer and other diseases), *Anderson v. W.R. Grace & Co.*, 628 F. Supp. 1219, 1232 (D. Mass. 1986) (“To award damages based on a mere mathematical probability would significantly undercompensate those who actually do develop cancer and would be a windfall to those who do not.”), and *Ayers v. Jackson Tp.*, 525 A.2d 287 (N.J. 1987) (rejecting claim to recovery for increased risk of cancer). He adds, “[W]hen plaintiffs can prove to a ‘reasonable medical certainty’ that a past exposure will cause a future harm, they have been allowed recovery.” Schroeder, *supra*, at 441 & n.11. There are, however, a few unpublished opinions to the contrary. See *Valori v. Johns-Manville Sales Corp.*, No. 82-2686, 1985 WL 6074 (D. N.J. Dec. 11, 1985) (allowing admission of evidence that plaintiff suffering from asbestosis had 43% likelihood of contracting lung cancer to prove claim based on enhanced risk of cancer); *Lewitt v. Johns-Manville Sales Corp.*, No. 81-2950, letter op. at 5 (D.N.J. Mar. 11, 1985) (holding admissible statistical evidence of increased risk of cancer among plaintiffs with asbestosis, although less than a reasonable medical probability, to support claim for enhanced risk of cancer); *Gold v. Johns-Manville Sales Corp.*, No. 80-2907, bench op. at 34–37 (D.N.J. 1984) (allowing admission of evidence that plaintiff with asbestosis was exposed to 40% to 45% risk of contracting cancer to support claim for damages based on enhanced risk of cancer).

likely be liable for negligence, and the jury would be required to determine the compensation owed to the pedestrian. It is well established that the cost of physical rehabilitation for tortiously caused injuries is compensable.⁵¹ Would the pedestrian be entitled to any recovery if the evidence established a 30% chance that his leg would be amputated and he would need \$10,000 worth of physical rehabilitation at some future point versus a 70% chance his leg would not be amputated so only minimal rehabilitation would be needed?

The law on this point is unsettled. Traditionally, the plaintiff must establish the extent of the harm, like the other elements of the claim, by a preponderance of evidence. If the plaintiff can do so, she is entitled to recovery sufficient to compensate fully for that harm.⁵² Indeed, in many jurisdictions, juries are also instructed that “the plaintiff has the burden of proving damages by a preponderance of the evidence,”⁵³ or words to that effect.⁵⁴ A jury following such a charge would not award any significant damages for the cost of physical rehabilitation in the case of the negligent driver described above, where the evidence showed only a 30% chance that the pedestrian would incur such cost.

⁵¹ RESTATEMENT (SECOND) OF TORTS, *supra* note 19, § 924.

⁵² See, e.g., *Canada ex. rel. Landy v. McCarthy*, 567 N.W.2d 496, 507 (Minn. 1997) (“In an ordinary civil action, the plaintiff has the burden of proving damages caused by the defendant by a fair preponderance of the evidence.”); *Cnty. Bank, Ellisville, Mississippi v. Courtney*, 884 So. 2d 767, 776 (Miss. 2004) (“It is elementary that the plaintiff has the burden of proving her damages by a preponderance of the evidence.”); *accord DOBBS ET AL.*, *supra* note 4, § 479 (“The plaintiff has the burden of proving both past and future damages by the preponderance of evidence.”); 2 D. DOBBS, *REMEDIES* § 8.1(7), at 407 (2d ed. 1993); Joseph H. King, Jr., *Causation, Valuation, and Chance in Personal Injury Torts Involving Preexisting Conditions and Future Consequences*, 90 YALE L.J. 1353, 1370–72 (1981).

⁵³ See, e.g., *Manual of Model Jury Instructions*, U.S. COURTS FOR THE NINTH CT. (2017), <https://www.ce9.uscourts.gov/jury-instructions/node/106> [<https://perma.cc/W8C7-2JDN>]; see also *Washington Pattern Jury Instructions: Civil*, sec. 21.01 (5th ed. 2005); COMMITTEE ON PATTERN JURY INSTRUCTION, NORTH CAROLINA PERSONAL INJURY: CIVIL, SEC. 810.00 (“[T]he plaintiff must prove, by the greater weight of the evidence, the amount of actual damages [proximately caused by the negligence] [caused by the wrongful conduct] of the defendant.”).

⁵⁴ Some jurisdictions require that damages be proved with “reasonable certainty” or “reasonable probability.” See JACOB STEIN, *STEIN ON PERSONAL INJURY DAMAGES* § 7:44 (“You are instructed that as to any alleged future disability, pain, or suffering on the part of plaintiff . . . you must be convinced from a fair consideration of the evidence that it is reasonably certain to occur in the future.”). See, e.g., AK-JICIV 20.01A. These terms are equivalent to “preponderance of evidence.” STEIN § 9:18. See, e.g., *MacIntyre v. Puritan Distrib., Inc.*, 2010 WL 5621082 at 5–6 (Sup. Ct. Mass. 2010) (quoting jury instruction as, “[T]he plaintiff has the burden of proving damages by a fair preponderance of the evidence . . . Damages must be proved with a reasonable degree of certainty.”).

In theory, any damage award for rehabilitation would be overturned on the ground that it is contrary to the evidence.

There is some support, however, for recovery comparable to proportionate probabilistic recovery in cases involving damages for uncertain future harm. The Restatement (Second) of Torts states that when it comes to recovery for future harms, a plaintiff is entitled to damages based upon “the probability that harm of one sort or another will ensue and upon its probable seriousness if it should ensue.”⁵⁵ Probability and seriousness are critical to PPR since, under PPR, a plaintiff’s award is the probability of suffering a tortiously caused harm multiplied by the magnitude of the harm. Furthermore, some jury instructions focus on an undefined notion of “fair compensation” as an element of damages.⁵⁶ Such a charge might be broad enough to allow substantial recovery in the negligent driver case, since some rehabilitation damages have been proven, and a substantial recovery based on 30% of a \$100,000 loss is arguably fair considering the potential expense. Accordingly, it is unsurprising that multiple jurisdictions have allowed partial recovery for future harms, even where the evidence demonstrates that the loss probably will not occur.⁵⁷

Notably, tort law often employs damage measures that model PPR. For example, jurors commonly receive life expectancy information in cases where the duration of some injury, like loss of wages or pain and

⁵⁵ RESTATEMENT (SECOND) OF TORTS § 912, cmt. e (AM. L. INST.).

⁵⁶ See Ronald W. Eades, Jury Instructions on Damages in Tort Actions § 1.02 (1998) (“If you find from the preponderance of all the evidence that the defendant is liable to the plaintiff and that the plaintiff has suffered damages, then you must decide the amount of money that will fairly compensate the plaintiff for each proven element of damage.”).

⁵⁷ *United States v. Anderson*, 669 A.2d 73, 77 (Del. 1995) (recovery possible for 15% chance of reoccurrence of testicular cancer); *Doering v. Janssen*, 394 N.E.2d 721 (Ill. App. 1979) (recovery for future lost earnings based on testimony that there was a 40% chance that seizures would continue in future); see also *Petriello v. Kalman*, 576 A.2d 474, 484 (Conn. 1990) (where “breach of duty . . . was a substantial factor in causing a present injury [plaintiff] . . . entitled to compensation to the extent that the future harm is likely to occur”); *Dillon v. Evanston Hosp.*, 771 N.E.2d 357, 366–70 (Ill. 2002) (holding “the size of the award must reflect the probability of occurrence”); *Elam v. Alcolac*, 765 S.W.2d 42, 208 (Mo. Ct. App. 1988) (discussing theory that damages for cancer risk award should be reduced proportionately to risk); *Jordan v. Bero*, 210 S.E.2d 618, 640 (W. Va. 1974) (Neely, J., concurring); *Feist v. Sears, Roebuck & Co.*, 517 P.2d 675 (Or. 1973) (allowing recovery for susceptibility to illness); *Hayu v. Ventura*, 38(4) Pisket Din 393 (1984) Israel (allowing 30% recovery of future lost wages based on evidence of a 30% chance plaintiff would lose such wages) (cited in Porat at 117 n. 9); Fischer, *supra* note 9, at 609 (“Courts often award damages for the risk of future harm by discounting the recovery for the harm by the chance that the harm will not occur. Such damages are, in effect, compensation for the loss of a chance to avoid future harm.”).

suffering, is at issue.⁵⁸ Life expectancy based on mortality tables reflects a statistically weighted average of the range of possible life lengths.⁵⁹ In this respect, life expectancy represents an amount akin to the probabilistic weighted average calculation inherent in PPR rather than a median duration amount, which would follow from the strict application of the preponderance of evidence recovery rule.⁶⁰ Likewise, in cases of wrongful damage to property, loss of market value is the standard measure of damage.⁶¹ If, for example, Defendant negligently caused the death of Plaintiff's racehorse, Plaintiff may recover the market value of the horse as a matter of general damages.⁶² No showing would have to be made that Defendant was actually going to sell the horse for that amount or that a similar horse could actually be acquired for that amount. The market value of a racehorse, it seems safe to assume, is based on a probabilistic weighted average of the horse's possible winnings rather than an amount the horse has a greater than 50% chance of winning. Thus, market value recovery reflects a PPR approach to damage determination.

In sum, considerations of probability, consistent with PPR, are not wholly foreign to the law of damage determination for future losses of uncertain extent.

II

ARGUMENTS ABOUT THE FAIRNESS OF PPR AND SMSR

In this Part, we present the major arguments courts and commentators have developed regarding the fairness of PPR and SMSR. In Section A we consider "new harms" arguments; in Section B we consider "recovery error" arguments. While the first set of arguments for PPR is unconvincing, the second set carries moral weight. Because one recovery error argument ("error equalization") supports PPR and one (error minimization) supports SMSR, we conclude that objective considerations of fairness do not favor either PPR or SMSR. This is an important conclusion because it opens the

⁵⁸ See DOBBS, *supra* note 52, § 8.5(2).

⁵⁹ See *Life Expectancy*, https://en.wikipedia.org/wiki/Life_expectancy#Calculation [<https://perma.cc/975K-MW6V>].

⁶⁰ See DOBBS, *supra* note 52, § 3.2 ("[T]he average future lifetime shown by [a mortality] table is not the same as the most *likely* future lifetime . . ."). For example, if there were a group of 100 persons, and sixty lived to fifty years old and forty lived to 100 years old, the life expectancy of a member would be seventy ($[(60*50)+(40*100)]/100$) even though the likelihood that a member would live past fifty is less than 50%.

⁶¹ See *id.*

⁶² *Id.*

door to considerations of perceived fairness being decisive for the debate on whether tort law should expand the scope of PPR.⁶³

A. New Harms

The first set of arguments we consider are those that support the fairness of PPR by introducing a new form of harm. Traditionally, tort law has recognized harms such as injury to physical security and liberty, damage to property, reputation and privacy, emotional distress, and stand-alone economic loss.⁶⁴ In this section, we consider arguments based on recognizing risks as harm and evidential damages as actionable harms occurring in cases of traditional wrongful conduct. As shown below, neither presents a persuasive reason for finding PPR to be a fairer recovery scheme than SMSR.

1. Risk as Harm

The first argument for PPR centers on a topic to which we have already alluded to: the identification and recognition of risk as a compensable harm in and of itself.⁶⁵

The idea that being placed at risk is a compensable injury has deep roots. Judicial acceptance of PPR in the United States traces back to the seminal work of Joseph King.⁶⁶ Recognizing that, traditionally, loss of chance was not a cognizable legal harm, King contended that awarding damages for loss of chance was the “more rational” approach.⁶⁷ According to King, where the plaintiff is able to demonstrate a probability of 50% or less that some future loss is attributable to the defendant, it is “manifest” that the plaintiff’s interests have been

⁶³ There are, to be sure, other normative and policy arguments relevant to the merits of PPR and SMSR. For example, deterrence-based arguments have been made for PPR, as well as process-based arguments for SMSR. Compare Charles Nessen, *The Evidence or the Event? On Judicial Proof and the Acceptability of Verdicts*, 98 HARV. L. REV. 1357, 1382–84 (1985) (arguing all-or-nothing facilitates public acceptance of verdicts as statements about events and so reinforces behavior norms), with Joseph H. King, Jr., *Causation, Valuation and Chance in Personal Injury Torts Involving Preexisting Conditions and Future Consequences*, 90 YALE L.J. 1353, 1377 (1981) (arguing that SMSR “subverts the deterrent objectives of tort law by denying recovery for the effects of conduct that causes statistically demonstrable losses”). Evaluating these arguments, however, is beyond the scope of the current undertaking.

⁶⁴ See DOBBS ET AL., *supra* note 4, § 3.

⁶⁵ See *supra* text accompanying notes 37–38.

⁶⁶ King, *supra* note 63. While King’s article was important, it was not without precedent. The first United States torts case recognizing loss of chance was decided in 1966. See *Hicks v. United States*, 368 F.2d 626 (4th Cir. 1966).

⁶⁷ King, *supra* note 63, at 1364.

adversely affected.⁶⁸ King appeals to the intuition that “there is a qualitative difference between a condition that affords a chance of recovery and one that offers no chance at all, as any patient with terminal cancer will confirm.”⁶⁹

Many courts have similarly spoken of the loss of a chance as an actual loss. For example, in *Matsuyama v. Birnbaum*, the Supreme Court of Massachusetts stated:

When a physician’s negligence diminishes or destroys a patient’s chance of survival, the patient has suffered real injury. The patient has lost something of great value: a chance to survive, to be cured, or otherwise to achieve a more favorable medical outcome. Thus we recognize loss of chance not as a theory of causation, but as a theory of injury.⁷⁰

While such claims may not be an explicit argument for the fairness of PPR, they naturally lead to one. If loss of chance is a harm that the plaintiff has wrongly suffered, compensation seems due as a matter of fairness as much as compensation for any other harm. Indeed, the *Matsuyama* court criticized the alternative all-or-nothing rule on grounds of fairness, stating, “[The all-or-nothing rule] fails to ensure that victims, who incur the real harm of losing their opportunity for a better outcome, are fairly compensated for their loss.”⁷¹ As to valuing the loss, King asserts that the appropriate method values a compensable chance as “the percentage probability by which the defendant’s tortious conduct diminished the likelihood of achieving some more favorable outcome.”⁷² This, of course, is just PPR.

Whether justice requires that a person placed at risk be compensated is a question that has also attracted scholarly commentary, both in favor

⁶⁸ *Id.* at 1373.

⁶⁹ *Id.* at 1378.

⁷⁰ *Matsuyama v. Birnbaum*, 890 N.E.2d 819, 832 (Mass. 2008) (citations omitted). Likewise, in *Lord v. Lovett*, the New Hampshire Supreme Court held that treating the loss of a chance as the cognizable injury “permits plaintiffs to recover for the loss of an opportunity for a better outcome, an interest that we agree should be compensable, while providing for the proper valuation of such an interest.” *Lord v. Lovett*, 770 A.2d 1103, 1106 (N.H. 2001).

⁷¹ *Matsuyama*, 890 N.E.2d at 830.

⁷² King, *supra* note 63, at 1382.

of the notion⁷³ and against it.⁷⁴ Claire Finkelstein has tried to make a case that risk should be treated as harm by focusing on our intuitions regarding chances for favorable outcomes, i.e., opportunities. She writes:

[I]magine that a friend purchases a lottery ticket on your behalf. It seems reasonable to think the friend has benefitted you, even if the ticket turns out not to be the winning ticket. Further, it is likely you would feel this way even if you learned of the existence of the ticket only after the lottery had been won and it was determined that the ticket purchased on your behalf was not the winning one.⁷⁵

Finkelstein argues that if we accept unrealized opportunities as benefits, we should accept unrealized risks as harms, because they are simply the other side of the harm-benefit coin.

The weight of scholarly commentary, however, squarely rejects the risk-as-harm theory. Richard Wright has argued against the idea of risk as harm.⁷⁶ He objects that if risk were recognized as harm, it would create an untenable situation in cases in which the risked harm does not materialize.⁷⁷ If, for example, a patient pulled through despite a doctor's malpractice that somewhat increased the chance of her death, either (1) the plaintiff would recover the partial loss of chance due to the malpractice, or (2) the plaintiff would not recover for the loss of chance. The first alternative seems to award the plaintiff more than is needed to restore her to the status quo ante. The second alternative seems ad hoc insofar as its elimination of recovery for lost chance is motivated only by the desire to avoid excessive recovery.⁷⁸ Heidi Hurd

⁷³ See Claire Finkelstein, *Is Risk a Harm?*, 151 U. PA. L. REV. 963 (2003) (invoking alleged common intuitions about risks); John C.P. Goldberg & Benjamin Zipursky, *Unrealized Torts*, 88 VA. L. REV. 1625, 1651 (2002) (“[W]e assume that exposure to increased risk can be regarded as in and of itself a loss of welfare to the person(s) placed at heightened risk. Whether correct or incorrect, this assumption strikes many as intuitive.”); Benjamin Shmueli, *“I’m Not Half the Man I Used to Be”*: *Exposure to Risk Without Bodily Harm in Anglo-American and Israeli Law*, 27 EMORY INT’L L. REV. 987 (2013); Stephen F. Brennwald, Comment, *Proving Causation in “Loss of a Chance” Cases: A Proportional Approach*, 34 CATH. U. L. REV. 747, 771–72 (1985).

⁷⁴ Heidi M. Hurd, *The Deontology of Negligence*, 76 B.U. L. REV. 249, 263 (1996) (defending the position that tort law requires wrongdoing that has materialized and that a defendant cannot be held liable in tort for a risk of harm).

⁷⁵ Finkelstein, *supra* note 73, at 968.

⁷⁶ See Richard W. Wright, *Liability for Possible Wrongs: Causation, Statistical Probability, and the Burden of Proof*, 41 LOY. L.A. L. REV. 1295 (2008).

⁷⁷ *Id.* at 1296.

⁷⁸ Wright writes, “Treating the risk exposure as the legal injury, but only when the risked harm actually occurs and only in the problematic causation situations, is an ad hoc solution that, among other problems, fails to explain why recovery [for risk exposure] is contingent

has also objected to treating risks as harms on conceptual grounds. She argues that to accept risks as wrongs is either to be committed to a bizarre metaphysics that equates risks with actual physical events or else to fall victim to a vicious circle, for “to risk is to risk a wrong; and what is wrong cannot therefore be to risk.”⁷⁹ Finally, Stephen Perry contends that characterizing risk as a harm is an “an warranted fiction” because risk is “simply a reflection of our present state of partial knowledge about certain matters, not a true interest that consists of some aspect of human well-being and that is actually capable of being harmed.”⁸⁰

2. *Evidential Damages*

An alternative argument for PPR draws on the idea of evidential damages. This approach is elaborated most fully by Porat and Stein.⁸¹ Like the loss-of-chance theory, which recognizes that the loss of chance of avoiding harm is itself a harm, the evidential damage theory relies on recognizing a novel form of harm.

