Liability for Lapses:
First or Second Order Negligence?

by

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Abstract

When making a decision and executing it, harm can result from misjudged distances, under-estimated probabilities, quavering hands, slips of the tongue, and clumsy feet. Such lapses cause a high proportion of accidents, but they are under-theorized in liability law. This paper develops a theory of liability for lapses by distinguishing between first and second order behavior. "First order precaution" refers to behavior that directly affects the probability of an accident, such as judging the speed of a car, stepping on the brakes, and wielding a scalpel. Given the possibility of a lapse, this behavior has a probabilistic component. We model first order precaution as a draw from a probability distribution, not an exact choice. Drawing a low level of first order precaution from the probability distribution is a "lapse." "Second order precaution" refers to behavior that reduces the probability of an accident by affecting the probability distribution over first order behavior. Examples include concentration when driving and preparation before performing a medical operation. The prevailing tort rule is liability for harm caused by unreasonable first order precaution, regardless of second order precaution. For some decisions, however, liability law permits a defense of reasonable second order precaution. The most familiar example is the business judgment rule – a director whose bad decision (first order behavior) lowered the price of the company's stock can defend himself against a stockholder suit by proving that he diligently prepared to decide (second order behavior). We advocate extending the defense of second order reasonableness more generally to activities that benefit others ("positive externalities"), such as practicing medicine. We also advocate allowing this defense when it prevents actors from substituting worse actions for better ones.

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Introduction

When making a decision and executing it, harm can result from misjudged distances, under-estimated probabilities, unforeseen consequences, quavering hands, slips of the tongue, clumsy feet, or an eye's blink. Given the possibility of lapses, actors cannot simply choose a specific level of precaution. Instead, they draw their precaution from a probability distribution. Here is an example.

> **Example 1: Driver's Lapse.** A motorist sets out on the long, straight drive from San Francisco to Los Angeles on Route 5. The speed limit is 70 miles per hour. The car lacks a mechanical device to maintain constant speed (no "cruise control"). The driver aims for 65 miles per hour. Not being a machine, the driver cannot possibly go 65 all the time. The driver makes reasonable effort to maintain constant speed, but occasional lapses in attention cause the driver to exceed or fall short of 65. Near the end of the trip, the driver has an accident while going 73.

In statistical terms, the driver in Example 1 draws his speed from a probability distribution with high density around 65 and low density above 70.

We use the term "first order precaution" to refer to acts that directly affect the probability of an accident, such as driving speed. First order precaution that falls short of a community standard of care constitutes negligence in common law. The possibility of a lapse makes negligence and liability probabilistic. We illustrate this fact by expanding Example 1.

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> **Example 1`: Driver's Liability for Lapse.** Under the driving conditions in the preceding example, the speed limit of 70 miles per hour is also the reasonable speed. The driver aims for 65 and makes reasonable efforts to achieve his goal, but he has an accident near the end of the trip while going 73. He would have avoided the accident if he had been going 70 or less. Under the prevailing tort rule, the driver was negligent at the time of the accident, and his negligence caused the accident, so he is liable for the resulting harm.

We call the prevailing liability rule "a first order negligence rule."

While the driver in the example cannot choose an exact speed, he can affect the probability of lapse. After beginning his journey, the probability of a lapse depends on how often the driver checks the speedometer, glances in the rear-view mirror, observes the gap between his car and the car in front of him, and makes a rest stop or drinks coffee. Even before the journey begins, the driver can take driving lessons, practice going a constant speed, and get a good sleep the night before the journey. We refer to such acts that affect the probability distribution over first order precaution as "second order precaution." In liability law, second order precaution often takes the form of preparation and concentration. In our terminology "second order negligence" is a failure to take reasonable second order precaution.

Besides lapses in executing an intention, another kind of lapse concerns uncharacteristic failures in judgment. By "judgment" we mean a decision reached by weighing alternatives. Here the prevailing liability law is less clear. For some judgments, the rule of liability permits a defense of reasonable second order behavior. The "business judgment rule" as applied to corporate directors is a typical example.[1] In tort law, which is our subject, failures to execute typically trigger liability more often than failures in judgment. The following example illustrates this point:

> **Example 2: Doctor's Lapse in Judgment.** A doctor has performed a given operation successfully many times. Before a particular operation, the doctor carefully examines the patient and prepares the operating room. During the operation, the patient's condition unexpectedly deteriorates and the doctor must immediately make a critical decision. The doctor makes the wrong decision and the patient dies. The right decision would have saved the patient's life.

[1] *See infra* discussion.

In Example 2, the doctor's decision is first order behavior, and preparing for the operation is second order behavior. A doctor who reasonably prepares for an operation, but nevertheless makes the wrong decision, often escapes liability for harm that the right decision would have avoided. Courts do not formally recognize a second order reasonableness defense, but they are reluctant in practice to "second guess" a doctor's judgment.[2] Similarly, courts are reluctant to "second guess" the judgment of other certified experts such as an accountant or lawyer. Reluctance to "second guess" often implies the relevance of the second order behavior to liability.

Lapses cause a high proportion of accidents, yet probabilistic precaution is under-theorized in liability law. This paper develops a theory of lapses based on the difference between first and second order behavior. We model first order precaution as a draw from a probability distribution, not an exact choice. We model second order precaution as behavior that affects the probability distribution over first order precaution, such as concentration when driving and preparation for an operation. Second order precaution shifts the distribution and reduces the probability of drawing a low level of first order precaution. We advocate extending the defense of second order reasonableness more generally to activities that benefit others ("positive externalities"), such as practicing medicine. We also advocate extending the defense of second order reasonableness when it prevents actors from substituting worse actions for better ones. Thus without the defense people will substitute more dangerous capital for less dangerous labor or actions with more lapses in judgment for actions with more lapses in execution, even if efficiency requires the opposite.[3]

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[2] *Infra*.

[3] Liability for lapses also raises concerns from a retributive justice perspective. Consider someone who lapses no more often than other reasonable people. If the person lapses and harms someone, the injurer is arguably no worse morally than other reasonable people who did not lapse. The injurer, consequently, does not deserve a sanction in the form of tort liability. Theorists who discussed the fairness (or retributive justification) of outcome responsibility (liability for materialized harms as opposed to liability for unrealized risks) often use such examples of lapses to illustrate the allegedly unfairness of outcome responsibility.

Arguments against outcome responsibility based on "moral luck" would be stronger if theorists distinguished between first and second order negligence, and offered examples of first order negligence without second order negligence. *See* e.g. Jeremy *Waldron, Moments of Carelessness and Massive Loss*, PHILOSOPHICAL FOUNDATIONS OF TORT LAW 387 (1995, D.G. Owen ed.) (justifying outcome responsibility

The paper is organized as follows. Part I provides an account of the way prevailing tort law deals with lapses. Part II develops our model of lapses. Part III applies the model to situations where the activity creates negative or positive externalities. Part IV discusses the substitution effect. Part V develops a second order negligence rule and offers various ways to implement it. The conclusion follows.

I. Lapses Under Prevailing Tort Law

A lapse from a legal standard of precaution is usually sufficient to trigger liability for any resulting harm. "First order negligence rule," as mentioned above, refers to liability for lapses without a defense of second order reasonableness. We will discuss this rule as it applies to various types of accidents. Close inspection will reveal circumstances where courts are open to a defense of second order reasonableness. Liability law thus contains pockets of a second order negligence rule.