According to the evidential damages theory, courts should recognize when the defendants have wrongfully deprived the plaintiff of evidence that would allow the plaintiff to litigate a claim for damages successfully. Moreover, the theory asserts that deprivation should be compensated consistent with PPR, that is, with an award equal to the likelihood that the negligent actor’s conduct was a factual cause of the

on the actual occurrence of the risked harm and why the damages are based on the *ex post* actual harm rather than the *ex ante* expected harm.” *Id.*

⁷⁹ Hurd, *supra* note 74, at 263–64.

⁸⁰ See Stephen R. Perry, *Protected Interests and Undertakings in the Law of Negligence*, 42 U. TORONTO L.J. 247, 258 (1992).

⁸¹ PORAT & STEIN, *supra* note 9. Others have also made the argument. Porat and Stein are not the first to take this angle. See King, *supra* note 63, at 1378 (“A defendant’s tort not only destroys a ‘raffle ticket,’ in so doing it destroys any chance of ever knowing how that ticket would have fared in the drawing.”); King, *supra* note 35, at 545 (“The right to avoid a tortiously caused ‘blind spot’ in the ability to know the victim’s prognosis can be deemed a legally protected interest in its own right.”); S.M. Waddams, *Damages: Assessment of Uncertainties*, 13 J. CONT. L. 55, 66 (1998); Mark A. Geistfeld, *The Doctrinal Unity of Alternative Liability and Market-Share Liability*, 155 U. PA. L. REV. 447, 476 (2006). Courts have also made a similar point. For example, the court in *Matsuyama* stated, “Courts adopting the loss of chance doctrine also have noted that, because a defendant’s negligence effectively made it impossible to know whether the person would have achieved a more favorable outcome . . . it is particularly unjust to deny the person recovery for being unable ‘to demonstrate to an absolute certainty what would have happened in circumstances that the wrongdoer did not allow to come to pass.’” See also *McKellips v. Saint Francis Hosp., Inc.*, 741 P.2d 467, 469 (Okla. 1987); *Hicks v. United States*, 368 F.2d 626, 632 (4th Cir. 1966).

plaintiff's (traditionally understood) loss multiplied by the value of the loss.⁸²

Porat and Stein illustrate the operation of the evidential damage theory in the context of various cases involving uncertain causation of harm. They consider a case modeled on *Summers v. Tice*, involving three hunters, two of whom negligently fire their rifles and one of whom is hit. The evidence cannot establish, however, whether the first or second shooter is the cause of the third's injury. Porat and Stein argue:

By firing at plaintiff, either the first or the second defendant nullified the evidential significance of the injuring shot. One of them (or even both of them) thus caused the plaintiff serious evidential damage. If the non-injuring shot had not been fired, the existing evidence would have been strong enough to single out the plaintiff's injurer. But the shot was fired, and it evidentially incapacitated the plaintiff. Crystalizing in the plaintiff's inability to attribute his injury to either the first or the second defendant, the plaintiff's evidential damage equals the value of his physical damage. If the first defendant is not responsible for the latter damage, he certainly should be responsible for the former, and the same holds true also in relation to the second defendant.⁸³

Having established that the plaintiff in this case has suffered a compensable wrong, Porat and Stein propose a method for monetizing the value of the evidential harm done. They assert that the value of the evidential harm should be equated with the expected value of the information. According to Porat and Stein, that value should be calculated as follows:

[T]he size of the direct damage must be multiplied by the probability of the allegation that the direct wrong-doer (or the originator of the relevant risk of damage) actually inflicted that damage. This probability should be determined in a way that accounts—statistically or otherwise—for the evidential potential for the information of which the plaintiff was wrongfully deprived.⁸⁴

Thus, the evidential damages theory achieves awards consistent with PPR.

The evidential damages theory begins from a sound premise. Evidential harm—the deprivation of information or items that have

⁸² The “evidential harm theory” might be a more apt name for Porat and Stein’s theory. “Damages” in the context of torts, usually refers to the award sought by the plaintiff rather than the harm, injury, or loss suffered by the plaintiff.

⁸³ PORAT & STEIN, *supra* note 9, at 162.

⁸⁴ *Id.* at 168.

value in a lawsuit—should be recognized as a legal harm. To some extent, it already is. For example, a lawyer’s careless loss or destruction of an item with foreseeable evidentiary value is legal malpractice.⁸⁵ Furthermore, damages in such a case may be calculated as the item’s litigation value, at least where there is more than a 50% chance the destroyed item’s availability would have led to a more favorable outcome at trial.⁸⁶ There seems no reason in principle not to allow recovery for tortiously destroyed evidence outside the lawyer-client relationship. Thus, the evidential damages theory appears to have a solid foundation in law.

Applying the evidential damages theory to cases of uncertain causation, however, is problematic. Foreseeability of harm is a well-established requirement of tort liability (generally built into the notion of duty or scope of duty (proximate causation)⁸⁷). It is easy to imagine that the hunters, who, by hypothesis, fired independently, were not able to appreciate that their firing posed an unacceptable risk of causing evidential damage—that is, of improperly denying the threatened hunter’s access to information that might aid a possible lawsuit against the hunters.⁸⁸ For example, the hunters might have been standing outside each other’s view and unaware of the possibility of another’s firing. Such a case would not pose a problem for the plaintiff under existing alternative causation doctrine, and recovery would be consistent with the corrective justice as it is usually understood. Yet, recovery would be problematic under the evidential damages theory due to the lack of foreseeability. Recognizing a new form of harm does not provide a reason to jettison the general recovery requirement of foreseeability.

⁸⁵ See, e.g., *Jerista v. Murray*, 883 A.2d 350 (N.J. 2005) (spoliation of evidence).

⁸⁶ See DOBBS ET AL., *supra* note 4, §§ 722, 729; see also George S. Mahaffey, *Cause-in-Fact and the Plaintiff’s Burden of Proof with Regard to Causation and Damages in Transactional Legal Malpractice Matters: The Necessity of Demonstrating the Better Deal*, 37 SUFFOLK U. L. REV. 393 (2004).

⁸⁷ See *Palsgraf v. Long Island R.R.*, 162 N.E. 99 (N.Y. 1928) (majority and dissent reflecting alternative views of place of foreseeability).

⁸⁸ Indeed, it seems problematic to apply the evidential damages theory to any case where the very act that tortiously threatens to cause plaintiff physical injury is the act that is alleged to produce evidential damage. Normally the litigation consequences of an act of are not regarded as foreseeable. For example, it clearly would not do for an actor who places another at physical risk to argue that a foreseeable consequence was a tort action against him in which he would be found liable and a subsequent compensatory payment to the plaintiff, and when such positive consequences for the other are taken into account (along with the burden of foregoing the risky conduct), his conduct should no longer be regarded as negligent. Taking litigation consequences into account raises the specter of vicious circularity.

Regarding this argument against the evidential damages theory, Porat and Stein write: “A possible way to reconcile [this case] with the foreseeability requirement is to say that since each defendant foresaw a physical injury, each should have expected liability to the extent of the physical injury, whether we label it liability for the physical damage or the evidential damage.”⁸⁹ But, such a move will not work. If only one hunter shot, foreseeably risking the death of another, and the sound of his rifle caused an unseen elephant who had escaped from a traveling circus to charge and trample to death the hunter who had been at risk of being shot as that hunter was complaining about the near miss, the foreseeability requirement would rightly preclude liability. This is so despite the foreseeability of the extent of the damages—that is, death. Foreseeability of the type of harm, not the extent of the harm, is usually required.⁹⁰ Physical injury and loss of information relevant to future litigation are different types of harm.⁹¹

Finally, the evidential damages theory runs into problems in the more typical case involving a single tortfeasor. Porat and Stein argue that in malpractice cases with uncertain causation, plaintiffs unable to establish they were more likely than not harmed by the malpractice should be able to recover on the theory that due to the malpractice, they were denied the critical litigation information whether, but-for the malpractice, they would have had a better outcome.⁹² Porat and Stein claim that courts should base the value of this information on what the plaintiff would be willing to pay for the information denied him (its litigation value). Because the information might either help or hurt his claim, they explain, the value of the information, is the amount of the plaintiff’s injuries discounted by the likelihood the defendant did not cause them.⁹³

Recognizing a claim for evidential damages runs into all the problems, discussed in the last section, that plague recognizing a claim for lost chance. In fact, evidential damages are just a form of loss of chance—the loss of chance of obtaining a better litigation outcome, as opposed to the loss of chance of obtaining a better medical or physical

⁸⁹ PORAT & STEIN, *supra* note 9, at 173 & n.6.

⁹⁰ DOBBS ET AL., *supra* note 4, § 206.

⁹¹ Relatedly, the evidential damages theory will not always generate awards consistent with PPR. This is because the likelihood of causing harm—the critical element for PPR—will not always be equal to the likelihood of depriving the plaintiff of evidence she is entitled to.

⁹² PORAT & STEIN, *supra* note 9, at 178–79.

⁹³ *Id.*

outcome. Indeed, suppose the valuation of a loss of chance based on willingness to pay was sound. In that case, a plaintiff in a given malpractice case with uncertain causation should be able to directly recover the value of the chance of a better medical outcome that the defendant's malpractice denied her, valued at what she would have been willing to pay to avoid the malpractice. Such a recovery would obviate any claim of evidential damage. Thus, in the case of a single tortfeasor, the evidential damage theory fails to advance the ball.⁹⁴

Despite these potential objections, the evidential damages theory is an important one. Although we do not consider it as sound as the Recovery Error arguments discussed in the next section, the extent to which the public shares the intuitions underlying it is worthy of investigation.⁹⁵

B. Recovery Error Arguments

Problems of uncertain causation arise only where the available evidence concerning causation creates a possibility of an erroneous award. Thus, the problem of uncertainty can be thought of as the problem of error imposition: who the tort system subject to the possibility of an unjust outcome? The following two arguments present conflicting ways of treating the possibility of error fairly in tort law. According to the first argument—Error Minimization—the total expected long-run deviation of the tort system from the ideal of corrective justice should be reduced as much as possible. This argument favors the SMSR. According to the second argument—Error Equalization—the expected deviation from corrective justice in any

⁹⁴ Porat and Stein attempt to distinguish reliance of probabilities to determine damages in the context of damages for physical harm and in the context of evidential damages on the ground that the defendant is culpably responsible for the reliance on probabilities in the latter case but not the former. *Id.* at 178. But defendants seem equally responsible and culpable when it comes to the need for probabilistic evaluation of loss of chance of avoiding physical harm and loss of chance of avoiding an adverse litigation outcome.

⁹⁵ Another argument falling under the “novel harm” rubric is the autonomy interference argument. Stephen Perry, discussing recovery in a medical malpractice case with uncertain causation, contends that “the loss is not the lost chance as such but the lost opportunity to pursue a preferable course of action.” Stephen R. Perry, *Protected Interests and Undertakings in the Law of Negligence*, 42 U. TORONTO L.J. 247, 313 (1992). In this manner, Perry recasts the wrong to be remedied as “interference with the plaintiff’s interest in his or her personal autonomy.” *Id.* at 250. While interference with autonomy is arguably wrongful, it is unclear why this interest in autonomy should be compensable where it is improbable that the interference produced any adverse physical outcome to a defendant. Many people would gladly forsake the opportunity to pursue an ex ante preferable course of action in return for an ex post preferable outcome. Thus, Perry’s appeal to autonomy appears to do no moral work.

given case should fall equally on the plaintiff and the defendant. This argument favors PPR.

1. Error Minimization

One argument for SMSR draws on the idea of recovery error minimization. When the plaintiff's recovery compensates the plaintiff for her loss, and no more, the plaintiff receives the objectively just recovery. Recoveries may diverge from the objectively just recovery by being too high or too low. Every dollar awarded to the plaintiff less than the objectively just recovery is an underpayment recovery error. Every dollar the defendant must pay the plaintiff over the objectively just recovery is an overpayment recovery error. Total recovery error is the sum of the plaintiff's underpayment and the defendant's overpayment.⁹⁶

A couple of examples illustrate the comparative potential of SMSR and PPR to produce recovery error. First, imagine that Defendant's factory has tortiously released a toxic pollutant into the air upwind from Plaintiff's ranch. The following week, Plaintiff's cow dies. Plaintiff brings a tort claim against Defendant, alleging that Defendant caused the death of his cow, valued at \$1,000. Expert testimony establishes a 30% chance that the pollutant caused the cow's death. Under SMSR, Plaintiff would recover nothing, because the preponderance of evidence test would not be satisfied. Because Plaintiff recovers nothing, and there is a 30% chance that Defendant's conduct caused the loss, the expected value of the recovery error is $0.3 * \$1,000$, or \$300.

In contrast, under PPR, Plaintiff would recover \$300 ($0.3 * \$1,000$). On one hand, if Defendant's conduct caused Plaintiff's loss, Plaintiff would be undercompensated by \$700 relative to the objectively just recovery. There is a 30% chance of this. The value of the expected recovery error to Plaintiff would be \$210. On the other hand, if

⁹⁶ We do not count the plaintiff's overpayment or the defendant's underpayment as independent components of total recovery error because, as a normative matter, such errors do not seem as serious as a plaintiff's underpayment or a defendant's overpayment and because, as a logical matter, the former set of errors are reflections of the latter. If a plaintiff receives \$X more than she is justly due, it is because defendant has been required to pay \$X more than she should have to. Likewise, where there are multiple defendants, one defendant's underpayment may be reflected in another defendant's overpayment, and where there are multiple plaintiffs, one plaintiff's overpayment may be reflected in another's underpayment. See Saul Levmore, *Probabilistic Recoveries, Restitution, and Recurring Wrongs*, 19 J. LEGAL STUD. 691, 699–700 (1990) (discussing different ways of computing error).

Defendant's conduct did not actually cause Plaintiff's loss, Defendant would have suffered an unjust deprivation of \$300 relative to the objectively just recovery. Because there is a 70% chance of this, the value of the expected recovery error to Defendant is $0.7 * \$300$, or \$210. Adding these two amounts together yields \$420 as the expected recovery error under PPR. Because this amount is greater than SMSR's \$300 expected recovery error, SMSR will likely produce an outcome closer to the objectively just outcome. Indeed, any time there is uncertainty regarding whether the recovery conditions exist in a tort action, SMSR will produce a lower expected recovery error than PPR.⁹⁷

Likewise, in cases with multiple tortious actors, only one of whom has caused a loss, as in *Summers v. Thrice I and II*, SMSR minimizes expected error. If, for example, three defendants, $D1$, $D2$, and $D3$ have acted tortiously, and if the likelihood of each defendant having caused the plaintiff's loss is $p1$, $p2$, and $p3$ respectively, where $p1 > p2 > p3$, holding $D1$ liable for the entire loss minimizes the expected recovery error. The same principle applies regardless of the number of defendants.

Reducing the expected recovery error has intuitive appeal. All factors equal, it is desirable to reduce the actual recovery error. Reducing the expected recovery error as much as possible in every case will, in the long run, reduce the actual total expected recovery. As SMSR produces less expected recovery error than PPR, it seems the superior recovery scheme.

The desirability of recovery error minimization relies, however, on at least a couple of assumptions. First, it assumes that plaintiff-underpayment errors and defendant-overpayment errors are equally unjust. This may not be the case. Failing to compensate a wrongfully harmed plaintiff and holding liable a defendant who has caused no harm both seem wrong, but we might think that the defendant should bear the risk of error because he is at least partly at fault for creating the uncertainty. Indeed, it is arguably worse to fail to compensate a plaintiff who has suffered a given amount of tortious harm than it is to hold a defendant who has acted tortiously liable for the same amount, even though he has not caused the plaintiff harm. Likewise, where only causation is uncertain, the plaintiff will usually be without fault, and the defendant will have acted in a morally culpable manner. Given the

⁹⁷ Proof of this proposition is presented in Appendix B *infra*.

higher moral status of the plaintiff relative to the defendant, it may seem worse that error falls on the plaintiff.

A second assumption underlying the goal of recovery error minimization is that every dollar erroneously awarded (or not awarded) should count equally. However, because of the diminishing marginal utility of dollars, initial dollars erroneously denied by the plaintiff might be of greater value to the plaintiff, and later dollars erroneously awarded to the plaintiff might be of greater value to the defendant.⁹⁸ If this were so, it might be more just to subject a plaintiff to a 70% risk of a \$300 underpayment and subject a defendant to a 30% risk of a \$700 overpayment under PPR than to subject a plaintiff to a 30% chance of a \$1,000 underpayment. The \$1,000 underpayment might have a disproportionate impact on the plaintiff. At the very least, a recovery *disproportional* to probabilities would be required to equalize the expected recovery error.

Finally, minimizing expected recovery error underdetermines the recovery amount. If, for example, there was a 50% chance that *D* tortiously caused *P*'s loss of \$1,000, any award from \$0 to \$1,000 would produce an expected recovery error of \$500. In such a case, other criteria might be relevant for determining the fairest award.⁹⁹

2. Error Equalization

Recovery error equalization is a potential alternative goal of the tort system to recovery error minimization. Considerations of recovery error equalization provide the basis for an argument for the fairness of PPR.

Imagine a case where there is a 30% chance that Defendant's tortious conduct caused Plaintiff a \$1,000 loss. A court would minimize expected recovery error by denying Plaintiff any recovery, consistent with SMSR. With no recovery, the expected recovery error would be

⁹⁸ See Michael Abramowicz, *A Compromise Approach to Compromise Verdicts*, 89 CALIF. L. REV. 231, 247 (2001).

⁹⁹ Even if one accepts the idea that recovery error minimization ought to be determinative in choosing a recovery rule, it does not always follow that SMSR is to be preferred to PPR. Where there are multiple claims by a plaintiff against a defendant, either in single or multiple actions, recovery error cancellation may occur. For example, a plaintiff receiving an overpayment on one claim may receive an underpayment on another, thereby reducing aggregate recovery error. The magnitude of recovery error cancellation under both SMSR and PPR will depend on the number and type of recovery errors. In some cases, due to error cancellation, PPR will produce lower aggregate recovery error than SRSR. The significance of recovery errors cancellation, however, is debatable. It is not clear normatively that "two wrongs make a right."

\$300 because there is a 30% chance Plaintiff would be deprived of the \$1,000 she should objectively receive. Under SMSR, the expected recovery error is completely allocated to Plaintiff.

In contrast, under PPR, Plaintiff would recover \$300. There would then be a 30% chance that Plaintiff would not receive the additional \$700 objectively due, yielding an expected recovery error of \$210 ($.30 * 700$), and a 70% chance that Defendant would pay \$300 that, objectively, she should not have to, yielding an expected recovery error of \$210 ($.70 * 300$). The total expected recovery error of \$420 ($\$210 + \210) would be greater than that produced by SMSR, but it would be equally allocated between Plaintiff and Defendant. Likewise, in cases of multiple defendants who have acted tortiously, but only one of whom caused Plaintiff's loss, PPR more equally allocates recovery error than SMSR.