A. Road Accidents

In most jurisdictions, drivers are liable for harm caused by their negligence, and a driver is found negligent when his behavior is unreasonable. Lapses appear to be a common cause of unreasonable behavior of drivers, possibly *the* most common cause.[4] Examples are speeding (Example 1), not stopping at a stop sign, reacting too slowly in

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on ground of retributive justice, and using an example of a lapse); Tony Honore, *Responsibility and Luck: The Moral Basis of Strict Liability*, 104 L. Q. Rev. 53 (1988) (justifying outcome responsibility on fairness grounds); *C. H. Schroeder, Corrective Justice & Liability for Increasing Risks"* 37 UCLA L. Rev. 439 (1990) (arguing from a corrective justice perspective for liability for unrealized risks instead of materialized harms). For a discussion of the moral luck argument from a corrective justice perspective, see Arthur Ripstein, *Closing the Gap*, 9 THEORETICAL INQ. L. 61, 62-80 (2008) (Justifying liability for materialized harms only); Benjamin C. Zipursky, *Two Dimensions of Responsibility in Crime, Tort and Moral Luck*, 9 THEORETICAL INQ. L. 97, 98-106 (2008) (justifying negligence-based liability); John Goldberg & Benjamin Zipursky, *Tort Law and Moral Luck*, 92 CORNELL L. REV. 1123, 1127, 1153-4 (2007) (explaining that negligence law, while counting the injurer's bad luck against him, cannot be defended on moral grounds only).

[4] See Porter v. State, 88 So. 2d 924. In deciding a criminal case on manslaughter, Justice O'connell noted that "There are few, if any, persons who drive automobiles who have not, through momentary lapse of attention, error of judgment, failing to see what they should have seen, particularly on roads not in municipalities, been guilty of running a stop sign at an intersection without slowing down. *Such, no doubt, constitutes negligence sufficient to support a damage suit based on simple negligence.* We doubt that it would support a verdict under our guest statute. Nor do we believe that it is sufficient to support a verdict of manslaughter." Ibid., at 926 (Emphasis added).

dangerous situations,[5] taking eyes off the road,[6] not maintaining a proper lookout,[7] failing to slow down when necessary, and not keeping adequate distance from other cars.

In road accidents, a driver who lapses offers a second order defense by showing that he acted reasonably at an earlier stage to reduce the probability of lapsing. Courts are reluctant to admit such a defense in road accidents. In exceptional case, however, courts refuse to consider a momentary lapse of attention as negligence *per se*. One such case is *Plowman v. Digatono.* In this case, the plaintiff stopped its car at a red light, proceeded forward when light turned green, then stopped in the intersection to avoid striking a car in front of him. Defendant ran into the rear end of plaintiff's car. The collision occurred as defendant looked away from traffic for a "moment" to hang up the microphone on his car radio. The jury found that the defendant was not negligent, and the Court of Appeals upheld the jury's decision, stating that "the district court did not err in … allowing the jury to consider whether… [defendant's] momentary lapse of attention to replace his microphone was a reasonable excuse for his conduct."[8]

In two categories of cases, drivers' lapses are *in*sufficient for imposition of liability. The first category concerns *guest statutes* that govern the liability of a driver toward a guest in his car. Under these statutes, a lapse in precaution is not enough to satisfy the requirements of driver's liability to a guest. Liability requires the driver's

[5] See Bobstein v. Splinter, 168 So. 2d 560. In this Guest Statute case, the defendant collided into another vehicle which was not expected to be there. The dissent was not convinced that gross negligence, which is a precondition for imposing liability on the driver under that statute, was proven. The judge reasoned that "it affirmatively appears that due either to a momentary lapse of attention, or the unnatural and unanticipated action of the driver of the other vehicle, defendant did not see such vehicle until it was too late to stop his automobile before the collision ensued. *While such action on the part of defendant may constitute simple negligence*, it falls far short of the standard required in order to allege gross negligence." (Emphasis added).

[6] See Pedersen v. Kinsley, 25 Ill. App. 3d 567. In this Guest Statute case, the defendant driver swerved off the road and struck a lamppost. The court imposed liability on the driver, for taking her eyes off the road, and considered it not only as mere negligence, but as willful and wanton misconduct. For similar facts and same outcome, see also *Rosbottom v. Hensley*, 61 Ill.App.2d 198, 209 N.E.2d 655.

[7] See Security Timber & Land Co. v. Reed, 398 So. 2d 174. In this case, a driver was found contributory negligent for not maintaining a proper lookout, resulting in a collision with another car.

[8] See Plowman v. Digatono, 1995 Minn. App. LEXIS 1291. The defendant was a policeman who drove a police car.

gross negligence or willful and wanton misconduct.[9] Gross negligence and willful and wanton misconduct go to the quality of self-monitoring. They often imply a knowing or deliberate choice of unreasonable second order behavior.

The second category concerns *sudden emergencies* on roads and elsewhere. One court formulated the sudden emergency doctrine, which many courts have recognized, as follows:

> "One who suddenly finds himself in a position of imminent peril, without sufficient time to consider and weigh all the circumstances or best means that may be adopted to avoid an impending danger, is not guilty of negligence if he fails to adopt what subsequently and upon reflection may appear to have been a better method, unless the emergency in which he finds himself is brought about by his own negligence."[10]

According to this formulation, the sudden emergency doctrine lowers the legal standard of conduct after an emergency has arisen. It does not lower the standard of care required of a motorists before the emergency occurs.[11] The sudden emergency defense cannot be invoked by one who has brought the emergency on himself by his own wrong or who has not used due care to avoid it. In our language, defense against liability for first order negligence in a sudden emergency is conditioned upon second-order reasonableness.

B. Medical Malpractice

Turning to medical malpractice, doctors are held liable for the consequences of their negligence in making decisions and executing them. Many medical accidents are the result of errors, and errors are often caused by lapses.[12] Lapses in decisions include

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[9] See Hoffman v. Slocum, 219 Cal. App. 2d 100. The court imposed liability on a driver toward a guest, reasoning that "the trier of the fact was entitled to infer that this was not simply an error of judgment or a momentary lapse of attention on the driver's part". See also *Porter v. State*, supra note 3; *Bobstein v. Splinter*, supra note 4.

[10] *Hickman v. Southern Pacific Transport Company*, 262 La. 102, 262 So.2d 385 (La.1972).

[11] *Dick v. Phillips, 253 La. 366, 218 So.2d 299, 302 (La.1969).*

[12] For a profound analysis, both positive and normative, of errors, lapses, and related occurrences in the field of medicine, *see* Alan Merry & Alexander McCall Smith, ERRORS, MEDICINE AND THE LAW 72-97, 127-151 (Cambridge University Press, 2006). For data on the medical errors and their huge contribution to patients' injury, *see*, Robert James Cimasi, *Medical Malpractice and Tort Reform Risks*, in INSURANCE AND RISK MANAGEMENT STRATEGIES 186-8 (Jones and Bartlett Publishers, David E. Marcinko ed., 2005). For

failing to diagnose, choosing the wrong drug to administer, choosing the wrong technique to perform, , using the wrong medical equipment, omitting tests needed to diagnose the patient's illness, or deciding to operate too early or too late. Lapses in execution include administering a different drug from the one intended, incorrectly performing a medical technique, using medical equipment improperly, misreading results of diagnostic tests, operating on the wrong patient or the wrong body part, leaving a sponge inside a patient's body, failing to sterilize medical equipment, and failing to monitor the patient's condition.[13]

Anecdotal evidence from the case law suggest that doctors are more found liable for failures in execution, than for failures in judgment.[14] One reason could be implicit recognition of a second order reasonableness defense. Thus courts sometimes exempt physicians from liability for an error of judgment if they acted in good faith.[15] Good faith depends to a large extent upon second order behavior. When courts are satisfied that doctors prepared reasonably before making a decision, they often exempt them from liability for making the wrong decision. For example, when a doctor decides to deliver a baby by Cesarean, courts will ordinarily not check the reasonableness of his decision so

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the argument that systemic errors are major causes for most medical accidents even if typically combined with individual errors, and for a comprehensive account of all types of medical errors based on extensive empirical evidence, see Michelle M. Mello & David M. Studdert, *Deconstructing Negligence: The Role of Individual and System Factors in Causing medical Injuries*, 96 GEO. L.J. 599.

[13] For a comprehensive list of causes for patients' injury which include those mentioned in the text and many others, see James E. Orlikoff with Audrone M. VANAGUNAS, MALPRACTICE PREVENTION AND LIABILITY CONTROL FOR HOSPITALS 65-7 (2nd ed., 1988); Mello & Studdert, *supra* note. For case law illustrations of execution failures, *see* Rivera v. Anilesh, 869 N.E.2d 654 (2007) (negligent performance of injections of anesthesia and extraction of a tooth could result in dentists' liability); Vanderpool v. Adirondack Neurosurgical Specialists, P.C., 846 N.Y.S.2d 832 (2007) (failing to diagnose plaintiff's bilateral pars defect, which was evident from X rays and an MRI, prior to performing spinal surgery.)*;* Powell v. Kleinman, 151 Cal. App. 4th 112 (2007) (Failing to ascertain results of a test administered for the patient); Mobile Infirmary Association v. Tyler 2007 Ala. LEXIS 192 (2007).

[14] Similarly, in the field of liability of public authorities, courts are much more willing to impose liability for execution of operational, rather than discretional powers. Dobbs, *supra* note, §262, 269, at pp. 697-705, 718-20. See also Cherie Booth & Dan Squires, THE NEGLIGENCE LIABILITY OF PUBLIC AUTHORITIES 46-51(2005) (distinguishing between policy and operational decisions of the public authority and indicating courts' enhanced willingness to impose liability for the latter rather than for the former).

[15] *See* Dotson v. Hammerman, 932 S.W. 2d 880 (Mo. App. 1996); Dobbs, *supra* note, §243, at p. 634. See also David A. Hyman and Charles Silver, *Medical Malpractice Litigation and Tort Reform: It's the Incentives, Stupid*, 59 Vand. La. Rev. 2006 1085 (1097) (citing several studies and stipulating that "[a]ll find that the merits matter, and some find that the merits matter more than anything else. Plaintiffs who received substandard care generally obtained compensation… plaintiffs who received proper care generally did not… and plaintiffs whose care quality was uncertain wound up in between".

long as they are convinced he prepared prudently for the decision. In contrast, once the method is decided for delivering the baby, the courts are reluctant to excuse faulty execution on grounds of reasonable preparation.[16]

A second possible reason why courts are more hesitant in imposing liability for doctor's misjudgment is difficulties of proof. Lapses in execution are relatively easy to observe, whereas misjudgments require second-guessing. As a result many misjudgments remain undetected or unproved, so they do not trigger liability.

Powell v. Kleinman, decided by a Californian Court of Appeal,[17] illustrates our points. In this case a patient sued his doctors for harms resulting from failure to diagnose promptly and treat an injury to his spinal cord. The plaintiff alleged that his doctors' negligence manifested itself in three ways:

1. Failing to test for weakness, discover weakness, or note findings of weakness earlier than the time they sent him for an MRI test. Here the doctor seems to have balanced alternatives and made the judgment tests were unnecessary.

2. Failing to take steps to ascertain the MRI results when the plaintiff's symptoms continued. Here the doctor allegedly failed to execute his decision to evaluate the patient by using an MRI test.

3. Assuming the staff at the hospital had tested for cord compromise without confirming it had done so. Here the doctor allegedly failed to execute his decision to evaluate the patient by using hospital tests.

On defendant's appeal for summary judgment, the Court of Appeal faced the question of whether any of the plaintiff's allegations could give rise to the doctors' liability. Based on an expert opinion brought by the plaintiff, the court decided that the 2nd and 3rd allegations could give rise to the doctors' liability. Interestingly, these two allegations were about negligent execution, maybe even lapses. The 1st allegation, which the court implicitly assumed to be more problematic for the plaintiff's action, was about judgment.

[16] See discussion *infra*.
[17] Powell v. Kleinman, 151 Cal. App. 4th 112 (2007).

The tendency not to second guess doctors' judgments is also reflected in Section 6.03 of the California Civil Jury Instructions[18] which state as follows:

> "Where there is more than one recognized method of diagnosis or treatment, and no one of them is used exclusively and uniformly by all practitioners of good standing, under the same or similar circumstances, a physician is not negligent if, in exercising [his] [or] [her] best judgment, [he] [or] [she] selects one of the approved methods, which later turns out to be a wrong selection, or one not favored by certain other practitioners."

According to these instructions, a doctor's choice to deliver by Cesarean will seldom end up with imposition of liability for making a negligent choice and the same is true with respect to other doctors' choices among approved methods of treatment. As a result, many doctors' lapses in judgments will be exempted from liability.

Courts' enhanced willingness to impose liability for faulty executions rather than for faulty judgments is expected to influence the ratio between execution and judgment claims. We know of no research which can directly indicate what this ratio is. However, some impression can be derived from the National Practitioner Data Bank (2005),[19] which includes 191,082 medical malpractice claims brought by patients in 1991-2005, and which indicates the various types of such claims. The Data Bank includes both tried and settled claims. According to the data, roughly 20% of the claims were brought for misjudgments while the rest were brought for faulty execution. Thus, while 37,805 claims were brought for failed diagnose—probably more judgment than execution claims—most of the rest were brought for various types of faulty execution. Thus 16,356 claims were brought for delay in treatment, 3,286 for failed monitoring, 3,943 for failed performance of a procedure, 12,275 for improper management, 28,931 for improper performance, 857 for improper use of equipment, 2054 for administering treatment on a wrong body part, 1562 for administering wrong dosage of medication and 1,913 for administering wrong medication.

[18] These are the official instructions for jury approved by the Judicial Council.

[19] Public Use Data File (computer file): http://www.npdb-hipdb.com/publicdata.html.