Recovery error equalization seems *prima facie* desirable. Where there is uncertainty, there is an unavoidable risk that a judgment will result in a party's being placed in a worse position than she is entitled to be under the corrective justice principle that a person should be compensated for exactly those losses proximately caused by another's tortious conduct. Arguably, that risk should fall equally on the plaintiff and the defendant as much as any cost for an activity should fall equally on those participating in the activity. Some have argued, however, that an unequal distribution of expected recovery error between parties is not problematic because, *ex ante*, plaintiffs and defendants have an equal likelihood of being disadvantaged by the unequal error distribution of SMSR. Moreover, some argue that *ex ante*, all persons have an equal likelihood of being plaintiffs and defendants.¹⁰⁰

Considerations of recovery error equalization point to another normative advantage PPR may have over SMSR. Recovery error is not the only metric that we might equalize. Net recovery error might also be a normatively relevant metric. Net recovery error for a party may be defined as the sum of the expected overpayment and expected underpayment for that party. For example, in the case where a 30% chance exists that Defendant caused Plaintiff's \$1,000 loss, if Plaintiff receives \$300 pursuant to PPR, not only does Plaintiff face a 30% chance of a \$700 underpayment, yielding a \$210 expected underpayment, but she also enjoys a 70% chance of a \$300

¹⁰⁰ Compare Kaye, *supra* note 2, with Abramowicz, *supra* note 98, at 224 (arguing that behind a thin veil of ignorance, recovery errors would not be a factor and PPR would be preferred based on risk aversion).

overpayment, yielding a \$210 expected overpayment. The sum of her expected underpayment and overpayment is \$0. Likewise, the net recovery error for Defendant is the sum of a \$210 expected underpayment and a \$210 expected overpayment, or \$0.¹⁰¹

When it comes to net recovery error, PPR thus achieves equality in two respects. First, the expected recovery error of overpayments and underpayments are equal—they exactly cancel each other out. This is normatively significant because if Plaintiff and Defendant are risk neutral and seek to maximize personal utility, they should be *ex ante* indifferent to the application of PPR and the realization of the objectively just award. Because neither Plaintiff nor Defendant has grounds to object to an objectively just award, they would have no grounds to object to an award based on PPR. Second, under PPR, the net expected recovery error is the same for both Defendant and Plaintiff—zero. Insofar as equality of treatment is a large component of fair treatment, and net recovery error is an important measure of treatment, PPR advances fairness in tort litigation.¹⁰²

The normative significance of net expected recovery error, however, is open to dispute, much as is simple expected recovery error. Again, a nonzero net expected recovery error under SMSR might not be problematic because, *ex ante*, plaintiffs and defendants have an equal likelihood of being disadvantaged by the unequal error distribution, as well as the fact that *ex ante*, all persons have an equal likelihood of being plaintiffs and defendants. Any unfairness that appears when focusing narrowly on the treatment of a given party arguably disappears when considering the big picture.

Furthermore, minimizing net expected recovery error might undervalue justice. Imagine a case where two parties, *A* and *B*, come before a judge to settle a dispute about the ownership of an item. *A* and *B* share all relevant information concerning ownership, and both

¹⁰¹ In general, where one party's net expected recovery error is \$0, the other party's will also be \$0 because every dollar overpaid to the plaintiff is a dollar overpaid by the defendant and every dollar underpaid to the plaintiff is a dollar underpaid by the defendant.

¹⁰² A similar analysis applies to cases of multiparty alternative causation, like *Summers v. Thrice II*. As shown above, under PPR, the distribution of expected overpayments—while more equal than that produced by SMSR—varies; the defendant who most likely caused the harm bears the greatest risk of overpayment error. In contrast, each defendant would face a *net* expected recovery error of zero. That is, the likelihood of each of them overpaying would be balanced out by the likelihood of each of them underpaying. For example, the defendant with a 30% chance of causing harm, who is required to pay \$300, would be subjected to an expected overpayment of \$210, as explained above. She would also enjoy a \$210 expected underpayment because there is 30% chance that she objectively should pay an additional \$700.

believe further investigation is equally likely to demonstrate that the item belongs to her as it is to demonstrate that it belongs to the other party. Also, assume that the judge could determine conclusively to whom the item belongs with little effort. Instead, however, the judge flips a coin to determine who should take the item home.

Flipping a coin produces a net zero expected error for *A* and *B*, because for each, there is a 25% chance they will receive the item even though they don't objectively own it, there is a 25% chance they will not receive the item even though they do objectively own it, and there is a 50% chance they will correctly—that is, consistent with their objective ownership—receive or not receive the item. And yet, flipping a coin instead of awarding based on ownership seems problematic.¹⁰³ True, if the parties sought to achieve the best outcome for themselves, and they were risk neutral, they would be indifferent between awarding the item based on ownership and a coin flip. But awarding based on a coin flip, as opposed to awarding based on ownership, seems to undervalue reaching the just result—awarding the owner her item. Arguably, the legal system should prefer the objectively just result (the item going to its owner) to one that might not be (the coin flip result), even if the net expected recovery error for the parties is zero.¹⁰⁴

At a minimum, the preceding analysis demonstrates a trade-off between minimizing and equalizing expected recovery error. SMSR minimizes total recovery error, while PPR reduces recovery error inequality (if one focuses on erroneous deprivations) or eliminates it entirely (if one focuses on net expected recovery error). In cases involving two parties, the trade-off is greatest where there is a 25% or 75% chance that the objective conditions for recovery exist. As discussed previously, in that case, the expected recovery error under SMSR is \$250, and under PPR, it is \$375. Thus, the situation is comparable, assuming risk neutrality, to one where the legal system has the option of either depriving one of two persons of \$250 (resulting in a total of deprivation of \$250), or depriving two persons of \$187.50 each (resulting in a total unjust deprivation of \$375).

¹⁰³ Indeed, psychological research on fairness has demonstrated that people object to such a randomized outcome when countervailing bases exist to distribute the resource. See Alex Shaw & Kristina Olson, *Fairness as Partiality Aversion: The Development of Procedural Justice*, 119 J. EXPERIMENTAL CHILD PSYCH. 40 (2014).

¹⁰⁴ We explore this issue through survey questions discussed later in this article. See discussion *infra* Section III.B.2.c. These survey questions attempt to develop information about the value people place on outcomes consistent with corrective justice in the context of zero net expected error recovery.

The trade-off between recovery error minimization and recovery error equalization may be analogous to the more familiar potential trade-off between efficiency and equality. Efficiency and equality are distinct concepts. Because they are distinct, the pursuit of one may diverge from the pursuit of the other. On a social policy level, institutions may be structured to maximize efficiency and total wealth or maximize the equal distribution of wealth.¹⁰⁵ Each approach to social structuring has its advocates.¹⁰⁶ There is no consensus regarding which approach is superior, and the truth might fall in between, i.e., an approach that sacrifices some degree of efficiency or distributional equality to gain a degree of the other.¹⁰⁷ Just as reasonable minds can differ regarding the optimal trade-off between efficiency and equality, they can differ regarding the optimal trade-off between recovery error minimization and equalization.¹⁰⁸

¹⁰⁵ See generally ARTHUR M. OKUN, EQUALITY AND EFFICIENCY: THE BIG TRADEOFF 86 (1975) (exploring how actual and alternative social structures influence economic efficiency and equality in a range of domains).

¹⁰⁶ On the side favoring equality, there is, for example, John Rawls. Under Rawls's Difference Principle, economic inequalities are presumptively unjustified, permissible only insofar as they make the typical member of the least advantaged group materially better off than they would be under strict equality. See JOHN RAWLS, POLITICAL LIBERALISM 5–6 (1993); see also BRUCE A. ACKERMAN, SOCIAL JUSTICE IN THE LIBERAL STATE (1980) (favoring as a fundamental principle, the equal initial distributions of resources). On the side favoring efficiency, there is, for example, Milton Friedman. Friedman critiques governmental efforts to eliminate economic inequality, such as progressive taxation, on the ground that they result in a loss of productivity and impede the accumulation of wealth without normative justification. See MILTON FRIEDMAN, CAPITALISM AND FREEDOM 161–66, 173–74 (1962); see also LOUIS KAPLOW & STEVEN SHAVELL, FAIRNESS VERSUS WELFARE (2002) (rejecting any principle of distributional equality that would permit a reduction in every individual's welfare); Richard A. Posner, *Wealth Maximization Revisited*, 2 NOTRE DAME J.L. ETHICS & PUB. POL'Y 85 (1985) (offering a qualified defense of wealth maximization).

¹⁰⁷ See OKUN, *supra* note 105, at 92 (specifying a preferred trade-off between economic efficiency and equality).

¹⁰⁸ Other arguments have been deployed relating to the relative fairness of SMSR and PPR. For example, Michael Abramowicz has argued that the "principle of equality" favors PPR. Abramowicz argues that from the principle of equality, like cases should be treated alike, it follows that similar cases should be treated similarly. Therefore, where there is a small change in evidence regarding causation, there should be a small change in recovery. Abramowicz, *supra* note 98, at 281, 312. This is consistent with PPR, but not with SMSR, where a small change in evidence—say evidence establishing 49% chance of causation and a 51% chance of causation—can result in a large change in recovery. When it comes to justice, however, sometimes a small factual change can warrant a large, discontinuous response. A slight change in the factors relating to risks and costs of avoidance may turn reasonable conduct into negligent conduct and justify full compensation for any harm done, rather than none. While there may be something to Abramowicz's intuition about equality, the scope of the intuition needs further refinement.

III

PUBLIC PERCEPTIONS OF FAIRNESS

As the discussions in Parts I and II demonstrate, both existing law and scholarly commentary allow room for reasonable debate regarding the possible expansion of the use of PPR in tort law. In this Part, we provide new arguments supporting such expansion, drawing on psychology and original empirical data. Section A argues that the tort system should not only be fair, but should also be perceived as fair by the general public, because such perceptions may be pivotal in maintaining the legitimacy and justness of the system. Section B presents our empirical surveys, in which we tested how PPR and SMSR, and the rationales for them, compare to people's actual intuitions about fairness. Section C summarizes our findings.

*A. Fairness and Perceived Fairness**1. Fairness and Justice*

This Article centers on fairness, a term we also use extensively in our surveys. "Fairness," however, can have different meanings in different contexts. Here, we clarify our usage of the term "fairness" and how it relates to justice.

On one hand, there is a narrow sense of "fairness." Understood narrowly, fairness simply implies that equals are treated equally.¹⁰⁹ But what is it for two things to be equal? In legal disputes, the parameters of equality may be set by the relevant legal rules. Thus, a fair outcome may be one that follows from the relevant rules being applied without bias or favoritism. So long as the legal actors charged with implementing the rules, e.g., the judge or jury, acted without such bias or favoritism, the outcome would be fair because similar litigants would be treated similarly.

Fairness, in these narrow senses, might be distinguished from justice. Construing fairness narrowly, it might be possible for an outcome to be fair but not just. Imagine a jurisdiction that adopted the substantive rule that if an actor intentionally converts the property of another, the actor's liability is capped at 50% of the amount necessary to restore the victim to the status quo ante. If, under this rule, Plaintiff was awarded \$500 based on findings that Defendant intentionally

¹⁰⁹ See, e.g., *Fairness*, MERRIAM-WEBSTER.COM DICTIONARY, <https://www.merriam-webster.com/dictionary/fairness> [<https://perma.cc/EGZ2-6Z4T>] (defining *fairness* as "lack of favoritism toward one side or another").

destroyed Plaintiff's property worth \$1,000, the \$500 award would likely be considered unjust, even if the outcome was "fair" in the narrow sense it followed properly from correctly applied fair procedural rules. In general, "fair but unjust" outcomes will be those where unjust outcomes are or would be imposed consistently and equally across a defined group.¹¹⁰

On the other hand, fairness has a broader sense that incorporates justice. Considering the example above, it might be said that the rule that caps liability at 50% was unfair insofar as it was biased against victims and unjustifiably favored intentional wrongdoers. Victims and wrongdoers, it might be said, are not treated equally. This example can be generalized to other departures from corrective justice. Fairness implies justice in zero-sum games like litigation, where it is impossible to impose an unjust outcome on both sides simultaneously (because one side's loss is the other's gain). Indeed, the common meaning of "fair," as reflected by dictionaries, recognizes its close tie to justice.¹¹¹

We use "fairness" in the term's broader, more common meaning, according to which fair outcomes are necessarily just ones. This meaning is reinforced by our use of the term in our surveys. The survey questions are posed to participants regarding "fair" outcomes. The questions do not include elements, such as potentially conflicted decision-makers or arguably one-sided procedural rules, that might invoke the narrower sense of the term. Rather, the questions suggest that we are inquiring about fairness broadly. We asked participants to give their ultimate, normative evaluation of the situations presented and the available outcomes.¹¹²

¹¹⁰ The distinction between fairness and justice was colorfully illustrated by the philosopher Sidney Morgenbesser. Morgenbesser once participated in a disorderly protest demonstration at Columbia University, quelled by police violence. Afterwards, he was asked if it was unfair or unjust that the police hit him on the head during the protest. "It was as unfair but not unjust," he replied. When queried, he explained, "It was unfair because they hit me over the head, but not unjust because they hit everyone else over the head." See *Sidney Morgenbesser*, WIKIQUOTE, https://en.wikiquote.org/wiki/Sidney_Morgenbesser (Jan. 24, 2024) [<https://perma.cc/TCV9-PT76>].

¹¹¹ See, e.g., *Fair*, CONCISE OXFORD ENGLISH DICTIONARY (Catherine Soanes & Angus Stevenson eds., 11th ed., rev. ed. 2008) ("[T]reating people equally . . . just or appropriate in the circumstances.").

¹¹² See *Fair*, Dictionary.com, <https://www.dictionary.com/browse/fair> [<https://perma.cc/9GME-UWA2>] ("[F]ree from bias, dishonesty, or injustice."); *Fairness*, Collins Dictionary, <https://www.collinsdictionary.com/us/dictionary/english/fairness> (last accessed Feb. 28, 2024) ("[T]he quality of being reasonable, right, and just."); Oxford Languages ("[H]onesty, impartiality, equitableness, justness, fair dealing.").

2. *The Importance of Perceptions*

Equal protection of the laws is a fundamental guarantee of the American justice system. Fairness is the first principle of the legal system.¹¹³ But it is also important that the system be *perceived to be* fair. As a vast body of research has demonstrated across various contexts and settings, when participants and observers perceive processes to be fair, they are more likely to view those processes as legitimate exercises of authority.¹¹⁴ Likewise, research has demonstrated that legitimacy of this sort encourages trust in and cooperation with the legal system and may even facilitate obedience to laws.¹¹⁵

Perceptions of fairness are particularly relevant to the legal system when there is no clear answer regarding what is fair. As shown in Part II, that is the case for rules of tort recovery in the face of factual uncertainty. As discussed, reasonable minds may differ regarding whether SMSR, in minimizing recovery error, or PPR, in equalizing recovery error, is the fairer approach to awarding compensation. It is thus appropriate to defer to public perceptions. In this manner, the manifold advantages flowing from a tort system in harmony with public perceptions of fairness will not come at the cost of actual fairness.

Given the significance of perceptions of fairness, it is unsurprising that a large and growing body of empirical research has sought to test

¹¹³ See, e.g., *United States v. Lovett*, 328 U.S. 303, 321 (1946) (Frankfurter, J., concurring) (“Most constitutional issues derive from the broad standards of fairness written into the Constitution.”).

¹¹⁴ See, e.g., Tom R. Tyler & Kenneth Rasinski, *Procedural Justice, Institutional Legitimacy, and the Acceptance of Unpopular U.S. Supreme Court Decisions: A Reply to Gibson*, 25 L. & SOC’Y REV. 621, 621–22 (1991); Rebecca Hollander-Blumoff & Tom R. Tyler, *Procedural Justice and the Rule of Law: Fostering Legitimacy in Alternative Dispute Resolution Symposium*, 2011 J. DISP. RESOL. 1, 4 (2011); Tom R. Tyler & Justin Sevier, *How do the Courts Create Popular Legitimacy?: The Role of Establishing the Truth, Punishing Justly, and/or Acting Through Just Procedures*, 77 ALBANY L. REV. 1095, 1129 (2014); John M. Gallagher & José B. Ashford, *Perceptions of Legal Legitimacy in Veterans Treatment Courts: A Test of a Modified Version of Procedural Justice Theory*, 45 L. & HUM. BEHAV. 152 (2021).

¹¹⁵ TOM R. TYLER, *WHY PEOPLE OBEY THE LAW* (2006); Tom R. Tyler, *Procedural Fairness and Compliance with the Law*, 133 REVUE SUISSE D’ECONOMIE POLITIQUE ET DE STATISTIQUE 219, 229 (1997); Tom R. Tyler & Jonathan Jackson, *Popular Legitimacy and the Exercise of Legal Authority: Motivating Compliance, Cooperation, and Engagement*, 20 PSYCH., PUB. POL’Y & L. 78, 79 (2014); Tom R. Tyler et al., *The Impact of Psychological Science on Policing in the United States: Procedural Justice, Legitimacy, and Effective Law Enforcement*, 16 PSYCH. SCI. PUB. INT. 75, 83 (2015).

and measure those perceptions.¹¹⁶ Much of this work has focused on criminal law and policing,¹¹⁷ although scholars have examined topics as wide-ranging as administrative rulemaking,¹¹⁸ tax compliance,¹¹⁹ and jury service.¹²⁰ Amid all this research, however, relatively little attention has been paid to tort law specifically.¹²¹

We designed the surveys presented below against this backdrop of fairness research. Despite robust arguments in the literature about the relative fairness of PPR and SMSR in various contexts, no previous work has sought to elicit lay views on the topic. The rest of this Article begins to fill this gap.

B. Empirical Surveys of Fairness Perceptions

To evaluate people's fairness intuitions, we designed two large-scale surveys. We presented participants with a variety of legal and nonlegal scenarios and asked them what outcomes were fairest. Several questions mirror the complex cases outlined in Part II, in which courts and commentators seem willing to consider PPR. We draw some preliminary conclusions about public support for PPR decision rules

¹¹⁶ See, e.g., Rebecca A. Anderson & Amy L. Otto, *Perceptions of Fairness in the Justice System: A Cross-Cultural Comparison*, 31 SOC. BEHAV. & PERSONALITY 557, 558 (2003); Vanessa A. Baird & Amy Gangl, *Shattering the Myth of Legality: The Impact of the Media's Framing of Supreme Court Procedures on Perceptions of Fairness*, 27 POL. PSYCH. 597, 598 (2006); Nancy A. Welsh, *Perceptions of Fairness in Negotiation*, 87 MARQ. L. REV. 753, 753–54 (2003); Honorata Mazepus & Florian Van Leeuwen, *Fairness Matters When Responding to Disasters: An Experimental Study of Government Legitimacy*, 33 GOVERNANCE 621, 622 (2020); George Loewenstein et al., *Self-Serving Assessments of Fairness and Pretrial Bargaining*, 22 J. LEGAL STUD. 135, 139–40 (1993).

¹¹⁷ E.g., Joselyne L. Chenane et al., *Traffic Stops, Race, and Perceptions of Fairness*, 30 POLICING & SOC'Y 720 (2019); Tom R. Tyler, *Policing in Black and White: Ethnic Group Differences in Trust and Confidence in the Police*, 8 POLICE Q. 322 (2005); Tyler et al., *supra* note 116; Robert J. MacCoun & Tom R. Tyler, *The Basis of Citizen's Perceptions of the Criminal Jury - Procedural Fairness, Accuracy, and Efficiency*, 12 L. & HUM. BEHAV. 333 (1988).

¹¹⁸ Alexander I. Ruder & Neal D. Woods, *Procedural Fairness and the Legitimacy of Agency Rulemaking*, 30 J. PUB. ADMIN. RES. & THEORY 400 (2019).

¹¹⁹ Lin Mei Tan & Carrol Chin-Fatt, *The Impact of Tax Knowledge on the Perceptions of Tax Fairness and Attitudes Towards Compliance*, 8 ASIAN REV. ACCT. 44 (2000).

¹²⁰ Daniel W. Shuman & Jean A. Hamilton, *Jury Service - It May Change Your Mind: Perceptions of Fairness of Jurors and Nonjurors*, 46 S.M.U. L. REV. 449, 450 (1992).

¹²¹ *But see*, e.g., Jennifer K. Robbennolt, *Apologies and Legal Settlement: An Empirical Examination*, 102 MICH. L. REV. 460 (2003) (examining apologies in the context of tort cases); Jennifer K. Robbennolt, *Apologies and Settlement Levers*, 3 J. EMPIRICAL L. STUD. 333 (2006) (same); Jessica Bregant et al., *Perceptions of Settlement*, 27 HARV. NEGOT. L. REV. 93 (2021) (looking at lay inferences surrounding settlement of tort cases, among others).

from the surveys.¹²² The surveys also include more discrete questions, allowing us to test constituent arguments in favor of PPR and SMSR individually. From these, we can begin to generalize beyond the basic fact patterns provided in our case hypotheticals, and we can also get a clearer understanding of how participants reason about fairness. These questions should allow us to evaluate the scholarly arguments articulated by us and others for consistency with actual intuitions about fairness.

1. *Methods*

We administered two surveys. We administered the first survey (“primary survey”) in February 2022. We administered the second survey (“follow-up survey”) in April 2022. In both the primary and follow-up survey, we recruited participants using Amazon’s Mechanical Turk (MTurk), a commonly used platform for online data collection. MTurk “workers” choose from a list of available assignments, including surveys or other tasks, and complete them at home in exchange for payment.¹²³ Each of our participants was paid \$2.50 for completing our survey.

We recruited 1,070 adults for the primary survey.¹²⁴ Participants began by watching a short video thanking them for their time and

¹²² A survey is, of course, a rough approximation of how people might judge fairness in the “real world,” such as when they serve as jurors. We are not concerned, however, about the lack of deliberation in our study, for two reasons. First, our goal here is to measure comparatively pure intuitions of fairness, not to predict jury outcomes. Second, research on juries is decidedly mixed as to the effects of deliberation, but a substantial set suggests that the ultimate decisions made by a jury may not diverge meaningfully from the initial impressions of individual jurors. For a review, see Dennis J. Devine et al., *Jury Decision Making: 45 Years of Empirical Research on Deliberating Groups*, 7 *PSYCH., PUB. POL’Y & L.* 622, 699 (2001).

¹²³ Some recent research has raised concerns about MTurk data quality and participant inattention. Several reviews, however, have concluded that appropriate quality control practices are sufficient to alleviate these concerns. See, e.g., Herman Aguinis et al., *MTurk Research: Review and Recommendations*, 47 *J. MGMT.* 823, 833 (2021); Michael Chmielewski & Sarah C. Kucker, *An MTurk Crisis? Shifts in Data Quality and the Impact on Study Results*, 11 *SOC. PSYCH. & PERSONALITY SCI.* 464 (2020). Our surveys have adopted those practices, including attention checks, quality screens, and sample size adjustments. We used Cloud Research (formerly TurkPrime.com) to manage the distribution and recruiting for our survey. See Leib Litman et al., *TurkPrime.com: A Versatile Crowdsourcing Data Acquisition Platform for the Behavioral Sciences*, 49 *BEHAV. RES.* 433 (2017).

¹²⁴ The age and gender identity distribution of the survey participants fairly represented the population. For the primary survey, $M_{age} = 39.45$; 42.2% female, 56.9% male, 0.7% nonbinary. For the follow-up survey, $M_{age} = 38.63$; 43.2% female, 56.5% male, 0.3% nonbinary.

attention, and they ended by answering a set of demographic questions. In between, we randomly assigned each participant to complete a subset of our substantive questions. The questions were distributed among the participant groups so that each participant saw (1) one of seventeen different recovery hypothetical questions and (2) either an unjust transfer or willingness to pay question. We describe the survey questions in more detail below.¹²⁵

We designed the follow-up survey to help clarify some ambiguous patterns in the primary survey results. Most notably, as the results indicate, we found an unexpected tendency among primary survey participants to “split the difference” and choose a 50/50 award response if one was available, even when no facts directly supported this kind of division. While this inclination likely represents important information about participants’ fairness intuitions,¹²⁶ it does not lend itself to our primary goal of determining whether they view PPR or SMSR outcomes as fairer. We therefore recruited an additional 352 adults, none of whom had participated in the primary survey, to complete a follow-up survey. The structure of the follow-up survey followed that of the primary survey and included the same video and demographic questions. The substantive questions in the follow-up survey were largely like the questions in the first survey, although we did not repeat all the questions. For many of the follow-up survey questions, the only change from the original survey was the responses available to the participants. However, as discussed below, we sometimes adjusted the fact patterns. The complete survey texts of both surveys are in an online appendix to this Article.¹²⁷ Sample sizes for each question are specified for each survey result presented below.

2. Questions and Results

a. Recovery Hypotheticals

The recovery hypothetical questions capture different settings and circumstances in which PPR has been applied or suggested. The hypotheticals fell into eight categories: malpractice, generic uncertain causation, alternative causation, uncertain valuation, uncertain

¹²⁵ An additional set of questions designed to examine risk preferences have been omitted from the present Article. They do not form the basis of any of our suggestions or analyses.

¹²⁶ See discussion *infra* Sections IV.C, IV.D.

¹²⁷ Jessica Bregant, *Bregant Dillof 2023 – Online Appendix*, OSF, <https://osf.io/5j2m7> [<https://perma.cc/6G4S-8NWA>] (Mar. 30, 2024).

valuation due to tortious loss of information, uncertain breach, alternative breach, and property division between faultless actors.

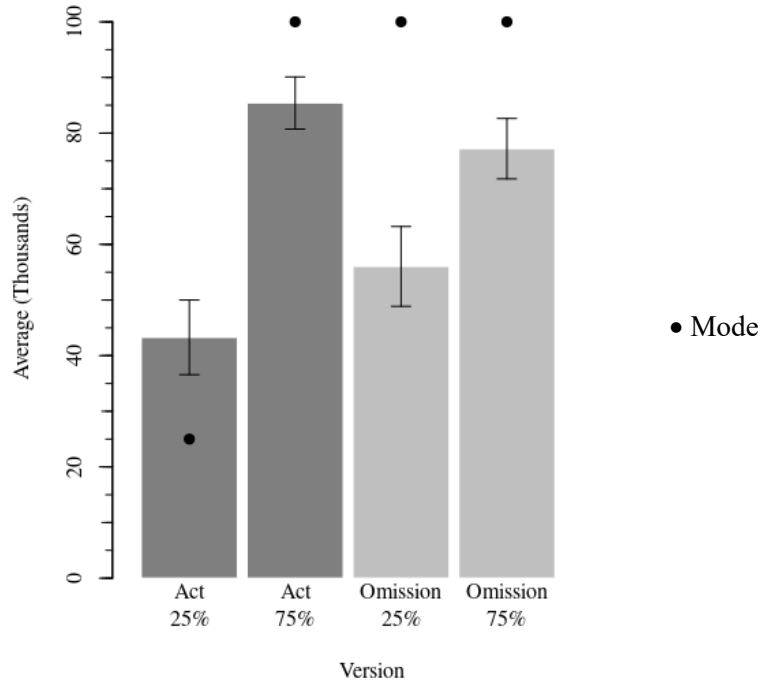
i. Malpractice

In the primary survey, we posed four versions of a question involving uncertain causation in the context of medical malpractice. Each version described a suit brought by a patient who had suffered a \$100,000 loss. In two versions, the alleged malpractice was negligently failing to prescribe a helpful medication (omission). In the other two versions, the alleged malpractice was negligently prescribing a harmful medication (act). We then varied whether testimony established that there was a 25% chance or a 75% chance that the omitted medication would have prevented the harm (in the omission version) or that the medication was the but-for cause of the plaintiff's damages (in the act version). These two variations (omission vs. act; 25% vs. 75%) were fully crossed, creating four versions in total. In all four, participants were asked what award, between \$0 and \$100,000, would be "fairest."¹²⁸

A total of 404 participants were shown and responded to one of the four versions of the question.¹²⁹ Figure 1 summarizes the responses.

¹²⁸ In all the questions where participants were asked to supply a value within a specified range, the range is inclusive of its endpoints; for example, participants were free to answer \$0 or \$100,000 or anything in between.

¹²⁹ After entering their responses, participants were asked to recall how likely it was that the doctor's act or omission caused or could have prevented the loss. Eleven participants answered this question incorrectly: four in the omission-25% version, three in the omission-75% version, one in the act-25% version, and three in the act-75% version. Given the low number of participants who failed this and other comprehension check questions, we have included all participants in our reported analyses. The results would not substantially change if those participants were excluded.

Figure 1. *Responses to Medical Malpractice Hypotheticals*

Note: Error bars denote 95% confidence intervals. Mean (SD) responses, left to right: \$43,282.83 (34,062.98), \$85,410.19 (24,323.03), \$56,042.50 (36,611.44), \$77,201.96 (27,983.68).

The result of the primary survey suggested the use of follow-up questions to gather more information. While the average awards in the 75% conditions were significantly greater than the average awards in the 25% conditions, the range of responses varied widely within each condition.¹³⁰ The modal responses reflect some of this variety. Participants in the 75% chance conditions were most likely to award either full damages or 75% damages,¹³¹ but a substantial number of participants in the 25% chance conditions chose to award 50% (as well as 25% damages or no damages).¹³² The 50% choice in the 25% condition seemed insensitive to the 25% chance condition.

¹³⁰ See *supra* Figure 1.

¹³¹ 50.2% of participants awarded \$100,000 and 18.5% awarded \$75,000.

¹³² 13.1% of participants awarded \$50,000, compared to 20.1% who awarded \$25,000 and 8.5% who awarded nothing.

Accordingly, the follow-up posed the texts of the 25% condition malpractice questions but asked participants to choose the fairest outcome from a limited set of alternatives: no recovery, 25% recovery (\$25,000), and full recovery (\$100,000). Immediately following a 25% condition question, participants were asked to provide an open-ended fairest value between \$0 and \$100,000.¹³³

A total of 123 participants in the follow-up survey saw the omission version of the malpractice question¹³⁴ and a different group of 80 participants saw the act version.¹³⁵ The open-ended responses were substantially similar to the open-ended responses in the primary survey.¹³⁶ Responses to the multiple-choice questions are summarized in Table 1.

Table 1. *Summary of Multiple-Choice Responses for Medical Malpractice Follow-Up Questions by Version (Act vs. Omission)*

Condition	Response		
	SMSR (\$0)	PPR (\$25,000)	Full recovery (\$100,000)
Act	18.8%	33.8%	48.8%
Omission	18.7%	39.0%	42.3%

ii. Generic Uncertain Causation

To examine ideas about uncertain causation outside the medical malpractice context, we developed a simple fact pattern involving a defendant dog owner and his plaintiff neighbor. In all questions involving this fact pattern, the plaintiff alleges that the defendant's dog escaped the defendant's yard due to negligence and destroyed valuable flowers in the plaintiff's garden. We used this as the basis for questions on generic uncertain causation (described in this section), as well as alternative liability, generic uncertain valuation, and alternative breach (described in subsequent sections).

¹³³ Having answered the open-ended question, participants could not go back and change their response to the multiple-choice question.

¹³⁴ Nine (7.3%) of those 123 participants answered the subsequent comprehension question incorrectly.

¹³⁵ Four (5.0%) of those eighty participants answered a subsequent comprehension question incorrectly.

¹³⁶ The average awards were \$54,927.68 ($SD = 38,472.77$) in the omission case and \$47,813.12 ($SD = 38,618.45$) in the act case.

For the question subset evaluating generic uncertain causation, participants read that the dog owner had, in fact, negligently allowed his dog to escape his property. The plaintiff's \$1,000 flowers were destroyed, but the evidence varied as to whether the dog caused the damage. Another possibility is that a wild fox destroyed the flowers. A credible expert witness testified about the likelihood that the dog, rather than the fox, was the culprit. Across four versions, we varied how likely the expert thought it was that the dog had done the damage: 0%, 25%, 75%, or 100%. Participants supplied what they believed the "fairest" award would be, entering an amount between \$0 and \$1,000.

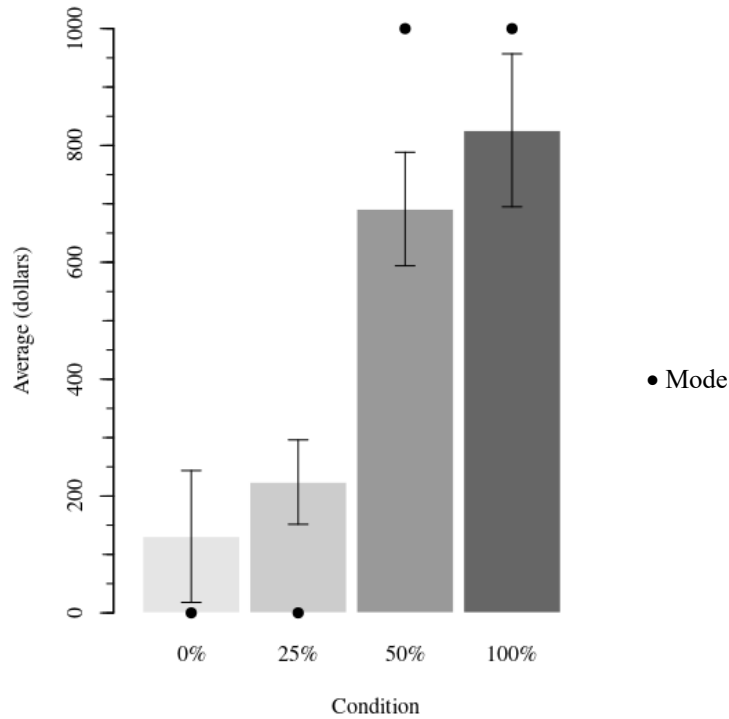
In total, 154 participants read one of the four versions of the generic uncertain causation question.¹³⁷ Figure 2 summarizes the responses.

In the follow-up survey, only the 25% condition and 75% condition versions of the question were presented, and in these, multiple choice responses, rather than open-ended award amounts, were requested. In both versions, we presented a choice consistent with SMSR and one consistent with PPR. For the 25% version, we asked participants to choose \$0 or \$250 as the fairest award. For the 75% version, we asked participants to choose between \$1,000 and \$750. The responses are summarized in Table 2.¹³⁸

¹³⁷ Because we were most interested in participants' responses in the 25% and 75% conditions, each of those was seen by twice as many (n 's = 51) as the 0% and 100% conditions (n = 26 and n = 27, respectively). After participants had responded to the question, they were asked to recall how likely it was that the dog, rather than the fox, had caused the damages. When there was no chance the dog was to blame, six participants answered incorrectly; at 25% chance, seven participants answered incorrectly; at 75%, four answered incorrectly; and when the expert was certain the dog was to blame, four participants answered incorrectly.

¹³⁸ Three participants (4.3%)—one in the 25% condition and two in the 75% condition—answered the comprehension question incorrectly.

Figure 2. Responses to Generic Uncertain Causation Question



Note: Error bars denote 95% confidence intervals. Mean (SD) responses from left to right: \$130.77 (354.00), \$223.82 (263.20), \$691.29 (293.62), \$825.93 (347.07).

Table 2. Proportion of Participants Choosing SMSR- or PPR-Consistent Outcomes as “Fairest” When Causation Uncertain

Expert’s Estimate	Response Selected	
	SMSR	PPR
25% chance (n = 34)	61.8%	38.2%
75% chance (n = 35)	62.9%	37.1%

Note: The SMSR-consistent response was \$0 in the 25% chance condition and \$1,000 in the 75% chance condition. The PPR-consistent response was \$250 in the 25% condition and \$750 in the 75% condition.

iii. Alternative Causation

Across both surveys, we posed six question versions concerning alternative causation—that is, cases where only one among a set of tortfeasors has caused the harm at issue. All six questions built on the dog escape fact pattern, adding one or more additional negligent dog owners to the hypothetical. Four versions appeared in the primary survey, and two additional versions appeared in the follow-up.

The first version of the question in the primary survey added just one more dog owner. Participants read about two neighbors who both negligently allowed their dogs to escape. As in the generic uncertain causation case, the plaintiff was another neighbor whose flowers were destroyed, causing \$1,000 in damages. This time, however, participants read that one of the two dogs caused the damage; the only question was which one. While the expert witness could not say for sure, the expert estimated a 70% chance that it was the first neighbor's dog and only a 30% chance it was the second neighbor's dog. Participants then chose the fairer of two options, one consistent with SMSR and one consistent with PPR. The choices were, respectively, (1) the first neighbor should pay \$1,000 and the second neighbor should pay nothing, or (2) the first neighbor should pay \$700 and the second neighbor should pay \$300.¹³⁹

The second version of the question in the primary survey was presented to a different set of participants. The question was identical to the first except that we included a table with figures that indicated that the SMSR option (an award of \$1,000 against the first neighbor) produced a lower expected recovery error argument than the PPR option (award of \$700 against the first neighbor and \$300 award against the second neighbor).¹⁴⁰

In the follow-up survey, we ran a third version with two dogs that was identical to the first version but added a third multiple choice option: (3) each of the neighbors should pay equally (\$500).¹⁴¹ Responses to the first, second, and third versions are summarized in Table 3.

¹³⁹ None of the 51 participants who saw the first, “No Table” version of this question answered the comprehension question incorrectly.

¹⁴⁰ Six (12.0%) of the 50 participants who saw the “Table” version answered the subsequent comprehension question incorrectly.