C. The "Business Judgment Rule"

When corporate directors make bad decisions that lower the value of the company's shares, stockholders sometimes sue to hold them liable. As formulated in *Smith v. Van Gorkom* the business judgment rule prohibits courts in such cases from second-guessing directors' substantive decisions.[20] Instead, courts may consider only the quality of the directors' decision-making *process*, especially the information that they gathered before deciding.[21] Thus a director who prepares to make a business decision, decides in good faith, and makes the wrong choice in the circumstances, escapes liability to stockholders for harm that the right decision would have avoided. To recover damages, the plaintiff must prove that the defendant's bad judgment caused the harm, and also prove that the defendant was negligent in preparing to make the decision.

In our language, the bad decision is first order behavior, and preparation to decide is second order behavior. The business judgment rule thus allows a defense of second order reasonableness for an unreasonable first order behavior, even if the latter results from a lapse. The second order defense is available even for clear mistakes.[22]

D. Products Liability

Quality control reduces the frequency of defective products in manufacturing, but it is not perfect. Thus a soft drink bottler must monitor the process of filling bottles to

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[20] Smith v. Van Gorkom, 488 A.2d 858, 872 (Del. 1985). For a discussion, see Stout, L.A. and M.M. Blair, *Truth, Trustworthiness, and the Behavioral Foundations of Corporate Law* 149 U. PENNSYLVANIA L. REV. 1735 (2001). The business judgment rule is considered to be the main reason for the rarity of court decisions imposing liability on directors: *see* Brian R. Cheffins & Bernard S. Black, *Outside Director Liability Across Countries*, 84 TEX. L. REV. 1385, 1395 (2006). The rule was adopted by most states including Delaware: DENNIS J. BLOCK, NANCY E. BARTON & STEPHEN A. RADIN, THE BUSINESS JUDGMENT RULE 20-24 (5th ed. 1998).

[21] Tthe business judgment rule has various formulations. A leading book phrased it: "the [business judgment rule's] terms are far less important than the fact that there is special deferential approach." FRANK H. EASTERBROOK & DANIAL FISCHEL, THE ECONOMIC STRUCTURE OF CORPORATE LAW 93 (1991).

[22] "The rule is simply that the business judgment of the directors will not be challenged or overturned by courts or shareholders, and the directors will not be held liable for the consequences of their exercise of business judgment – *even for judgments that appear to have been clear mistakes* – unless certain exceptions apply." (Emphasis added). ROBERT C. CLARK, CORPORATE LAW 123 (1986). The main justification for the business judgment rule is that shareholders prefer a lenient standard of liability for their directors, believing it serves their goals. Many corporations adopted exemptions from the duty of care to their directors. *See* J.M. Karpoff & M.G. Danielson, *On the Uses of Corporate Governance Provisions*, 4 J. CORP. FIN. 347 (1998). (Check).

avoid using cracked bottles or overcharging them with gas. The more the bottler spends on quality control, the lower the probability that it sells a defective bottle to a consumer, but some defective products inevitably slip through. The history of the law of defective consumer products, as we will show, is a change from a second order negligence rule to a first order negligence rule.[23]

At the beginning of the 20th century, the common law imposed a negligence rule on manufacturers for harm caused by defective products. Under this rule, the injured consumer had the burden of proving that a defect in the product caused his harm, and that the manufacturer's negligence caused the defect. Proving manufacturer's negligence often involved proving that quality control was unreasonable.[24] (We do not discuss design defects.[25]) We restate this liability rule in our terminology. Manufacturing a defective item occasionally is a lapse. Quality control reduces the probability of a lapse. So the consumer product injury rule at the beginning of the 20th century was liability for lapses in manufacturing caused by unreasonable second order behavior. Since unreasonable second order behavior is necessary for liability, we call this rule "second order negligence."

Consumers seldom had enough evidence about manufacturer's quality control to meet this burden of proof. To allow more recoveries by injured consumers, American courts in the early 20th century applied the doctrine of *res ipsa loquitur*. In fact, this doctrine reversed the burden of proof about quality control. According to this doctrine the court is allowed to infer the defendant's negligence if the specific accident belongs to a type of accident that regularly results from negligence, and if two more conditions are satisfied.[26] In the context of product liability, when the consumer showed that he was

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[23] Note that this paper commends a change in the opposite direction for some kinds of accidents. *See infra*.

[24] *See* J.A. Henderson & T. Eisenberg, "The Quiet Revolution in Products Liability: An Empirical Study of Legal Change" 37 UCLA L. Rev. 479, *** (1990); RICHARD EPSTEIN, TORTS 386-94 (1999).

[25] Imperfect quality control causes a few items in a manufacturing process to fall short of the design that the others satisfy. In contrast, a defect in design affects all items manufactured according to that design. Manufacturing and design defects require a separate analysis in the law of torts. This article discusses the former and not the latter. For a discussion of the distinction, see Epstein, supra note, at 406-8; ROBERT COOTER AND THOMAS ULEN, LAW AND ECONOMICS 403-6 (5th ed., 2007).

[26] The other two conditions are that the event was caused by an agency or instrumentality within the exclusive control of the defendant; and that it was not due to any voluntary action or contribution on the

injured by a defective product, the manufacturer could only defend by proving that its quality control satisfied the legal standard.[27] Thus the original liability rule required the plaintiff to prove second order unreasonableness to establish liability, and the revised rule required the defendant to prove second order reasonableness to escape liability.

The doctrine of *res ipsa loquitur* was an intermediate step towards the rule of strict liability for consumer product injuries. When courts took the last step and adopted the rule of strict liability for consumer product injuries, they eliminated the manufacturer's right to defend itself by showing reasonable quality control. If a product is unreasonably dangerous, the manufacturer is strictly liability for the harm the defect causes to consumers, and no amount of quality control excuses the manufacturer.[28]

Notice that in our analysis of lapses, the rule of strict liability for consumer product injuries resembles the prevailing rule of negligence in everyday accidents.[29] Under the rule called "strict liability," a manufacturer is liable for harm caused by a lapse in manufacturing, with no defense of reasonable second order behavior allowed. Under the rule called "negligence," an ordinary person is liable for harm caused by a lapse in everyday behavior, with no defense of reasonable second order behavior allowed. Modeling precaution probabilistically makes the rules identical. Quality control is probabilistic precaution in manufacturing, and self-monitoring is probabilistic precaution in everyday life. Given probabilistic precaution, the crucial question is whether or not a liability rule allows a defense of second order reasonableness, not whether the rule is named "strict liability" or "negligence." (Later we discuss a difference between the failure of a machine and a lapse by a person.[30])

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part of the plaintiff. See Epstein, *supra* note, at 172; Ariel Porat & Alex Stein, Tort Liability under Uncertainty 84-92 (Oxford, 2001).

[27] Richenbacher v. California Packing Corp., 145 N.E. 281 (Mass. 1924); Escola v. Coca Cola Bottling Co. 150 P. 2d 436 (Cal. 1944).

[28] See Greenman v. Yuba Power Products, Inc., 377 P. 2d 897 (Cal. 1962); Epstein, *supra* note, at 389-94; Henderson & Eisenberg, *supra* note, at ***.

[29] As we have explained we focus on products liability for manufacturing defects: *supra* note. With design defects the distinction between first and second order negligence disappears.

[30] *Infra*.