¹⁴¹ Four (7.5%) of the 53 participants who saw this question in the follow-up survey answered the subsequent comprehension question incorrectly.

Table 3. *Proportion of Participants Choosing SMSR- or PPR-Consistent Outcomes as “Fairest” When There Is Alternative Liability Between Two Defendants*

Question Version	Response Selected		
	SMSR	PPR	50/50 Split*
(1) No table ($n = 51$)	13.7%	86.3%	–
(2) Table ($n = 50$)	20.0%	80.0%	–
(3) No table, 50/50 added ($n = 53$)	11.3%	30.2%	58.5%

Note: Versions (1) and (2) were included in the primary survey. Version (3) was in the follow-up survey.

* The 50/50 split option was included only in version (3).

The fourth question version in the primary survey added two more neighbors to the dog escape fact pattern, each of whom also negligently allowed their dogs to escape their property. Again, expert testimony indicated that only one of the four dogs dug up the \$1,000 flowers on the plaintiff’s property. In contrast to the versions with two defendants, this four-defendant version did not include a defendant who was more likely than not to be liable, only one who was more likely than the other defendants to be liable. The expert testified that there was a 40% chance that it was the first neighbor’s dog that destroyed the flowers, a 30% chance that it was second neighbor’s dog, a 20% chance that it was the third neighbor’s dog, and a 10% chance that it was the fourth neighbor’s dog.

We again asked participants to select the fairest option, this time from among four choices: (1) a strict preponderance of the evidence standard, according to which none of the neighbors would pay damages because for each the preponderance of evidence supported the conclusion their dog did not cause the damage; (2) an SMSR option, where the first neighbor would pay all \$1,000 of the plaintiff’s damages; (3) the PPR option, where all four negligent neighbors would pay according to the likelihood their dog was responsible (i.e., \$400, \$300, \$200, \$100); and (4) an even split option where the four neighbors would each pay \$250.¹⁴²

¹⁴² Three (5.7%) of the fifty-three participants who saw the fourth version of the dog escape fact pattern answered the subsequent comprehension question incorrectly.

In the follow-up survey, we added a fifth version. This one was identical to the four-neighbor version in the primary survey, but the percentages associated with the neighbors were changed to 40%, 20%, 20%, and 20%. Our goal was to maintain the key feature of the fourth version—having no neighbor’s responsibility supported by the preponderance of the evidence—while creating a greater gap between the first neighbor’s likelihood of responsibility and the other three neighbors’. Participants were given the same four options, except that the third option was changed from requiring payments of \$400, \$300, \$200, and \$100 to \$400, \$200, \$200, and \$200.¹⁴³ Table 4 summarizes results for the fourth and fifth versions.

Table 4. *Proportion of Participants Choosing SMSR- or PPR-Consistent Outcomes as “Fairest” When There Is Alternative Liability Among Four Defendants*

Question Version (% likelihood of responsibility for each defendant)	Response Selected			
	Strict preponderance	SMSR	PPR	Even Split
(4) 40/30/20/10 (<i>n</i> = 53)	7.6%	5.7%	22.6%	64.2%
(5) 40/20/20/20 (<i>n</i> = 48)	20.0%	6.3%	22.9%	50.0%

Note: Version (4) was included in the primary survey. Version (5) was in the follow-up survey.

The primary survey included one final variation on the alternative causation question with four possible defendants. In this one, the facts were again identical, but we changed the percentage likelihood that each defendant was actually responsible to an even 25%. Unlike the other alternative causation questions, this sixth version asked participants what award, if any, would be fair for the first defendant to pay. Fifty-two participants saw the sixth version of this question.¹⁴⁴ Of these, thirty-seven (71.2%) responded that the PPR-consistent \$250 would be the fairest amount to require, and twelve (23.7%)

¹⁴³ One (2.1%) of the forty-eight follow-up survey participants who saw the fifth version of the dog escape question answered a subsequent comprehension question incorrectly.

¹⁴⁴ Ten participants (19.2%) incorrectly answered the comprehension question: “According to the expert, how many dogs did the damage to Ned’s garden?” Seven of the ten participants responded that four dogs had done the damage; the other three participants chose the option that there was “no way to know.”

responded with an SMSR-consistent \$0. The average award generated was \$186.06.¹⁴⁵

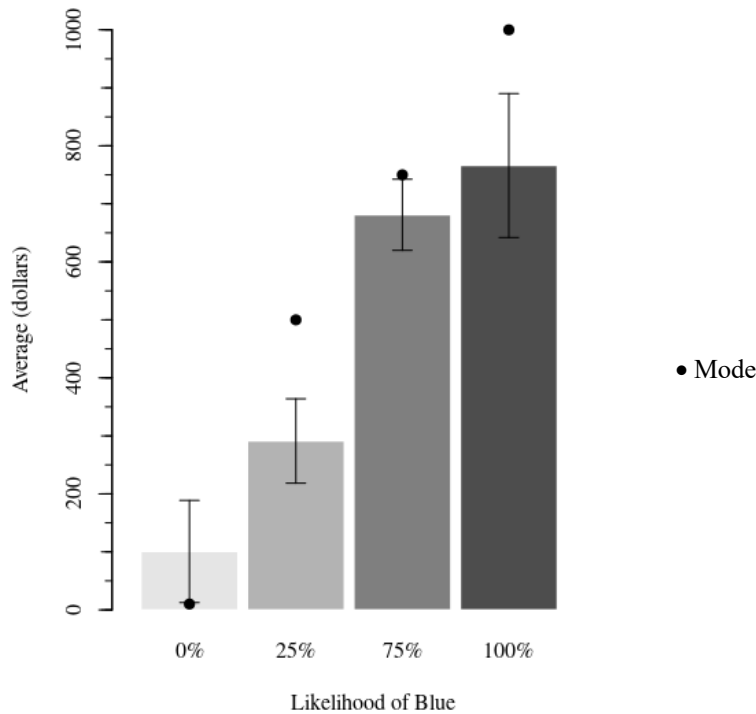
iv. Uncertain Valuation

We also created a version of the dog escape fact pattern in which only the amount of damages, not liability, was uncertain. In this set of four questions, primary survey participants read about a defendant who negligently allowed his dog to escape and destroy a particular flower in his neighbor's garden. We explained that if the destroyed flower had blossomed into a red flower, it would have been worth \$10, and that if it had blossomed into a blue flower, it would have been worth \$1,000. But, with the destruction of the plant, the varietal of this particular flower could not be determined with certainty. Again, the question included an expert opinion offered at trial. The expert testified about the likelihood that the flower would have been red or blue. Across the four versions of this question, we varied the testimony such that the expert asserted the flowers were (1) 0%, (2) 25%, (3) 75%, or (4) 100% likely to have been the more valuable blue variety.¹⁴⁶ We then asked participants what, if any, award between \$0 and \$1,000 for the plaintiff would be the "fairest." Figure 3 summarizes the responses.¹⁴⁷

¹⁴⁵ $SD = 106.46$.

¹⁴⁶ Again here, because we were most interested in the 25% and 75% conditions, those versions of the question were shown to fifty-one and fifty participants, respectively, while the 0% and 100% versions were shown to twenty-four and twenty-five participants, respectively.

¹⁴⁷ Of the twenty-four participants who read the 0% blue version, four (16.7%) answered the subsequent comprehension question incorrectly, as did seven of fifty-one (13.7%) in the 25% blue condition, one of fifty (2.0%) in the 75% blue condition, and three of twenty-five (12.0%) in the 100% blue condition. In total, fifteen (10.0%) of 150 participants answered this comprehension question incorrectly.

Figure 3. *Average and Modal Awards When Only Value Is at Issue*

Note: Error bars denote 95% confidence intervals. Mean (SD) responses from left to right: \$100.62 (220.21), \$291.16 (265.17), \$681.08 (221.23), \$766.00 (316.48).

Based on these results, we believed an additional question was warranted. Although we did not include a condition in which the plant had a 50% chance of being worth \$1,000, many participants in the primary survey spontaneously suggested that the defendant should pay \$500. As Figure 3 shows, \$500 was the single most common response in the 25% condition. To get a better sense of whether people who were inclined to “split the difference” would choose a PPR- or SMSR-consistent response if forced to choose, we created a multiple-choice version of the 25% and 75% conditions for the follow-up survey. When the testimony was that there was a 25% chance that the flower would have been worth \$1,000, participants were asked to choose whether the fairer outcome was minimal recovery (\$10) or 25% recovery (\$250). In

the 75% chance condition, the choices were 75% recovery (\$750) or full recovery (\$1,000). The results are summarized in Table 5.¹⁴⁸

Table 5. *Proportion of Participants Choosing SMSR- or PPR-Consistent Outcomes as “Fairest” When Valuation Uncertain*

Estimated Likelihood of \$1,000 Damages	Response Selected	
	SMSR	PPR
25% chance ($n = 46$)	23.9%	76.1%
75% chance ($n = 55$)	30.9%	69.1%

Note: The SMSR-consistent response was \$10 in the 25% chance condition and \$1,000 in the 75% chance condition. The PPR-consistent response was \$250 in the 25% condition and \$750 in the 75% condition.

v. Uncertain Valuation Due to Tortious Loss of Information

We posed two questions to examine participants’ views in the context of loss of information about the amount of the plaintiff’s damages, where the defendant’s tortious conduct caused the loss. In both questions, participants read about a plaintiff who had acquired a vase from a distant seller, knowing that the vase could be either a valuable antique or an inexpensive imitation. Due to the negligence of the shipping company, however, the vase was destroyed before an appraisal occurred.

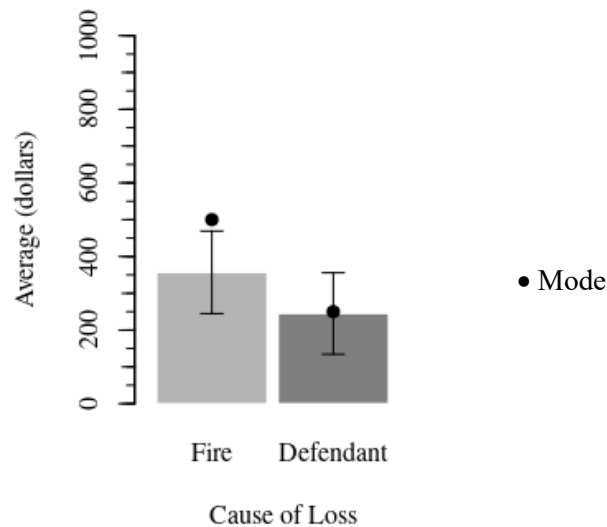
After the vase’s destruction, the plaintiff sent the broken pieces to an expert to try and determine the value of her loss, but in both hypotheticals, the expert was unable to reach a conclusion. Across the two versions, we varied the reason for the expert’s inability to determine the vase’s value. In the first version, the damage done by the shipper was too extensive to allow the expert to determine the vase’s value. In the second version, a naturally occurring fire destroyed the remaining pieces before the expert could examine them. Thus, while both versions emphasized that the shipper was responsible for the

¹⁴⁸ Four participants (4.0%) answered the comprehension question incorrectly. Three of those were assigned to the 25% condition, and one was assigned to the 75% condition.

plaintiff's injury, the shipper was responsible only for the plaintiff's inability to determine the value of the injury in the first version.¹⁴⁹

In both cases, the plaintiff relied at trial on a preliminary estimate that there was a 25% chance that the vase was worth \$1,000 and a 75% chance that it was worth \$10. In both versions, participants were then asked what amount between \$0 and \$1,000 was the "fairest" to award the plaintiff. Figure 4 summarizes the responses.

Figure 4. *Average and Modal Awards in Tortious Loss of Information Cases*



Note: Error bars denote 95% confidence intervals. Mean (SD) responses: \$356.92 (313.78) (left), \$245.00 (258.74) (right).

vi. Alternative Breach

The next question in the primary survey concerned uncertainty about which of two defendants acted negligently. Unlike the generic uncertain causation questions—where all defendants were negligent, but only one was the proximate cause of the plaintiff's damages—here, only one was negligent.

We adapted the dog escape fact pattern to include two persons boarding at a home. According to the question, one and only one of the

¹⁴⁹ None of the twenty-nine participants who read the version in which a fire had occurred answered the subsequent comprehension question incorrectly. One (4.5%) of the twenty-two participants in the no-fire version answered incorrectly.

boarders acted negligently, permitting a dog to escape and destroy a neighbor's flowers, worth \$1,000. A witness who saw the negligent actor from a distance testified that there was a 75% chance it was the first boarder and a 25% chance it was the second. Participants then chose the fairer of two options: (1) have the first boarder pay all the damages and the second boarder pay none, consistent with an SMSR rule; or (2) have the first boarder pay 75% of the damages and the second boarder pay 25%, consistent with a PPR rule. Table 6 summarizes the responses.¹⁵⁰

vii. Uncertain Breach

One of the two defendants in the alternative breach hypothetical above neither acted negligently nor played any role in causing the harm. Given this lack of fault and involvement, we were somewhat surprised by the strong preference of our survey participants for an outcome in which a defendant who was wholly innocent would be partly liable. For the follow-up survey, we posed a variation of the alternative breach fact pattern designed to test participants' willingness to hold liable defendants who were probably innocent.

Like the alternative breach hypothetical, the uncertain breach question concerned a homeowner and an escaped dog. In contrast to the previous question, however, the uncertain breach version included just one boarder. The boarder agreed to keep the gate always locked, lest the dog escape and destroy valuable flowers in the garden. While the homeowner was away, however, the dog escaped the yard, causing \$1,000 worth of damages. The plaintiff homeowner sued the boarder, and the only disputed issue was whether the tenant left the gate unlocked. At trial, an expert testified based on an examination of the garden and gate. According to the expert, the evidence established a 25% chance that the boarder negligently left the gate unlocked and a 75% chance that the dog had instead jumped the locked fence to get into the backyard.

As before, participants selected the fairest outcome from the provided choices, but this time, there were four options: \$0 and \$250, representing the SMSR- and PPR-consistent outcomes, \$500,

¹⁵⁰ Four (7.5%) of the fifty-three participants who saw this question answered the subsequent comprehension question incorrectly.

representing the “split the difference” or even split option, and a full-damages award option of \$1,000. Table 6 summarizes the responses.¹⁵¹

Table 6. *Proportion of Participants Choosing SMSR- or PPR-Consistent Outcomes as “Fairest” in Alternative and Uncertain Breach Hypotheticals*

Breach Version	Response			
	SMSR	PPR	Even Split	Full Award
(1) Alternative breach (2 boarders)	22.6%	77.4%	-	-
(2) Uncertain breach (1 boarder)	45.8%	22.9%	14.6%	16.7%

Note: In version (1), the SMSR response would require one boarder to pay all damages, and the PPR response would require one boarder to pay \$750 and the other boarder to pay \$250. In version (2), the SMSR, PPR, Even Split, and Full Award responses would require the sole boarder to pay \$0, \$250, \$500, and \$1,000, respectively.

viii. Property Division Between Faultless Actors

Up to this point, the hypotheticals presented to participants have involved apportioning damages among defendants who were either actually or potentially at fault. Because the possibility of fault might influence participants’ treatment of causal uncertainty, the primary focus of this Article, we were also interested in whether and how people might apply SMSR and PPR principles where there was no actual or potential fault. Thus, for the next question, we asked participants to imagine themselves in a quasi-judicial role, like King Solomon, distributing a windfall rather than rectifying harm actually or potentially caused by an actor at fault.

The question described a dispute between two neighbors over a bag of four diamonds found near the dividing line between their properties. The finder could not recall the precise location, but based on his description, an expert estimated a 75% chance the diamonds were found on the first neighbor’s property and a 25% chance they were found on the second neighbor’s property. Participants then read arguments supporting two different outcomes: first, that the first neighbor should get all four diamonds because the bag was probably on his property, or second, that the diamonds should be split between

¹⁵¹ Three (6.3%) of the forty-eight participants who answered this question answered a subsequent comprehension question incorrectly.

them, with three diamonds to the first neighbor and one diamond to the second neighbor, because this distribution would roughly balance the chances of over-award and under-award error between the claimants. Participants then selected the fairer option.¹⁵² Table 7 presents the results of this question from the primary survey.

Given the substantial support for “splitting the difference” in cases of factual uncertainty that we observed in other questions from the primary survey, we wondered whether participants would choose a 50/50 split between the neighbors here if given the choice. Therefore, in the follow-up survey, we asked a version identical to the question from the primary survey, except that it included a third option: giving each neighbor two diamonds. Participants then selected the fairest among the three options.¹⁵³ Table 7 includes the follow-up survey results.

Table 7. *Diamond Distribution*

Survey	Response Selected		
	All to First Neighbor	Proportional Split (3/1)	Even Split (2/2) (follow-up only)
Primary survey (<i>n</i> = 51)	11.8%	88.2%	–
Follow-up survey (<i>n</i> = 48)	10.4%	58.3%	31.3%

b. Communities with Unjust Transfers

We also wanted to explore participants’ more abstract intuitions about the relative importance of minimizing the risk of injustice versus equalizing the risk of injustice. To investigate this relatively complex idea, we presented participants with two otherwise-identical communities, Alphaville and Betaville.

In both Alphaville and Betaville, we explained, residents are periodically selected in random pairs. Based on a die roll, the paired residents may then gain or lose \$1,000 according to rules that differ between the communities. In Alphaville, the die roll determines

¹⁵² Twelve (23.5%) of the fifty-one participants who were asked to respond to this question answered a subsequent comprehension question incorrectly.

¹⁵³ Six (12.5%) of the forty-eight participants who answered the follow-up survey’s version of the property division question answered the subsequent comprehension question incorrectly.

whether \$1,000 is transferred from the first person to the second or the second to the first. In Betaville, however, the die determines whether \$1,000 is transferred from the first person to the second or there is no transfer at all. Thus, in Alphaville, there are more unjust transfers, but members of the pair are treated alike, and each is as likely to benefit from the transfer as they are to be harmed by it. In contrast, there are fewer unjust transfers in Betaville, but the risk of being the subject of a detrimental unjust transfer falls only on the second member of the pair. After being provided with contending rationales, survey participants indicated where they would rather live, and they could also select the statement that they were indifferent.

A total of 652 participants responded to this question.¹⁵⁴ Of those, 21.0% indicated a preference for Alphaville. The remaining participants were split fairly evenly between preferring Betaville and having no preference between the two, 39.1% and 39.9%, respectively.

c. Value of Corrective Justice

Finally, we sought to determine how much participants would pay to achieve results consistent with corrective justice in a particular case. This question asked participants to imagine themselves as the owner of one of two dogs in a dog escape fact pattern. Both dogs escaped due to owner carelessness, but one dog destroyed \$1,000 worth of a neighbor's flowers. Participants learned that the neighbor sued them and the other dog owner. Based on the existing evidence, participants were asked to assume a 50% chance the jury would find them liable and require them to pay \$1,000 and a 50% chance the jury would find the other defendant liable and require the other defendant to pay \$1,000.

Participants then learned that an animal expert could conclusively and correctly determine which dog destroyed the flowers. The expert's testimony would result in the guilty dog's owner being held fully liable and paying the \$1,000. We asked participants to assume an equal chance the expert would identify their dog, versus the other dog, as the culprit. Thus, while the degree of uncertainty in the outcome remains the same—that is, there remains a 50% chance that the participant would be found liable—the expert would ensure that the *correct* dog's owner paid.

¹⁵⁴ There was no comprehension question following this question, because the choices that we provided fully summarized the relevant information so that a comprehension question would have been redundant.

Finally, we explained that if the expert was hired, the participant would have to split the expert's fees evenly with the other dog owner, regardless of who the expert eventually determined was responsible. Participants were asked how much they, as individuals, would be willing to pay toward hiring the expert. They could choose an amount between \$0 and \$1,000.

A total of 404 participants responded to the question.¹⁵⁵ On average, they indicated they would be willing to pay \$266.18 to hire the expert.¹⁵⁶ The modal response, given by 28.2% of participants, was \$500.

C. Descriptive Synthesis of Results

Overall, our data provide an interesting and informative window into people's intuitions about fairness and tort rules. In this section, we briefly summarize and interpret the survey results. The questions are presented by subject matter in the subsections below: the recovery hypotheticals, the windfall property transfers, the unjust transfer questions, and the questions on the value of corrective justice. In Part IV, which follows, we address the implications of the results for law reform.

1. Recovery Hypotheticals

Across the recovery hypotheticals, we find openness to—and in some cases clear preferences for—PPR. In reviewing these results, we divide them according to the location of the uncertainty involved: uncertainty in causation, uncertainty in damages, uncertainty in breach, and uncertainty in ownership.

a. Uncertainty in Causation

In the medical malpractice questions, there was little difference in the average responses between the negligent act cases and the negligent omission cases. For the 25% chance of causation cases, the average award was approximately \$50,000, and for the 75% chance cases, the average was approximately \$81,000. Thus, the average responses were closer to those recommended by PPR than by SMSR. Similarly, when the doctor's negligent act had only a 25% chance of being the cause, the modal award was \$25,000 rather than the SMSR recommended \$0.

¹⁵⁵ Of the 404 participants who responded, twenty-one (5.2%) answered a subsequent comprehension question incorrectly.

¹⁵⁶ $SD = 231.96$.

In contrast, the modal response for the 25% omission case and for both the 75% act and omission cases was \$100,000.

When the plaintiff suffered only property damage, the results generally followed the same pattern. When the defendant negligently allowed his dog to escape and the only uncertainty concerned whether the escaped dog had caused the plaintiff's \$1,000 loss, participants' average responses more closely aligned with PPR than SMSR. In the 0%, 25%, 75%, and 100% likelihood conditions, the average awards were roughly \$131, \$224, \$691, and \$826, respectively. Nevertheless, a plurality of participants awarded the plaintiff no compensation when evidence showed only a 25% chance that the dog had caused the damage, and a plurality of participants awarded a full \$1,000 award when the evidence showed a 75% chance that the dog was responsible.

The follow-up survey replaced the open-ended, fair award question with a multiple-choice one. In the medical malpractice context, when participants were presented with a version in which there was a 25% likelihood that the defendant's negligence caused the injury, nearly twice as many chose the PPR option over the SMSR option, but a full \$100,000 award beat out both of these options. By contrast, in the generic uncertain causation case, where the possible culprits were the defendant's dog or a wild fox, in both the 25% and 75% chance of causation cases, the SMSR option was favored over the PPR option by approximately 62% to 38% (no full recovery option was presented).

Finally, in the alternative causation case of two negligent dog owners, one of whom caused the plaintiff's \$1,000 damages, participants overwhelmingly opted for a PPR award rather than an SMSR award. In the follow-up version, participants were presented with multiple-choice options, and as before, PPR was chosen more than twice as often as SMSR. When we added a choice requiring the defendants to pay equal shares, the 50/50 split again became the most popular response.

This preference for equally burdening similarly situated defendants also appeared in participants' responses to the version with four dogs. Whether the four defendants' chances of actually causing the damages were 40%, 30%, 20%, and 10% (in the primary survey) or 40%, 20%, 20%, and 20% (in the follow-up), PPR was preferred over SMSR. However, both PPR and SMSR lost out to the even split in which all four defendants pay 25%, regardless of the evidence of probability.

b. Uncertainty in Damages

When the uncertainty in the case surrounded valuation rather than compensation, we saw different patterns emerge. In the dog escape context, we found a clear and roughly proportional progression in open-ended damage awards. If the evidence showed the destroyed flowers had a 0%, 25%, 75%, or 100% chance of being the varietal worth \$1,000 (and not the version worth \$10), participants, left to their own devices, most commonly awarded \$10, \$500, \$750, and \$1,000, respectively. In the forced-choice versions of this question, involving the 25% and 75% conditions, participants chose the PPR response more than twice as often as the SMSR response.

In the case of the destroyed antique vase, we compared a situation in which the uncertainty in value was caused by the negligent defendant themselves to one in which the cause was an unrelated accident. In both situations, participants selected an average “fair” award that was in the area of an award consistent with PPR—25% of \$1,000. However, when the defendant was directly responsible for the missing evidence of value, the average and modal award given were marginally lower than the average and modal responses when a random accident destroyed the evidence.

c. Uncertainty in Breach

These questions return to the dog escape fact pattern with two defendants. When only one of the two defendants breached his duty, participants overwhelmingly favored the outcome requiring both defendants to pay according to the likelihood that they were the breaching party—the PPR outcome—over the outcome that would require the more likely culprit to pay the full damage award—i.e., the SMSR outcome. However, when there was only one defendant and a 25% chance that he had breached his duty, participants chose the SMSR outcome of no award over the PPR outcome. Less popular still were the options to require the defendant to pay a flat half of the damages or all the damages, though those two options were roughly equal in popularity.

2. Windfall Property Division

When the question was one of splitting a windfall rather than dividing a burden, PPR emerged as a clear favorite. When SMSR and PPR results were the only choices, participants favored PPR nearly nine-to-one. More strikingly, however, when we added the choice to

split the windfall equally, PPR remained the most popular choice. About 30% of participants chose the 50/50 split, compared to nearly 60% who chose the proportional outcome.

3. *Unjust Transfers*

When participants chose between two communities with unjust transfers, they were roughly just as likely to respond that the two communities were equally good or bad as they were to choose the community that minimized the overall rate of unjust transfers. Both were chosen by just less than 40% of participants. The remaining participants—just over 20% of them—chose the community where the rate of transfers was higher but the likelihood of being the victim of such a transfer was the same as the likelihood of being the beneficiary of such a transfer.

4. *Value of Corrective Justice*

Finally, participants were strikingly eager to pay to ensure that the *correct* outcome was reached in a hypothetical lawsuit against them. A plurality of participants indicated that they would be willing to pay \$500 to hire an expert to ensure the correct result in a \$1,000 tort case, even though hiring the expert would do nothing to change the overall odds that the participant would be found liable. On average, they were willing to personally pay approximately \$266 as their share of the cost to hire the expert.

IV

LAW REFORM IMPLICATIONS OF SURVEY RESULTS

The results of these surveys carry numerous implications about how people think about fairness in the context of tort rules. The data paint a rich and nuanced portrait of participants' intuitions about fairness across various legal and extralegal contexts. In this Part, we consider how our survey results bear on current legal issues and their implications for law reform. Sections A through G detail these implications across several contexts. However, we begin by offering two introductory points.

First, we think perceptions of fairness are important data for law reform. Most of our survey questions were designed to capture the nature of people's fairness intuitions rather than the strength of people's commitment to those intuitions. Nonetheless, we have some evidence that people put more than a nominal value on achieving what

they perceive to be a just outcome. As we have just noted,¹⁵⁷ the participants' responses were surprisingly high when asked what they would be willing to pay to resolve the uncertainty in a hypothetical case. A plurality of participants expressed a willingness to incur substantial additional costs—equal to the expected costs of the case—so that they could be sure the outcome was not arbitrary. In other words, ensuring an outcome they perceive as fair was worth a great deal to the participants.

Second, while we believe that legal outcomes—and tort outcomes in particular—should generally square with people's sense of fairness,¹⁵⁸ we recognize that the law should not be determined exclusively by public opinion surveys.¹⁵⁹ In considering the implications of our empirical data and the myriad theoretical arguments we have already outlined, we have identified a number of conditions under which we think lawmakers should be especially hesitant to modify the law to fit expressed public intuitions of fairness. These conditions include those in which following the expressed intuitions would (1) result in a radical change to the general character of the law,¹⁶⁰ (2) be administratively impractical,¹⁶¹ (3) lead to a doctrine wholly unsupported by existing law,¹⁶² or (4) lead to outcomes over a range of cases, which, when considered in total, appear normatively incoherent.¹⁶³ With these considerations in mind, we turn to the specific topics of our survey.

A. Medical Malpractice

Based on our survey results, courts and legislatures should feel comfortable following the trend over the last fifty years of applying PPR to medical malpractice cases—at least in the critical set of cases where the preponderance of the evidence does not support a causal connection between a doctor's negligence and the patient's injury. By a majority of approximately two-to-one, the participants in the follow-

¹⁵⁷ See *supra* Section III.C.4.

¹⁵⁸ See *supra* Section III.A.2.

¹⁵⁹ Even surveys as thorough and deliberately crafted as ours.

¹⁶⁰ For example, by transforming a system of compensation into a system of wealth redistribution.

¹⁶¹ For example, by requiring an open-ended inquiry into a litigant's life-long record of risky conduct.

¹⁶² For example, by introducing the reasonable doubt proof standard of criminal law into tort law.

¹⁶³ For example, by applying strict liability to acts committed on weekends but not weekdays.

up survey thought 25% recovery was fairer than no recovery, where the evidence indicated there was only a 25% chance that the doctor's wrongful conduct caused or permitted a patient's loss. Indeed, when we allowed participants in both surveys to generate their own fairest recovery amount following a doctor's wrongful act or omission, their average awards were much more consistent with PPR than with an all-or-nothing SMSR approach, which would have dictated no recovery. In the preliminary survey's act version, recovery pursuant to PPR was also the modal response where the evidence established only a 25% likelihood of causation. It appears the public, pressed by intuitions of fairness, believes a proportional award is appropriate where causation is improbable.

The story here, however, is not entirely straightforward. In the cases where the evidence established a 75% chance of causation, the participants' modal response was a full recovery, consistent with the prevailing SMSR approach for more-probable-than-not cases. Furthermore, almost half of the participants in the follow-up survey indicated that they favored full recovery even when there was only a 25% chance that the doctor's malpractice caused the patient's adverse outcome. Indeed, in the case involving an omission by a doctor in both surveys, the modal response in the 25% condition was 100% recovery.

These results' divergence from PPR may be attributable to several explanations. The simplest explanation is that the participants harbored pro-patient or anti-doctor biases.¹⁶⁴ Our results suggest a bias in favor of the plaintiff, demonstrated by the modal preferences for full recovery in three of the four original malpractice scenarios, as well as the pluralities who chose full recovery in the follow-up survey questions. In the context of medical malpractice, the public may be less concerned about causation and corrective justice than ensuring recovery for a needy and innocent patient from a negligent and presumably well-off and well-insured doctor. The argument that anti-doctor bias is at play can also be made by comparing the medical malpractice hypothetical results to the results of the generic uncertain causation questions. In those cases where the defendant was not a doctor and the chance of causation was 25%, the modal award was \$0, compared to 100% in the medical malpractice omission cases.¹⁶⁵

Simple anti-doctor bias, however, does not explain the difference between the 25% act condition, where the modal response was 25%

¹⁶⁴ We use "bias" in its normatively neutral sense of "tendency" or "inclination."

¹⁶⁵ See *supra* Figure 2 and accompanying text.

recovery, and the 25% omission condition in the primary survey, where the modal response was full recovery. If that result accurately represents public sentiment, the public may view a doctor's negligent failure to act as more blameworthy than a negligent act. Such an explanation might seem unusual, because observers generally view active wrongdoing as more blameworthy than passive wrongdoing.¹⁶⁶ Doctors, however, may be held more responsible for their omissions than other actors because of their unique power and authority over their patients.¹⁶⁷ Also, doctors may be particularly blamed when they have not tried to help. A negligent act may be an earnest mistake of fact, while a negligent failure to act may indicate laziness or disinterest.¹⁶⁸ Furthermore, a doctor's failure to act may be thought of as especially problematic because a patient who is undiagnosed—the most frequent form of wrongful diagnosis—has no cause to seek additional treatment and lacks crucial information even if they choose to do so. A patient who is subject to a wrongful act, typically a prescription or treatment with unintended side effects, is at least on notice of the potential wrongdoing.

While this discrepancy in responses is intriguing, distinguishing among the possible explanations is not necessary for guiding our current recommendations. Whatever the reason for participants' inclination to award full damages when an omission had only a 25% chance of causing the plaintiff's injuries, that inclination runs entirely counter to a causation-based model. The abandonment of a causation requirement represents a radical departure from the norms of tort law. Transforming the tort system into an insurance program or a punitive mechanism for punishing breaches of duty per se are not steps our legal

¹⁶⁶ Psychologists have repeatedly demonstrated that active harm-doers are viewed as more blameworthy than those who cause harm by omission. For a review, see Siu Kit Yeung et al., *Action and Inaction in Moral Judgments and Decisions: Meta-Analysis of Omission Bias Omission-Commission Asymmetries*, 48 PERSONALITY & SOC. PSYCH. BULL. 1499 (2021).

¹⁶⁷ Observers judge those in positions of power more harshly for their moral failings, and some research also suggests that those judgments are less likely to distinguish between acts and omissions than similar judgments made of subordinates. See Jonathan Haidt & Jonathan Baron, *Social Roles and the Moral Judgement of Acts and Omissions*, 26 EUR. J. SOC. PSYCH. 201 (1996); see also Yeung et al., *supra* note 166.

¹⁶⁸ Some research in psychology suggests that people are more willing to forgive so-called "competence" violations than so-called "integrity" violations. See, e.g., Peter H. Kim et al., *Removing the Shadow of Suspicion: The Effects of Apology Versus Denial for Repairing Competence- Versus Integrity-Based Trust Violations*, 89 J. APPLIED PSYCH. 104 (2004). If failing to act is viewed as a conscious decision to exert little effort, it may well constitute an integrity violation, or at least be more like an integrity violation than an action based on a presumptive mistake.

system is prepared for, nor which we support. In contrast, our findings provide direct evidence that expanding the so-called loss of chance doctrine in medical malpractice comports with people's sense of fairness.

Turning to the issue of recovery where a preponderance of the evidence supports a finding of no causation, PPR also comes out ahead. The average recovery for the 75% omission case was \$77,201—quite close to the PPR-recommended result of \$75,000. While the average response in the act case was slightly higher at \$85,410, it was also closer to the PPR-recommended result than the SMSR-recommended one of \$100,000. Hence, across the board, an expansion of PPR in medical malpractice cases makes sense.

B. Generic Causal Uncertainty

If there is public support for PPR in medical malpractice cases with causal uncertainty, does this extend to generic tort actions where there is causal uncertainty? At first blush, it may seem to. Consistent with PPR, participants' awards, on average, closely tracked the likelihood that the defendant's conduct was the cause of the plaintiff's injury.¹⁶⁹ In the 25% chance condition, the average award of \$223.82 was barely more than one dollar less than the \$250 award the PPR approach would recommend. In the 75% condition, the average award of \$691.29 is close to the \$750 award the PPR approach would recommend.

On the other hand, the results are also consistent with SMSR in several respects. First, the modal responses in the primary survey reflect SMSR recommendations: no award when the chance of causation is less than 50% and a full award when the chance is greater. More tellingly, in the follow-up survey, when we presented the participants with only the choice of an SMSR award or a PPR award, more than 60% of participants chose the SMSR award as the fairer.¹⁷⁰

Given the fairly strong support for PPR in the medical malpractice scenarios, what explains the more mixed results here? A few possibilities present themselves. First, as discussed above, we may be seeing evidence in the medical malpractice context of a bias against doctors or in favor of patients, especially in the 25% case. That the preference for PPR seems to have diminished in the generic case could be evidence in favor of this hypothesis. However, as discussed below,

¹⁶⁹ See *supra* Section III.B.2.a.ii.

¹⁷⁰ *Id.*

we see PPR's popularity manifested in cases other than medical malpractice.

Likewise, this does not appear to be a more general pro-plaintiff/anti-defendant bias. When survey participants evaluated the generic uncertain causation case, where there was testimony that the defendant's conduct had a 0% chance or a 100% chance of causing the plaintiff's loss, the average awards were \$130 and \$825. These responses, perhaps reflecting a skepticism about the reliability of the testimony or a rejection of the standard view of corrective justice, differ from the corrective justice ideal response of \$0 and \$1,000 by roughly equal amounts. If there were a general pro-plaintiff/anti-defendant bias, we would expect the former difference to be greater than the latter.

Alternatively, the difference in responses to the medical malpractice and the generic wrongdoing questions might be due to the differences in harm suffered by the plaintiffs. The plaintiff in the medical malpractice cases experienced \$100,000 in damages to his person and health, while the plaintiff in the generic case suffered \$1,000 in damages to his property. With greater sums at stake in the medical malpractice case—sums that could easily place the patient in serious financial difficulty—applying SMSR in the 25% case and awarding the plaintiff nothing may have seemed unacceptably harsh. It is also possible that the personal nature of the harm in the medical malpractice context drove participants toward a preference for higher awards compared to the relatively impersonal harm of property damage.

Ultimately, we do not consider the distinction between medical malpractice and other contexts to be a principled one. The predictability of liability and damages is central to the orderly administration of the tort system. A rule that creates uncertainty by employing PPR in some cases and SMSR in others should be adopted only if the benefits of such a system outweigh the costs. It seems unacceptably arbitrary to have the applicable recovery rule be a function of the recovery amount because that amount is a continuous variable. Likewise, distinguishing between personal and property damages seems problematic because many tort actions involve both. Employing the two recovery systems simultaneously would likely confuse and frustrate both litigants and jurors.