E. Violating Statutory Duties

Many jurisdictions recognize what we term a second order defense for violations of statutory duties. In those jurisdictions, a breach of statutory duty that results in harm creates a presumption that the defendant was negligent. The defendant, however, is entitled to rebut this presumption by showing that he behaved reasonably. Many courts maintain that an actor is excused for violating a statute when he shows that "he did what might reasonably be expected of a person of ordinary prudence, acting under similar circumstances, who desired to comply with the law."[31] In the case where a lapse causes the breach of the statutory duty, proof of second-order reasonableness may provide a sufficient defense against liability.

The case of *Waugh v. Traxler*, decided by the Supreme Court of Appeals of West Virginia, illustrates our point.[32] In this case the defendant's vehicle crossed the center line of an icy roadway and struck the plaintiffs' oncoming vehicle. The defendant violated traffic regulations by losing control of her car and driving in the wrong lane. Notwithstanding, the jury found that the defendant was not negligent. The Court of Appeal maintained that "the undisputed facts indicate a violation of the statute," but they only create a "rebuttable prima facie presumption of negligence." The presumption of negligence was rebutted mostly by the reasonableness of the defendant's second order behavior:

> "[T]he [defendant] offered evidence of her recognition of the hazardous conditions and her attempts to prevent the accident. She departed for work especially early… because she realized that the roads were hazardous. She further testified that she was fully aware of the hazardous conditions and had exercised extreme caution in the operation of her vehicle. She also directs attention to the testimony of State Police Trooper… to the effect that even he was unable to

[31] Alarid v. Vanier 50 Cal. 2d 617, 624, 327 P. 2d 897 (1958); Witham v. Norfolk & Western Ry. Co., 561 N.E.2d 484 (Ind. 1990) (a motorist was injured when his automobile was struck by a train. The court held ***; Leikin v. Wilson, 445 A.2d 993 (D.C. App. 1982) (The defendant's brakes were defective, in violation of statute, and the brake failure caused the accident. Since the defendant neither knew nor reasonably could have known that the brakes were defective the District of Columbia Court of Appeals affirmed the decision of the lower court that the defendant was not negligent, stating that the evidence supported a finding that the defendant had effectively rebutted the presumption of negligence. Id. at 1002). *See* also Restatement 2d Torts §288A (***); Dobbs, *supra* note, §140, at 330.

[32] Waugh v. Traxler, 186 W. Va. 355, 412 S.E. 2d 756 (1991).

> appreciate the full extent of the icy conditions until he stepped out of his vehicle and attempted to walk on the road. She explained that she was exercising caution in driving but was unable to avoid the accident due to the icy conditions."

In other cases, courts have exempted defendants from liability for violation of statutory duties if the injurer did not know, and could not reasonably discover, that his act violated a statute.[33]

F. Defamation

Under defamation law, a plaintiff must prove injury from the defendant's false assertion. The false assertion can be regarded as first order behavior. This proof, however, is not enough for liability. Thus communication errors, erroneous deductions, incorrect inferences, and ambiguous articulations are not enough for liability.[34] In addition, a plaintiff who is a private individual must establish that the defendant was negligent.[35] The relevant kind of negligence often involves failure to make reasonable effort to check information and verify its truth, which can be regarded as second order behavior.[36] Thus the required negligence under defamation law is typically second order,

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[33] Restatement 2d Torts §288A(2)(b) (***). But the injurer will not be excused if the statute requires investigation and knowledge. *See* Smith v. Owen 841 S.W. 2d 828 (Tenn. App. 1992); Dobbs, *supra* note, §140, at 330. The same is true if the statute is interpreted to impose strict liability. See Dobbs, ibid., §141, at 331-2.

[34] Dobbs, *supra* note, §419, at 1182. Even partial erroneous facts are often not enough for liability. Prosser and Keeton say that it is sufficient to show that the charge or imputation is "substantially true, or as it is often put, to justify the 'gist', the 'sting' or the 'substantial truth' of the defamation (Prosser and Keeton on The Law of Torts 842 (5th ed. 1984). See also Campbell v. Quad City Times; Hovey v. Iowa State Daily Publication; in Casteel v. News-Record Inc. the Court concluded that "the ordinary and obvious meaning of *fair* does not require that the report be true or accurate… What is required for the privilege to apply is that the report have qualities of impartiality and honesty, and be free from prejudice, favoritism and self-interest."
On the other hand, in Schiavone Construction Co. v. Time, Inc. it was decided that "[a] report that intentionally excludes information that is… obviously exculpatory… simply cannot, under any definition, be deemed either fair or accurate."

[35] *See* Gertz v. Robert Welch, Inc. 418 U.S. 323 (1974) (deciding that so long as the states do not impose liability without fault, they may define for themselves the appropriate standard of liability for a publisher or broadcaster of defamatory falsehood injurious to a private individual). A different rule applies to public officials or public figures under the Supreme Court decision of New York Times v. Sullivan, 376 U.S. 254 (1964), according to which liability for defamation is conditioned upon the defendant being guilty of publishing a knowing or reckless falsehood.

[36] See Dobbs, *supra* note, § 419, at 1182. Cooter formulated the gathering of information to support an assertion as an optimal problem. In this framework, negligence consists in stopping too soon. See ROBERT COOTER, THE STRATEGIC CONSTITUTION 324-331 (Princeton University Press, 2000), and Oren Bar-Gill

not first order.[37]

II. Model of Lapses

This section formulates our model of lapses. x_1 indicates first order behavior (precaution), which is a random variable. x_2 indicates second order behavior (e.g. preparation and self-monitoring). $p(x_1|x_2)$ indicates the probability density function for first order behavior, conditional on second order behavior. x_1^* indicates the legal standard for precaution x_1. If an accident occurs when $x_1<x_1^*$, and the accident would not have occurred if $x_1 \geq x_1^*$, then the actor's negligence caused the accident. We call this event a "negligent lapse." By definition, a *first order negligence rule* holds the actor liable for negligent lapses.

The graph in Figure 1 illustrates a first order negligence rule. The shaded area in Figure 1 depicts the probability of liability, which equals the cumulative probability: $P(x_1^*|x_2) = \int_0^{x1^*} p(x_1|x_2)\, dx_1$.