C. Alternative Causation

In the medical malpractice and generic uncertain causation hypotheticals, the alternative to awarding damages was to leave the plaintiff with no recompense. The harshness of this outcome may have

caused the participants to select options that they might otherwise reject. In contrast, the alternative causation hypotheticals asked the participants to choose between different allocations of the plaintiff's full damage award among multiple negligent defendants, removing any role for pro-plaintiff bias. Like the results of the medical malpractice questions, the results here support the view that PPR is consistent with people's intuitions of fairness, albeit with some nuance. Based on the primary survey, a strong case could be made that people feel that PPR is the fairest approach when there are two tortious actors, only one of whom caused the plaintiff's injury. Even when we provided a table illustrating that SMSR produced a lower recovery error, PPR was preferred four-to-one over the alternative SMSR award.¹⁷¹

Why such a dramatic preference for PPR? One possibility is that forcing just one of two people—who acted equally negligently and are otherwise similarly situated—to bear the burden of making the plaintiff whole is viewed as particularly unfair because it starkly turns on the contingency of causation. This explanation would be consistent with the findings in the medical malpractice section that suggest people are not particularly concerned about causation, at least not when an actor has violated a voluntarily assumed duty. In those cases, there was significant support for full liability even where causation was unlikely.¹⁷²

Furthermore, commitment to causation as a requisite for liability appears contextual. It appears to wane where the issue is the treatment of similarly situated defendants. When we provided a third option in the follow-up survey based on the alternative causation hypothetical with two negligent actors (the conduct of the first having a 70% chance of being the cause of the defendant's loss and the second having a 30% chance), more than half of the participants chose a 50/50 split as the fairest outcome, compared to roughly 30% who chose a straight PPR outcome and just over 10% who chose SMSR. This result is consistent with our four-way alternative liability questions. When there were four defendants whose tortious conduct had chances ranging from 40% to 10% of having been the cause of the plaintiff's injury, participants strongly favored assigning 25% of the burden to each of them over the alternative SMSR- and PPR-consistent options.

Nevertheless, we do not recommend that liability be split evenly among negligent defendants in cases of alternative liability. Our survey

¹⁷¹ See *supra* Section III.B.2.a.iii.

¹⁷² See *supra* Section III.B.2.a.i.

results show that participants do not generally reject the normative significance of causation. In the generic uncertain causation hypothetical, the testimony of greater likelihood of causation (0%, 25%, 75%, and 100%) resulted in increasing average award response responses (\$130, \$223, \$691, and \$825). These results suggest that in a more lopsided case of alternative causation—for example, where there are four equally negligent defendants with 85%, 5%, 5%, and 5% chances of being the causal agent, or 97%, 1%, 1%, and 1% chances—an even split would run contrary to public intuitions of fairness. Given that a single recovery system for an entire class of cases is highly desirable, PPR appears to enjoy the highest support over the range of alternative causation cases.¹⁷³

D. Valuation

Closely related to the issue of uncertain causation is the issue of valuation. While one may draw a distinction between the questions “Did defendant’s tortious conduct cause a setback to a legally recognized interest of the plaintiff?” and “What is the value of the setback to plaintiff’s legally recognized interest?,” each question might be merely a subcomponent of the ultimate moral question, “How much of a setback to plaintiff’s interest did defendant’s tortious conduct cause?” Accordingly, it is unsurprising to see some participant preferences favoring PPR over SMSR in the context of valuation as in causation. Furthermore, the inclination to “split the difference,” identified in the previous section, also showed up in these results, though to a different extent.

In the uncertain valuation hypotheticals, there was clear support for PPR. In the primary survey, survey participants’ average awards somewhat closely tracked the expert’s estimate that the destroyed

¹⁷³ Another possible explanation for this pattern is that survey participants did not reject the normative significance of causation, but instead they were insensitive to the statistical estimates we provided of the likelihoods. This could arise as a function of disregarding or misunderstanding the probabilities, but it could also have arisen from discounting or ignoring the expert testimony altogether. In other words, regardless of the expert’s opinion, there was still significant uncertainty as to which of the two or four defendants was responsible, possibly warranting an even split among them. We think this explanation is unlikely. Our follow-up version of the four-way question, in which the odds of causation were placed at 40% for one defendant and 20% for each of the other three, yielded similar results, except that a noticeably larger portion of the participants in the follow-up opted for no award at all. This suggests that, while the strong preference for an equal division remains, people are not completely insensitive to the provided statistical testimony.

flower would have been worth \$1,000.¹⁷⁴ The responsiveness of their awards to the proffered likelihoods provides some additional reason to believe that participants did not simply disregard the expert's testimony in these cases.

Underlying the average responses discussed above was a distinct thread of support for splitting the difference. Many participants in the key 25% and 75% likelihood conditions recommended an award of \$500; indeed, it was the modal award in the 25% condition. This response might be interpreted either as reflecting participants construing expert testimony regarding likelihood as simply admissions of uncertainty ("We just don't know for sure") or as reflecting a normative intuition that the probability estimates are irrelevant to just compensation.

Despite these seemingly robust notions of fairness, however, we are not inclined to recommend that courts begin adopting split-the-difference rules in cases of valuation. First, there is no support for such an approach in tort law. Second, in the context of valuation, splitting the difference is highly manipulable by parties who might identify a range of endpoints with *de minimis* evidential support. Third, insofar as the tort system's rules for recovery should try to track the public notions of fairness, it should be guided by average responses. While no recovery scheme will satisfy all, a scheme consistent with average awards will likely maximize the satisfaction of fairness preferences. As discussed, average responses to this survey are consistent with PPR.

Of course, if PPR-consistent results were themselves simply the average of SMSR and split-the-difference responses and themselves had no direct support, maximization of perceived fairness might not result. To better assess whether people viewed SMSR or PPR as the fairer approach, the follow-up survey asked them to choose one. This time, when we effectively prevented them from splitting the difference, participants chose PPR as the fairer by more than two-to-one.¹⁷⁵

This preference for PPR, or perhaps more accurately, this preference *against* SMSR, dovetails nicely with our earlier results. Here, a charge to the jury of "awarding an amount that fairly compensates the plaintiff for past, present, and possible future loss, taking into account the likelihood of the loss and its possible extent" would provide both consistency and the necessary latitude for the jury to follow its sense of

¹⁷⁴ See *supra* Section III.B.2.a.iv.

¹⁷⁵ See *supra* Section III.B.2.a.iv.

fairness rather than a charge that might push a jury to deny or distort its sense of justice.

E. Uncertain Breach

Thus far, we have seen a preference for PPR emerge in several contexts where one or more defendants are known to have all acted negligently. It is plausible to attribute to survey participants the belief that where an actor is at fault, the actor has lost the moral high ground to argue that he should be entirely free of liability. All considerations equal, it might be thought that a loss is better placed on a blameworthy actor than an innocent victim, causation notwithstanding. But, what about cases where there is uncertainty about the threshold issue of fault?

Our primary survey shows that the preference for PPR falters in cases where there is uncertainty regarding whether a single defendant has acted negligently. In such single-defendant cases where there was only a 25% chance that the defendant was at fault, almost half of the participants opted for no liability, consistent with SMSR. There was, however, substantial support for other approaches. The other half of the participants were roughly divided between PPR (awarding 25% damages), splitting the difference (awarding 50% damages), and full recovery.¹⁷⁶

A change from SMSR is not advisable where moral intuitions appear so mixed. An open-ended jury charge, for example, to simply determine what a fair award would be, would have significant potential to produce highly inconsistent results across cases. Inconsistency across cases can only undermine the public's confidence in the integrity of the torts system. Accordingly, we see no justification in terms of public perceptions of fairness to recommend a change from the current SMSR rule for recovery where there is uncertainty regarding breach by a single actor.

In contrast, perhaps surprisingly, there is significant support for PPR in cases of alternative breach. In a question concerning two defendants, where there was a 75% chance that the tortious act was committed by the first defendant and a 25% chance it was committed by the second, 77.4% of participants opted for PPR, i.e., holding the first defendant liable for 75% of the damages and holding the second liable for 25% of the damages, rather than holding the first defendant liable for all the damages, and the second for none. Nevertheless, we do not advise a

¹⁷⁶ See *supra* Section III.B.2.vii.

shift to PPR in the case of an alternative breach. First, there is at least tension between employing SMSR in cases of uncertain breach with one defendant and employing PPR in cases of alternative breach. Consider a defendant for whom there is only a 25% chance that his conduct was wrongful. Why should his liability go from zero to 25% simply because the alternative source of the harm is a potentially negligent actor rather than an innocent or natural one? The liability of one actor arguably should depend on their fault and causal role rather than on another's. Second, creating liability for a defendant who probably did nothing wrong is unprecedented in law. The survey data clearly justifies further examination of public attitudes toward the fairness of PPR in cases of uncertain breach. A stronger, more consistent showing of support for PPR, however, is desirable before recommending a change in law here.¹⁷⁷

F. Fairness Without Fault

According to traditional views of corrective justice, the questions of fault and causal responsibility are independent. The existence of one neither entails nor implies the existence of the other. Tort litigation, however, often involves a defendant who has acted in a faulty manner and a plaintiff who has not. Accordingly, jurors' treatment of causal uncertainty may be biased by favoritism toward the innocent plaintiff. The scenarios in our survey relating to a found bag of four diamonds were designed to isolate participants' views about causal uncertainty as we shifted their focus from apportioning a wrongfully caused loss to distributing a windfall between two equally (un)worthy parties.

The findings were the clearest indication thus far that PPR is more consistent with participants' views of fairness than SMSR. In both the primary and the follow-up surveys, where participants had to choose the fairest distribution of the found diamonds, only approximately 10% selected the SMSR solution of giving all four to the owner on whose property the diamonds were more likely found. This result suggests that an "unbiased" intuition concerning the treatment of uncertainty about a normatively significant fact does not lead participants to make all-or-nothing awards. Combined with the results of the medical malpractice

¹⁷⁷ Of course, the fact that participants were less willing to attach even proportional liability to a single defendant who may not have acted negligently is also somewhat reassuring. It suggests that participants were, in fact, sensitive to the information that both defendants in the two-defendant case acted negligently. If they were indifferent to this information, we would expect to see the same willingness to attach liability in the single-defendant case.

scenario discussed above, it also suggests that the preference for PPR that we find in those results is not simply a response to the deep pockets of doctors or their insurance carriers. Instead, we see a consistent underlying commitment to the idea that a just response to factual uncertainty should reflect the degree of uncertainty, as PPR does.¹⁷⁸ The more global participants' intuitions, the more stable and deep they likely are. These results thus support the application of PPR not only to property cases involving uncertain ownership but to tort cases as well.

The results of this question set may also shed some helpful light on participants' preferences for splitting the burden of liability equally rather than pursuant to PPR. Split-the-difference preferences were displayed in a few of the primary survey hypotheticals. When participants had to choose between 50/50 and proportional distributions of the four found diamonds in the follow-up survey questions, the vast majority chose a proportional distribution. Particularly when contrasted with the liability question results, this suggests that participants did not simply disregard the provided likelihood numbers and reason that "the evidence is inconclusive; therefore, splitting the difference is fair." Taken together, these preferences not only support the view that PPR is more consistent with intuitive views of fairness, but they also suggest that the decision on the part of survey participants to sometimes divide liability pro rata rather than according to an expert's proportional estimate of responsibility reflects a substantive interpretation of fairness.

G. Underlying Conceptions of Fairness

The clash between SMSR and PPR can be understood as a clash between their rationales. The survey results shed light on how various

¹⁷⁸ We view skeptically the theory that differences in responses between the questions apportioning a loss and the questions dividing a windfall may relate to differences in perceptions of loss versus perceptions of gain, such as that suggested by prospect theory. Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 *ECONOMETRICA: J. ECONOMETRIC SOC'Y* 263 (1979); see also, e.g., Jeffrey J. Rachlinski, *Gains, Losses, and the Psychology of Litigation*, 70 *S. CAL. L. REV.* 113 (1996); Amos Tversky & Daniel Kahneman, *Advances in Prospect Theory: Cumulative Representation of Uncertainty*, 5 *J. RISK & UNCERTAINTY* 297 (1992). Even if the assignment of liability, as a loss to the defendants, did "loom larger" than the gains associated with distributing diamonds, however, it remains unclear why the former should be done on a per-person basis while the latter should be done proportional to the underlying likelihoods. If the difference was purely about the perceived value, for example, we would have expected to see a more dramatic difference between the alternative liability cases—where \$1,000 worth of damages were at issue—and the medical malpractice cases—where \$100,000 worth of damages were at issue.

rationales might underlie participant responses to hypotheticals about fair awards in legal disputes. By posing several questions outside the litigation context with little surface relationship to it, we could unpack participants' views in more depth, finding interesting areas of support for SMSR and PPR. In this subsection, we highlight three key insights: participants' intuitions about the proper handling of recovery error, their understanding and appreciation of error minimization, and their evaluations of the fairness of applying PPR to cases involving evidential damages.

1. Recovery Error Minimization Versus Equalization

Perhaps the strongest rationale for the fairness of SMSR is that it is likely to produce the smallest deviation from the outcome that corrective justice would dictate in the absence of uncertainty ("objective recovery error"). In contrast, perhaps the strongest rationale for the fairness of PPR is that it equalizes the chances of unjust deprivations and unjust payments between plaintiffs and defendants. As discussed previously, while SMSR minimizes overall recovery error among litigants, PPR equally distributes recovery error among litigants.¹⁷⁹

Our survey questions on unjust transfers and gambling decisions evaluate these competing approaches, albeit with mixed results. First, we asked participants to compare two communities with unjust wealth transfers—Alphaville and Betaville. Alphaville, participants were told, equally distributes the chance of unjust deprivations and payment among randomly selected pairs. In contrast, participants in Betaville were told that there are fewer unjust transfers, but the risk of being the subject of an unjust transfer falls only on one member of the randomly selected pair. Alphaville thus models PPR-based tort systems, and Betaville models SMSR-based tort systems.

The results suggest that while the SMSR model might have more intuitive appeal than the PPR model, the differences are minor. When we asked survey participants where they would prefer to live, 21% chose Alphaville and 39.1% chose Betaville. Such a preference, however, likely overstates any underlying intuitions favoring SMSR over PPR for three reasons. First, a slight plurality of participants, 39.9%, responded that both communities were equally appealing (or, perhaps, unappealing).

¹⁷⁹ See *supra* Section II.B.

Second, while participants did demonstrate a preference for SMSR-based Betaville over PPR-based Alphaville, the 50% reduction in unjust transfers in Betaville compared to Alphaville is quite large—much larger than any corresponding shift from PPR to SMSR would produce in a typical range of tort cases. The greatest difference in the overall number of erroneous awards between SMSR and PPR systems occurs in cases where there is 25% or 75% uncertainty about causation. In those cases, we can expect SMSR to generate 18.5% fewer unjust transfers—a good deal less than the 50% reduction in unjust transfers between Betaville and Alphaville. In other cases, where the factual uncertainty is either larger or smaller, the expected reduction in unjust transfers will be less. For example, where there is 40% or 60% uncertainty about causation, the reduction in erroneous awards going from PPR to SMSR will be only 8%. Thus, if participants preferred Betaville for its reduced number of unjust transfers, we cannot be sure that preference would transfer to using SMSR over PPR in litigation.

Third, in the survey hypothetical, participants were placed “behind the veil of ignorance.” For them, it was equally likely that they might be selected as the first member of the Betaville pair, who might enjoy an unjust payment transfer, as it was that they might be selected as the second, who might suffer the unjust deprivation. In a second-order sense, at least, both members of the pair are treated the same, because both had the same chance of being initially selected as the advantaged member of the pair and as the disadvantaged member. Viewed in this manner, the disparity of treatment some suffer in Betaville seems less harsh.

Tort litigation works differently. In tort litigation, defendants as a group have some say in whether they will be defendants, because some defendants will, in fact, be tortfeasors. Tortfeasors, even negligent tortfeasors, generally have some control over whether they will be tortfeasors. In some contexts, even the set of potential tortfeasors is self-selected. In medical malpractice cases in particular, defendants chose to be doctors and, therefore, to take on the risk of committing (or at least being sued for) malpractice.

In contrast, plaintiffs in tort actions—including patient plaintiffs in medical malpractice actions—have little say in whether they will be injured. Arguably, there is no second-order equality between plaintiffs and defendants in tort litigation and no clear way to mitigate the advantage that SMSR brings defendants relative to PPR where causal uncertainty is less than 50%. Considering the artificially high number of unjust transfers in Alphaville and the artificially reduced inequality

of treatment in Betaville, it is a bit surprising that the preference among participants for Betaville over Alphaville was so weak. On the whole, these data are best viewed as inconclusive. They do not seem to reflect a normative commitment to recovery error minimizing over recovery error equalizing or vice-versa.

2. *Minimization Appreciation*

Our survey results have shown that in many litigation contexts, survey participants believed that PPR provided a fairer rule for recovery than SMSR. Might the significance of these results be undermined if participants did not appreciate, either on a conscious or gut level, that SMSR minimizes recovery error? We think not, for two reasons.

First, in the fairness-based questions concerning alternative breach discussed above, where we took special care to emphasize SMSR's minimization of expected recovery error,¹⁸⁰ we found no evidence that the information influenced participants' judgments of fairness. Half of the participants who answered the alternative breach question did so with the expected error displayed in a table and reenforced by a statement in the list of responses themselves that the lesser error would be under SMSR.¹⁸¹ If a significant number of participants did not initially appreciate that SMSR reduces expected error compared to PPR, and if they *also* thought that treating litigants fairly was simply a matter of minimizing expected error, then adding an explanatory table and statement to that effect would be expected to have a significant impact on survey results. Any impact, however, of these changes was minimal.¹⁸²

Second, even if there is a failure to grasp the error-minimizing tendency of SMSR in tort litigation, this failure should be taken into account when designing legal rules. It may be the case that if people appreciated SMSR's potential to reduce recovery error, more would favor it compared to PPR. But the tort system has limited ability to educate jurors and litigants, and so the system must take them—and their normative blind spots—as they are. A tort system that comports

¹⁸⁰ See *supra* Section II.B.1.

¹⁸¹ “The fairest thing would be for Adam to pay Ned \$1,000 and for Bill to pay Ned nothing—the first possibility. After all, under the first possibility, the total expected overpayment (70% chance of \$1,000 overpayment) will probably be less than the total expected overpayment (70% chance of \$300 overpayment plus 30% chance of \$700 overpayment) under the second possibility.”

¹⁸² See *supra* Section III.B.2.a.vi.

with flawed but prevalent judgments of fairness will function better than one that comports with accurate but uncommon ones.

3. *Evidential Damages*

Finally, we turn to one of the leading arguments for the normative superiority of PPR. According to Porat and Stein, PPR properly compensates plaintiffs not for the physical harm, mental distress, or property loss that the defendant's tortious conduct may have caused but instead for the loss of the very evidence or information that might have allowed the plaintiff to establish a winning tort claim.¹⁸³ Where there is such evidential damage, the argument goes, an award consistent with PPR is a fair and just response because the value of the evidential damage is simply the value of the plaintiff's loss multiplied by the likelihood that the absent evidence would have established that loss.

We examined whether this theory resonates with people through the pair of survey questions about a vase that was destroyed because of a shipper's negligence.¹⁸⁴ In the first version, the vase's value could not be conclusively determined because of the extensive damage it suffered in shipping. In the second version, the value of the vase could not be conclusively determined because of additional damage it suffered as a result of a naturally occurring fire. In both cases, based on the existing background information, the vase was most likely worth \$10, but there was a small chance the vase was worth \$1,000.