Figure 1: Probability of a Negligent Lapse

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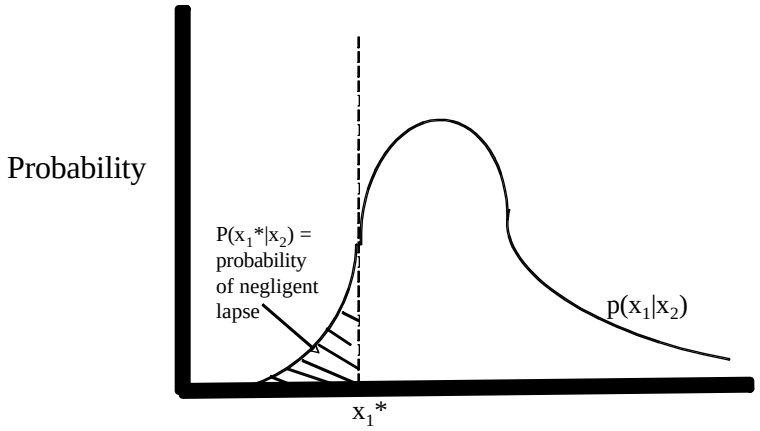
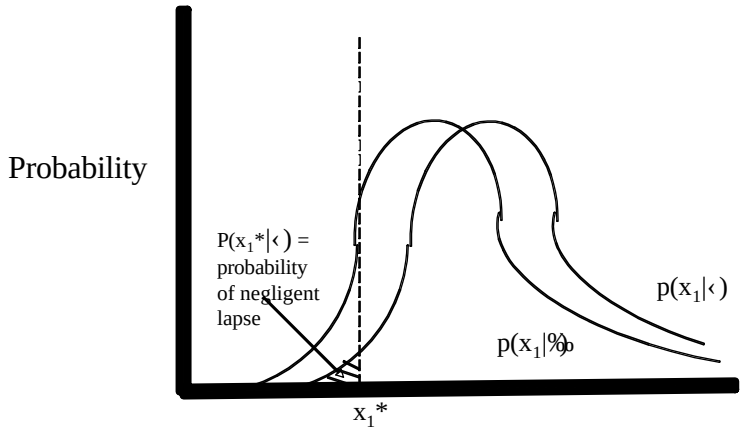
and Assaf Hamdani, "Optimal Liability for Libel," 2(1) CONTRIBUTIONS TO ECONOMIC ANALYSIS & POLICY, Article 6 (2003).

[37] In *Walker v. Colorado Springs Sun*, 188 Colo. 86., plaintiffs brought a libel suit against a newspaper, an editor, and a reporter. The court held that when a defamatory statement was published concerning one who was not a public official or a public figure, but the matter involved was of public or general concern, the publisher would be liable to the person defamed only if he knew that the statement was false or if he made the statement with reckless disregard of whether it was true or not. The court determined that "a simple negligence rule would cast such a chilling effect upon the news media that it would print insufficient facts in order to protect itself against libel actions". Id. In St. Amant v. Thompson, 390 U.S. 727, the Supreme Court held that "reckless conduct is not measured by whether a reasonably prudent man would have published, or would have investigated before publishing. There must be sufficient evidence to permit the conclusion that the defendant in fact entertained serious doubts as to the truth of his publication."



Now we depict how second order behavior affects liability. Let x_2 indicate second order behavior (preparation and self-monitoring). An increase in x_2 from a relatively low value denoted ã to a relatively high value denoted â causes the probability density function to shift to the right, as depicted in Figure 2. The shift causes the probability of a negligent lapse to fall as indicated by the decrease in size of the shaded area. Liability under a first order negligence rule thus falls from the large shaded area in Figure 1 to the small shaded area in Figure 2.

Figure 2: Shift in Probability of a Negligent Lapse

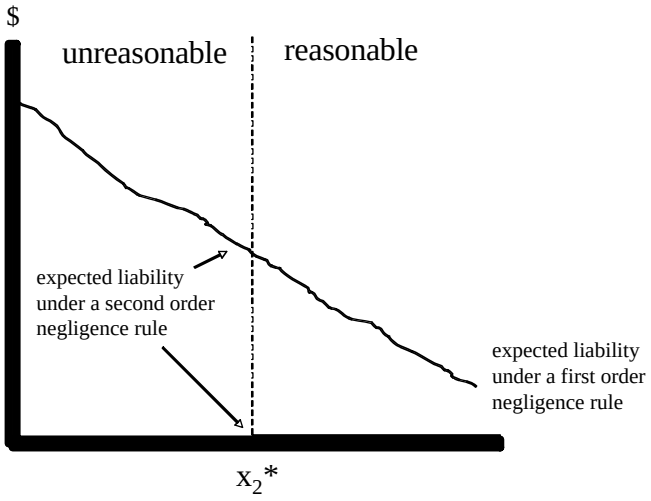


Now consider the possibility that, instead of a first order negligence rule, the law allows a defense of second order reasonableness. x_2* indicates the legal standard for second order behavior. The actor has a defense if $x_2 \geq x_2$*, and the actor has no defense if $x_2 < x_2$*. To illustrate by the figure, assume that â$< x_2 * \leq$ ã. Under this assumption, the increase in precaution from â to ã depicted in Figure 2 provides a defense, so the actor is not liable. He no longer bears the cost represented by the small shaded area in Figure 2.

Building on the previous graphs, we show in one figure how second order behavior changes liability for lapses under our two different liability rules. With no defense of second order reasonableness allowed, expected liability decreases steadily as second order behavior increases, as depicted by the line that slopes down in Figure 3. With a defense of second order reasonableness allowed, expected liability steadily decreases as second order behavior increases up to the legal standard of reasonable behavior. But when second order behavior crosses the boundary from unreasonable to reasonable, expected liability falls sharply. Allowing a defense of second order reasonableness causes a discontinuous break in expected liability at the legal standard

x_2*. In the ideal case where the court has perfect information on second order behavior, expected liability falls to zero, as depicted in Figure 3.

Figure 3: Expected Liability



The discontinuous break in expected liability at x_2* characterizes tort law in fact. Special legal institutions, however, could smooth the discontinuity in principle. Figure 3 represents second order reasonableness as a full defense. Instead, second order reasonableness could be a partial defense. By "partial," we mean that the defense could reduce liability by less than 100%. The reduction in liability could be a continuous function of second order behavior x_2. Thus liability could equal 0% of the harm caused by first order negligence when second order behavior almost equals the legal standard ($x_2 \approx x_2$*), and liability could rise to 100% as second order behavior falls far short of the legal standard ($x_2 << x_2$*). In general, a partial defense relies on refining the doctrine of causation to distinguish between the systematic and random components of a probabilistic event, which courts apparently do not do in fact.[38]

[38] The systematic effect of second order behavior on first order behavior refers to the expected effect. Thus more self-monitoring reduces the probability of a lapse. The random component refers to the difference between the expected effect and the actual result in a particular case. A partial defense makes liability equal to the systematic effect of unreasonable behavior, *e.g.* the increase in expected harm from more lapses due

The discontinuous break in expected liability at x_2* tends to stabilize the actor's second order behavior. The actor is almost certain to satisfy the standard of reasonable second order behavior in order to enjoy the abrupt fall in expected liability. After liability falls to zero, however, the actor has little incentive to increase his second order behavior. Thus an increase in the legal standard of first order behavior x_1* causes the expected liability curve to shift up in Figure 3. As long as the legal standard of second order behavior x_2* remains unchanged, however, the actor will not change second order behavior x_2 in response. By changing the legal standard x_2*, the legal system can induce a change in second order behavior x_2.

Conversely, if liability law does not allow a defense of second order reasonableness, the actor's second order behavior responds to small changes in the legal standard for first order behavior x_1*. Thus an increase in the legal standard of first order behavior x_1* causes actor to reduce his expected liability by increasing x_2.

Now we can state our first conclusion. Under the prevailing tort rule, actors are liable for accidents caused by lapses in their first order precaution. We assume that first order behavior is probabilistic and second order behavior affects the probability. If the defense of second order reasonableness is *not* allowed, the law can change the incentives for second order behavior by changing the legal standard of first order behavior. If the defense of second order reasonableness *is* allowed, the law can change the incentives for second order behavior by changing the legal standard of second order behavior. Given a complete defense of second order reasonableness, the expected liability of the injurer who complies with the standard of second order negligence remains zero regardless of the standard of first order negligence. So a rule allowing a defense of second order

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to the shortfall of actual self-monitoring from the legal standard. A legal doctrine that could supply a partial defense is probabilistic recovery. We discuss this possibility *infra*.

The discontinuity of liability under rule of negligence and its behavioral consequences were originally explained in Robert Cooter, *Economic Analysis of Punitive Damages*, 56 U.S. CAL. L. REV. 79 (1982). Cooter later explained that the discontinuity is due to incomplete information by the courts. *See* Robert Cooter, *Punitive Damages for Deterrence: When and How Much?* 40 ALABAMA L. REV. 1143 (1989). Grady argued against Cooter that courts would not actually hold injurers liable for more harm than they actually caused by negligently untaken precautions. *See* Mark F. Grady, *A New Positive Economic Theory of Negligence*, 92 YALE L.J. 799 (1983). *See also* Marcel Kahan, *On Causation and Incentives to Take Care under the Negligence Rule*, 18 J. LEG. STUD. 427 (1989); Richard Craswell, *Deterrence and Uncertain Legal Standards*, J. L. ECON. ORG. 279, 295-7 (1986) (advocating liability for incremental damages which is the difference between the social losses inflicted by injurers' activity and the social losses that would have been inflicted had they complied with the legal standard).

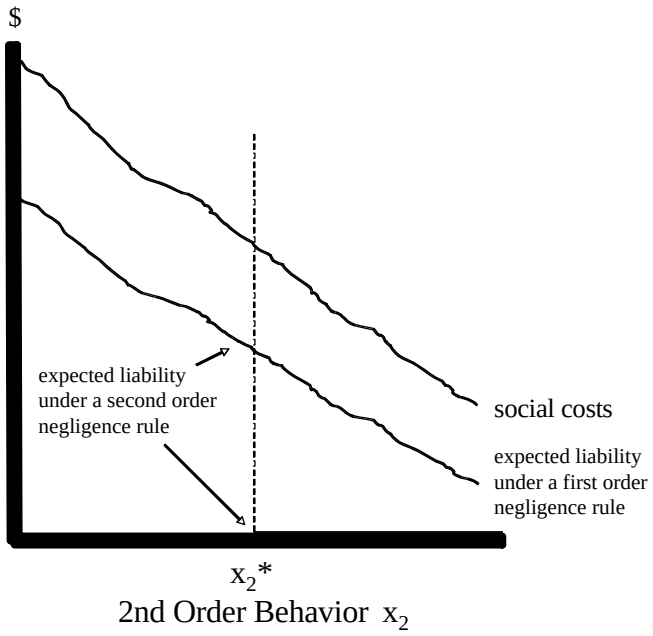
negligence makes the injurer unresponsive to the legal standard of first order negligence.[39]

III. Negative and Positive Externalities

In order to reach some normative conclusions, we now turn from analyzing the actor's liability costs to analyzing social costs. Under a first order negligence rule, the actor escapes liability whenever his first order behavior satisfies the legal standard of precaution. First order behavior is probabilistic, so the actor sometimes escapes liability. When the actor escapes liability, the harm from the accident is not a private cost of the actor, but it is a social cost. So the expected social harm from accidents exceeds the actor's expected liability. To depict this fact, we add a new line to Figure 3 indicating the social cost, which gives Figure 4. The social cost in Figure 4 lies above the actor's liability, and the gap between these two lines represents the actor's externalization of social costs.

[39] A more complete model would acknowledge that mounting a defense of second order negligence could be expensive, so injurer would want to avoid litigation costs. Given litigation costs, an increase in the standard of first order precaution could cause potential injurers to increase their second order precaution and exceed the legal standard.

Figure 4: Social Harm and Expected Liability



The gap would disappear, indicating the internalization of social costs, if the law eliminated the defense of first and second order reasonableness. If the law does not allow a defense of first or second order reasonableness, then liability is strict. Instead of considering strict liability, we are focusing on the conventional negligence rule, which allows the defense of first order negligence and opens a gap between social harm and liability. Allowing the additional defense of second order reasonableness widens the gap in the region where $x_2 \geq x_2^*$. As indicated in Figure 4, the gap representing externalized costs is very large near the standard of reasonable behavior x_2^*.[40]

We have explained that a defense of second order reasonableness externalizes social costs. This fact, however, need not cause second order behavior to depart from the social optimum.[41] Appropriate choice of the legal standard for second order precaution can induce socially optimal second order behavior in spite of external costs.

The same cannot be said of activity level. Allowing the defense of second order

[40] In the region where $x_2 < x_2^*$, the actor has no defense in fact, so the gap between social harm and liability is the same regardless of whether or not the law allows this defense.
[41] Bear in mind that second order behavior is the only way to affect probabilistic first order behavior.

reasonableness reduces the expected cost of engaging in the activity while taking reasonable precaution. Consequently, more people engage in the activity, they have more lapses, and the lapses cause more injuries. A well-known result in the economic analysis of tort law is that strict liability causes efficient activity level by internalizing the cost of accidental harm, whereas a negligence rule causes excessive activity level by externalizing the cost of accidental harm.

We have explained the familiar proposition that a rule of strict liability makes the injurer internalize the cost of accidents, which provides efficient incentives for injurer's precaution and activity level. A liability rule approaches this ideal more closely as defenses are removed from the defendant. Removing the defense of second order reasonableness makes the rule of liability for lapses approach strict liability more closely. So, according to this argument, removing the defense of second order reasonableness is desirable in order to make the actor internalize more external costs.

Activities like driving in Example 1 externalize social costs, but some activities like practicing medicine in Example 2 externalize social benefits. Doctors benefit patients and some of the benefits are not captured by prices.[42] Doctors also create benefits to third parties who do not pay for them.[43] To represent this fact graphically, we