If the evidential damage theory had intuitive appeal to the public, liability in the first version should be greater than in the second. In the first, not only did the shipper destroy the vase, but he also destroyed valuable litigation information about the value of the vase. In the second, the shipper destroyed only the vase.

Survey results only partially support the evidential damages theory. The average amount of \$245.00 awarded to the plaintiff in the first version is consistent with the theory, because \$250 is roughly the value of the valuation information destroyed by the shipper. The average amount of \$368.88 awarded in the second version, however, is inconsistent with the theory. According to the evidential damages theory, in the absence of evidential damages, there should be an award based on SMSR, and the existing background evidence shows that the vase likely has almost no value. While there is no ready explanation for the increased award in the second version of the question, this increase

¹⁸³ See *supra* Section II.A.2.

¹⁸⁴ See *supra* Section III.B.2.a.v.

runs directly contrary to what we would expect if participants shared the intuition that responsibility for the destruction of evidence or information relating to valuation was a separately cognizable harm—indeed, the only one supported by a preponderance of evidence. Thus, the core of the evidential damages theory finds no purchase among our participants.

CONCLUSION

How do you do justice when you are uncertain what really happened? While philosophers have long debated the nature of justice, this debate has been largely theoretical, focusing on broad principles and the deep structures that define justice. In contrast, this Article has addressed this practical, real-world—indeed distinctly *legal*—justice problem. Overlooked by philosophers, it is one that litigants, lawyers, judges, and juries contend with every day.

Courts and commentators have advanced a handful of arguments for the relative fairness of two contending approaches for tort recovery: PPR (Probabilistic-Proportional Recovery) and SMSR (Single Most Likely Scenario Recovery). While none of these arguments are decisive, those based on recovery error minimization (favoring SMSR) and recovery error equalization (favoring PPR) are the most compelling.

The relative equality of the arguments regarding fairness, however, is not reflected in the existing law. There, SMSR is the general rule. In a few areas of tort law, however, PPR has gained a foothold as a way to deal with uncertainty: (1) cases where two or more actors have acted wrongfully, but uncertainty surrounds which actor's wrongful conduct was the factual cause of the victim's loss; (2) cases where an actor has violated an assumed duty of care, but uncertainty surrounds whether the violation was a factual cause of the loss suffered by the victim; and (3) cases where an actor's wrongful conduct caused the victim a loss, but uncertainty surrounds the extent of the damages or the existence of future harm.

Harmony between the tort system's rules and the public's perception of fairness is critical for maintaining legitimacy. Thirteen hundred individuals responded to our surveys regarding their views of fairness. Overall, our survey data painted a rich and nuanced portrait of participants' intuitions about fairness and related matters and the basis for these intuitions. Over a selection of recovery hypotheticals, we found openness to—and, in some cases, clear preferences for—PPR.

Considered against the background of existing law and the weight and persuasive power of scholarly commentary, the results of our surveys support a range of possible law reforms:

- the wider use of PPR in medical malpractice actions
- the introduction of PPR into cases of uncertain causation
- the use of PPR in cases of multiple tortfeasors
- the use of PPR in the area of valuation of damages through a charge instructing the jury to award an amount that fairly compensates the plaintiff for past, present and possible future loss, taking into account the likelihood of the loss and its possible extent

In other areas, such as uncertainty regarding breach, we recommended using SMSR.¹⁸⁵

Finally, we recognize that, by their nature, empirical inquiries such as ours raise as many questions as they answer. Based on our survey results, we see the value of further investigation of public perceptions of fairness as they relate to uncertainty in tort litigation. Such investigation might focus on (1) the application of PPR to uncertain breach in the context of medical malpractice and alternative breach cases; (2) the basis of observed attractiveness of “split the difference” recovery rules; (3) the sensitivity of fairness intuitions to higher and lower degrees of uncertainty; (4) the effect of greater and lesser amounts of damages on views about fairness; (5) the existence and depth of possible anti-doctor/pro-patient biases; and (6) the commitment of the public to the background principles of corrective justice.

Completing such investigations, however, is not a prerequisite for reform. Just as the law must resolve tort disputes fairly in the face of causal uncertainty, so it must evolve tort doctrine wisely in the face of empirical uncertainty.

¹⁸⁵ See discussion *supra* Section IV.E.

APPENDIX A: JURISDICTIONAL SURVEY¹⁸⁶*A. Traditional Jurisdictions*

S.D. Codified Laws § 20-9-1.1 (2004) (rejecting loss of chance doctrine); *McAfee v. Baptist Med. Ctr.*, 641 So. 2d 265, 267 (Ala. 1994) (“If, as the defendants suggest, the plaintiffs are in fact asking this Court to abandon Alabama’s traditional rules of proximate cause and to recognize the ‘loss of chance doctrine,’ we decline to do so.”); *Doan v. Banner Health Inc.*, 535 P.3d 537, 548–49 (Alaska 2023); *Dumas v. Cooney*, 235 Cal.App.3d 1593 (1991) (rejecting the “lost chance” theory of recovery for negligence and hold that the plaintiff could not recover wrongful life damages when it was not more likely than not that the missed test would have discovered the abnormality); *Reigel v. SavaSeniorCare L.L.C.*, 292 P.3d 977, 986–87 (Colo. App. 2011) (“As the Tenth Circuit recognized, the Colorado Supreme Court has continued to adhere to the but-for test.”); *Boone v. William W. Backus Hosp.*, 864 A.2d 1, 18 (Conn. 2005) (“[I]n order to satisfy the elements of a lost chance claim, ‘the plaintiff must [first] prove that *prior to* the defendant’s alleged negligence, the [decedent] had a chance of survival of at least 51 percent.”); *Gooding v. Univ. Hosp. Bldg., Inc.*, 445 So. 2d 1015, 1020 (Fla. 1984) (“We . . . hold that a plaintiff in a medical malpractice action must show more than a decreased chance of survival because of a defendant’s conduct.”); *Chaskes v. Gutierrez*, 116 So. 3d 479, 480 (Fla. Dist. Ct. App. 2013) (indicating no change); *Manning v. Twin Falls Clinic & Hosp., Inc.*, 830 P.2d 1185, 1190 (Idaho 1992) (“Our review of the cases that have considered the rationale of the doctrines of ‘increased risk of harm’ or ‘lost chance’ convinces us to reject both doctrines.”); *Kemper v. Gordon*, 272 S.W.3d 146, 148 (Ky. 2008) (“[W]e reject the adoption of the ‘lost or diminished chance’ doctrine of recovery.”); *Samaan v. St. Joseph Hosp.*, 670 F.3d 21, 30 (1st Cir. 2012) (“[T]here is simply no room for judicial interpolation of the lost chance doctrine into Maine medical malpractice law.”); *Fennell v. S. Md. Hosp. Ctr., Inc.*, 580 A.2d 206, 211 (Md. 1990) (“We are unwilling to relax traditional rules of causation and create a new tort allowing full recovery for causing death by causing a loss of less than 50% chance of survival.”); *Clayton v. Thompson*, 475 So. 2d 439, 445 (Miss. 1985) (en banc) (“This Court

¹⁸⁶ This Appendix is partially based on a prior survey. See Steven R. Koch, *Whose Loss Is It Anyway - Effects of the “Lost-Chance” Doctrine on Civil Litigation and Medical Malpractice Insurance*, 88 N.C. L. REV. 595, 607 n.57 (2010).

concludes, therefore, that Mississippi law does not permit recovery of damages because of mere diminishment of the ‘chance of recovery.’”); *Cohan v. Med. Imaging Consultants, P.C.*, 297 Neb. 111, 112, 900 N.W.2d 732, 734 (2017) (“Nebraska has not recognized the loss-of-chance doctrine.”); *Parkes v. Hermann*, 376 N.C. 320, 321, 852 S.E.2d 322, 322–23 (2020) (“[W]e are asked to change our existing jurisprudence regarding proximate causation and to establish a new cause of action, ‘loss of chance.’ We decline to make these significant changes because they are best left to the legislative branch.”); *Jones v. Owings*, 456 S.E.2d 371, 374 (S.C. 1995) (“After a thorough review of the ‘loss of chance’ doctrine, we decline to adopt the doctrine and maintain our traditional approach.”); *Kilpatrick v. Bryant*, 868 S.W.2d 594, 603 (Tenn. 1993) (“Accordingly, we hold that a plaintiff who . . . more likely than not would have suffered the same harm had proper medical treatment been rendered, is entitled to no recovery for . . . the loss of a chance of obtaining a more favorable medical result.”); *Kramer v. Lewisville Mem’l Hosp.*, 858 S.W.2d 397, 407 (Tex. 1993) (“[W]e do not adopt the loss of chance doctrine as part of the common law of Texas.”); *Smith v. Parrott*, 2003 VT 64, PP12 & 14, 833 A.2d 843, 848–49, 175 Vt. 375, 381 (“The loss of chance theory of recovery is thus fundamentally at odds with the settled common law standard.”).

B. Relaxed Proof Jurisdictions

N.H. Rev. Stat. Ann. § 507-E:2 (2009) (rejecting recovery for loss of chance but leaving door open to recovery regardless of probability of survival or improved recovery); W.V. ST 55-7B-3 (apparently contemplating full recovery if plaintiff can show over 25% chance of survival or recovery.) *Thompson v. Sun City Community Hops., Inc.*, 141 Ariz. 597, 688 P.2d 605 (1984) (“If the jury finds that defendant’s failure to exercise reasonable care increased the risk of the harm he undertook to prevent, it may from this fact find a ‘probability’ that defendant’s negligence was the cause of the damage.”); *Ferrell v. Rosenbaum*, 691 A.2d 641, 651–52 (D.C.1997) (reversing summary judgment because of the loss of a substantial chance where evidence failed to show a 50% chance of superior outcome); *Estate of Frey v. Mastroianni*, 146 Haw. 540, 463 P.3d 1197 (2020) (“While a ‘loss of chance’ is not a separate compensable injury . . . factfinder, in medical malpractice case involving death of patient, may consider a loss of chance theory in determining legal causation under [the] traditional framework for negligence, which considers whether an actor’s conduct was substantial factor in bringing about the harm.”); *Roberson v.*

Counselman, 686 P.2d 149, 160 (Kan. 1984) (“The reasoning of the district court [rejecting the lost-chance doctrine] declares open season on critically ill or injured persons as care providers would be free of liability . . . if the patient had only a fifty-fifty chance of surviving the disease or injury even with proper treatment.”); *Delaney v. Cade*, 873 P.2d 175, 187 (Kan. 1994); *Flaherty v. Fromberg*, 849 N.Y.S.2d 278 (N.Y. App. Div. 2007) (permitting recovery for injuries where “evidence is presented from which the jury may infer that the defendant’s conduct diminished the plaintiff’s chance of a better outcome or increased his injury”); *Herskovits v. Group Health Coop. of Puget Sound*, 664 P.2d 474, 477 (Wash. 1983) (en banc) (contemplating full recovery for directly caused damages including lost earning and medical expenses).

C. Loss of Chance Jurisdictions

MONT. CODE ANN. § 27-1-739(3)(b) (“If the evidence establishes that the chance of recovering prior to the negligent act or omission was not more likely than not, the damages awarded must be the difference between the chance of recovering prior to the negligent act or omission and the chance of recovering after the negligent act or omission multiplied by the total damages.”); *Boone v. William W. Backus Hosp.*, 864 A.2d 1, 18 (Conn. 2005) (stating that to satisfy the elements of a lost chance claim, the plaintiff must prove that prior to the defendant’s negligence, the plaintiff had at least a 51% chance of survival); *United States v. Anderson*, 669 A.2d 73, 75–76 (Del. 1995) (permitting recovery for increased future risk and noting “it would not be coherent to adopt increased risk without also adopting loss of chance”); *Parker v. Wilk*, 2003 WL 21221895 (Sup Ct. Del. 2003); *Holton v. Mem’l Hosp.*, 679 N.E.2d 1202, 1213 (Ill. 1997) (rejecting claim that “plaintiffs may not recover for medical malpractice injuries if they are unable to prove that they would have enjoyed a greater than 50% chance of survival or recovery absent the alleged malpractice of the defendant”); *Cahoon v. Cummings*, 734 N.E.2d 535, 541 (Ind. 2000) (holding that upon a showing that defendant caused a loss of chance, “damages are proportional to the increased risk attributable to the defendant’s negligent act or omission”); *Susie v. Family Health Care of Siouxland, P.L.C.*, 942 N.W.2d 333, 340 (Iowa 2020) (recognizing in medical malpractice cases that the amount of damages for a lost chance of survival is the percentage of lost chance attributed to the intervening act of negligence); *Mead v. Adrian*, 670 N.W.2d 174, 178–79 (Iowa 2003) (quoting *Wendland v. Sparks*, 574 N.W.2d 327, 331

(Iowa 1998)); *Burchfield v. Wright*, 275 So. 3d 855, 857 (La. 2018) (“[P]laintiff must prove by a preponderance of the evidence that the tort victim had a chance of survival at the time of the professional negligence and that the tortfeasor’s action or inaction deprived the victim of all or part of that chance, and must further prove the value of the lost chance”); *Matsuyama v. Birnbaum*, 890 N.E.2d 819, 840 (Mass. 2008) (adopting “proportional damages approach”); *Dickhoff ex rel. Dickhoff v. Green*, 836 N.W.2d 321, 337 (Minn. 2013) (“Minnesota law permits a patient to recover damages when a physician’s negligence diminishes or destroys a patient’s chance of recovery or survival.”); *Missouri, Wollen v. DePaul Health Ctr.*, 828 S.W.2d 681, 685 (Mo. 1992) (en banc) (“[T]his Court chooses to recognize a cause of action for lost chance of recovery in medical malpractice cases.”); *Perez v. Las Vegas Med. Ctr.*, 805 P.2d 589, 592 (Nev. 1991) (“By defining the injury as the loss of chance of survival, the traditional rule of preponderance is fully satisfied.”); *Scafidi v. Seiler*, 574 A.2d 398, 400 (N.J. 1990) (“We hold . . . [that] plaintiffs’ damages will be limited to the value of the lost chance for recovery attributable to defendant’s negligence.”); *Alberts v. Schultz*, 975 P.2d 1279, 1288 (N.M. 1990) (“We recognize the legitimacy of the lost-chance concept in New Mexico, as set forth in this opinion.”); *Roberts v. Ohio Permanente Med. Grp.*, 668 N.E.2d 480, 484 (Ohio 1996) (“[W]e recognize the loss-of-chance theory and follow the [proportional] approach”); *McKellips v. St. Francis Hosp., Inc.*, 741 P.2d 467, 476 (Okla. 1987) (“The amount of damages recoverable is equal to the percent of chance lost multiplied by the total amount of damages which are ordinarily allowed in a wrongful death action.”); *Smith v. Providence Health & Servs.*, 393 P.3d 1106, 121 (Or 2017) (“[L]oss of a substantial chance of a better medical outcome can be a cognizable injury in a common-law claim of medical malpractice in Oregon.”); *Hamil v. Bashline*, 392 A.2d 1280, 1288 (Pa. 1978) (“We agree with [the lost-chance doctrine] and hold that once a plaintiff has demonstrated that defendant’s acts or omissions . . . have increased the risk of harm to another, such evidence furnishes a basis for [recovery].”); *Ehlinger by Ehlinger v. Sipes*, 454 N.W.2d 754, 763 (Wis. 1990) (“If the defendant’s negligence is found to have been a substantial factor in causing the harm, the trier of fact may also consider evidence of the likelihood of success of proper treatment in determining the amount of damages to be awarded.”); *McMackin v. Johnson Cnty. Healthcare Ctr.*, 73 P.3d 1094, 1100 (Wyo. 2003) (“[T]he full measure of damages would be those ordinarily allowed in

a wrongful death action, reduced by the statistical or percentage loss of chance for survival.”).

D. Undecided Jurisdictions

Holt ex rel. Holt v. Wagner, 43 S.W.3d 128, 132 (Ark. 2001) (“We recognize that lost chance of survival is a complex legal theory that has taken various shapes and forms in other states. We are not closing the door to the future adoption of one of the versions of lost chance of survival.”); Richmond County Hosp. Auth. v. Dickerson, 356 S.E.2d 548, 550 (Ga. Ct. App. 1987) (“Proximate cause is not eliminated by merely establishing by expert opinion that the patient had less than a fifty percent chance of survival had the negligence not occurred.”); Stone v. Williamson, 753 N.W.2d 106, 114–15 (Mich. 2008) (indicating that legislative enactment made in response to the court’s earlier adoption of lost-chance doctrine is ambiguous and that, as a result, the status of the doctrine in the state is unclear); VanVleet v. Pfeifle, 289 N.W.2d 781, 784 (N.D. 1980) (at best suggestive of some form of recovery); Almonte v. Kurl, 46 A.3d 1 (R.I. 2012); Andersen v. Brigham Young Univ., 879 F. Supp. 1124, 1129 (D. Utah 1995) (“The Supreme Court of Utah has not directly spoken to loss of chance as a possible separate and new cause of action”); Straus v. McDonald, 67 Va. Cir. 116, 120 (Va. Cir. Ct. 2005) (declining to apply lost-chance methodology without prior approval from state supreme court).

APPENDIX B: EXPECTED ERROR RECOVERY PROOF

Proof that SMSR produces lower expected recovery error than PPR in two-party litigation:

Assume there is a p chance that Defendant has tortiously caused Plaintiff to suffer a loss equal to L dollars. On one hand, if $p < .5$, under SMSR, the value of the expected recovery error is pL (the possible underpayment to Plaintiff), and, under PPR, the value of the expected recovery error is $(1-p)(pL)+p(L-pL)$ (the possible overpayment by Defendant plus the possible underpayment to Plaintiff), or $(2-2p)(pL)$. Since $p < .5$, pL is less than $(2-2p)(pL)$. Thus, if $p < .5$, the expected recovery error under SMSR is less. On the other hand, if $p > .5$, under SMSR, the value of the expected recovery error is $(1-p)L$ (the possible overpayment by Defendant), and, under PPR, the value of the expected recovery error again is $(1-p)(pL)+p(L-pL)$ (the possible overpayment by Defendant plus the possible underpayment to Plaintiff), or $(2p)(1-p)L$. Since $p > .5$, $(1-p)L$ is less than $(2p)(1-p)L$. Thus, if $p > .5$, the expected recovery error under SMSR is again less. See David Kaye, *The Limits of the Preponderance of the Evidence Standard: Justifiably Naked Statistical Evidence and Multiple Causation*, 1982 AM. B. FOUND. RES. J. 487 (identifying SMSR's superiority over PPR in recovery error minimization in single case litigation); see also Saul Levmore, *Probabilistic Recoveries, Restitution, and Recurring Wrongs*, 19 J. LEGAL STUD. 691, 693–94 (1990); Abramowicz, *supra* note 98, at 276.