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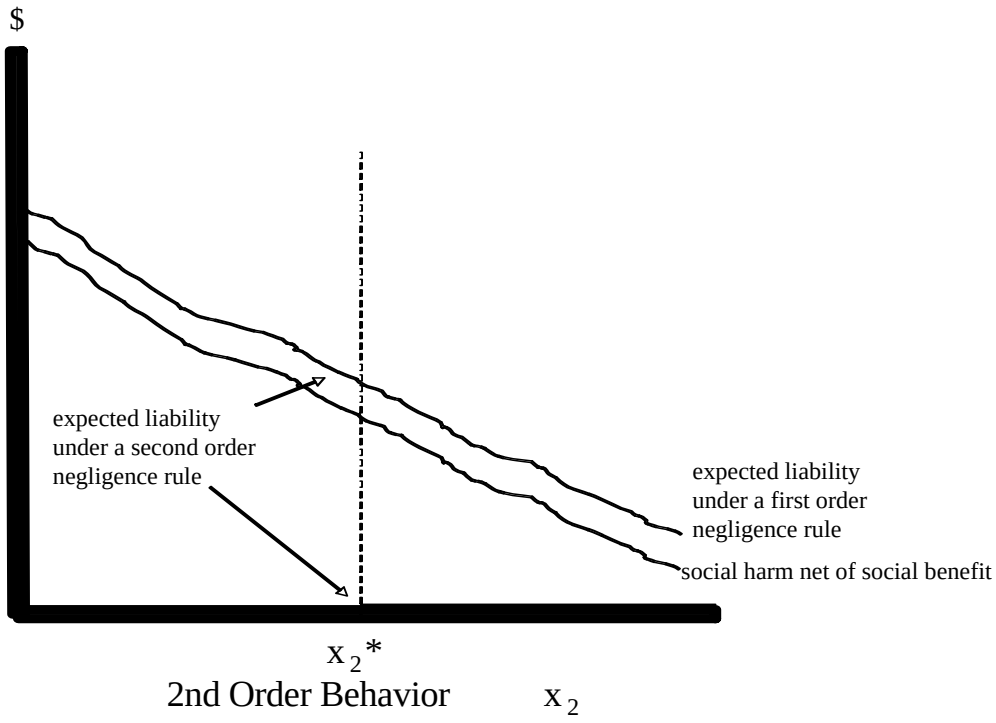
[42] *See* David S. Bloch & William R. Nelson Jr., *Defining 'Health': Three Visions and their Ramifications*, 1 *DEPAUL J. HEALTH CARE L.* 723, 731 (1997) ("Commentators who consider health a non-marketable good contend that there are elements of health which, though valuable, are unquantifiable, such as hope, compassion, and the extension and preservation of life … Health's social benefits are not fully realized by the market price it commands"). T.R Marmor, Richard Boyer & Julie Greenberg, *Medical Care and Procompetitive Reform*, 34 VAND. L. REV. 1003, 1009 (1981) ("Improved health, the anticipated outcome of medical care, has positive externalities. This makes medical care a merit good, and, unlike many other economic goods, one that should not be allocated solely on the basis of ability to pay"). Stuart Rome, *Medicine and Public Policy: Let Us Look Before We Leap Again*, 41 MD. L. REV. 46, 48 (1981). See also Maja Campbell-Eaton, *Antitrust and Certificate of Need: A Doubtful Prognosis*, 69 IOWA L. REV. 1451, 1459 (1984). ("Moreover, health care usually is viewed as a "merit good," with benefits extending beyond its economic value. This view is reinforced by the ethical mandates of the health professions and by a widespread belief that "more is better" in the provision of medical services").
On the inability of doctors to pass higher insurance costs along to patients, *see* Peter Eisler, Julie Appleby & Martin Kasindorf, *Hype Outraces Facts in Malpractice Debate*, USA Today (3/5/2003), available at: http://www.usatoday.com/news/nation/2003-03-04-malpractice-cover_x.htm. (Claiming that the cause of this inability is the limitations on reimbursements made by managed care insurers, Medicare and Medicaid).

[43] *Ibid*. See also Robert Cooter & Ariel Porat, *Liability Externalities and Mandatory Choices: Should Doctors Pay Less?* 1 JOURNAL OF TORT LAW (Issue 1) (2006).

must subtract the external benefit of the activity of doctoring from the external cost[44] to get the net external cost. Subtracting the benefit fact reverses the height of the two lines in Figure 4. Thus the net external cost line in Figure 5 lies *below* the liability line.

Figure 5: Social Benefit and Expected Liability



The contrast between Figures 4 and 5 suggests a reason for allowing or disallowing a defense of second order reasonableness. In our view, the law tends to allow the defense of second order reasonableness for activities that convey unpriced benefits on others. Since external effects are beneficial, the law should encourage doctoring. Conversely, the law tends to disallow the defense of second order reasonableness for

[44] We endorse the view that positive externalities exceed the negative externalities. *See* Cooter & Porat, Liability Externalities, *supra* note. For the argument that medical practice has negative externalities due to the fact that many patients who sustained injury as a result of negligence do not sue, *see* Tom Baker, THE MEDICAL MALPRACTICE MYTH (2005). For the argument that many patients do not bring suits and for the reasons for that, *see* Hyman & Silver, *supra* note.

activities that convey unpriced costs on others. Since external effects are harmful, the law should discourage driving.

The difference between external costs and benefits can justify at least one of the "pockets" of second order negligence discussed in the previous part of the paper. Journalists risk defamation when they write stories about public figures and others, but they also distribute information to the public whose value exceeds its market price. These positive externalities justify reducing the liability burden on the activity of journalists by replacing a first order negligence rule with a second order negligence rule. In contrast, manufacturers are expected to internalize most (or even all) of the marginal benefits of their products.[45] Therefore it makes sense to increase the liability burden on manufacturing by not allowing second order defenses.

We have argued that the law tends to impose first order negligence for lapses that harm others, and the law tends to allow a defense of second order reasonableness for activities with positive externalities. The general tendency is sound but not entirely reliable. Judges, it seems, can easily see the potential harm from holding a doctor liable for a lapse in judgment during an operation, so judges allow a defense of second order reasonableness. Judges, however, apparently have more difficulty seeing the potential harm from holding a doctor liable for a lapse in executing a medical procedure, so judges do not allow a defense of second order reasonableness. In either case, disallowing the defense of second order reasonableness increases the burden of liability on a beneficial activity. In general, we believe that the defense of second order reasonableness should be more widely available when the underlying activities that benefit others.

IV. Substitution

Having discussed positive externalities, we turn to another justification for having a defense of second order reasonableness. Some forms of precaution are more susceptible to lapses than others. These precautions carry a relatively heavy burden of liability under

[45] For the argument the consumer surplus is externalized by manufacturers, see Israel Gilead, *Tort Law Internalization: The Gap Between Private Loss and Social Cost*, 17 INTERNATIONAL REVIEW OF LAW AND ECONOMICS 589 (1997).

a first order negligence rule with no defense of second order reasonableness. Rational actors respond by switching to forms of precaution that are less susceptible to lapses, even if less efficient.

To see why, compare two forms of second order precaution in a numerical example. Assume that performing the activity without any second order precaution causes accidental harm of 500. Precaution A reduces accidental harm by 200, so the remaining harm equals 300. If actor's lapses cause remaining harm of 300, the actor is liable for 300 under a first order negligence rule. The cost of Precaution A is 100. Thus the actor's total private cost, which equals the total cost of liability plus Precaution A, equals 400. The total social cost, which equals the cost of harm plus Precaution A, also equals 400,

Alternatively, compare these costs to second order Precaution B. Precaution B reduces accidental harm by 150, so the remaining harm equals 350. Assume that the remaining harm of 350 is *not* caused by the actor's lapses, so the actor's liability is nil under a first order negligence rule. The cost of Precaution B is 120. Thus the actor's total private cost, which equals the total cost of liability plus Precaution B, equals 120. The total social cost, which equals the cost of harm plus Precaution B, equals 470.

Comparing the two forms of precaution under a first order negligence rule, the injurer will choose precaution B where the social costs are higher, instead of precaution A where the social costs are lower. A first order negligence rule thus gives the actor an incentive to substitute Precaution B for Precaution A, even though the substitution is socially inefficient. Alternatively, allowing a defense of second order reasonableness should reverse the incentives. Assume that taking Precaution A is reasonable, and taking precaution B is also reasonable, so either form of precaution provides a defense.[46] When the actor has a defense of second order reasonableness, the actor's private cost equals the cost of precaution. Precaution A costs 100 and Precaution B costs 120, so the actor will choose Precaution A, which is also socially efficient.[47]

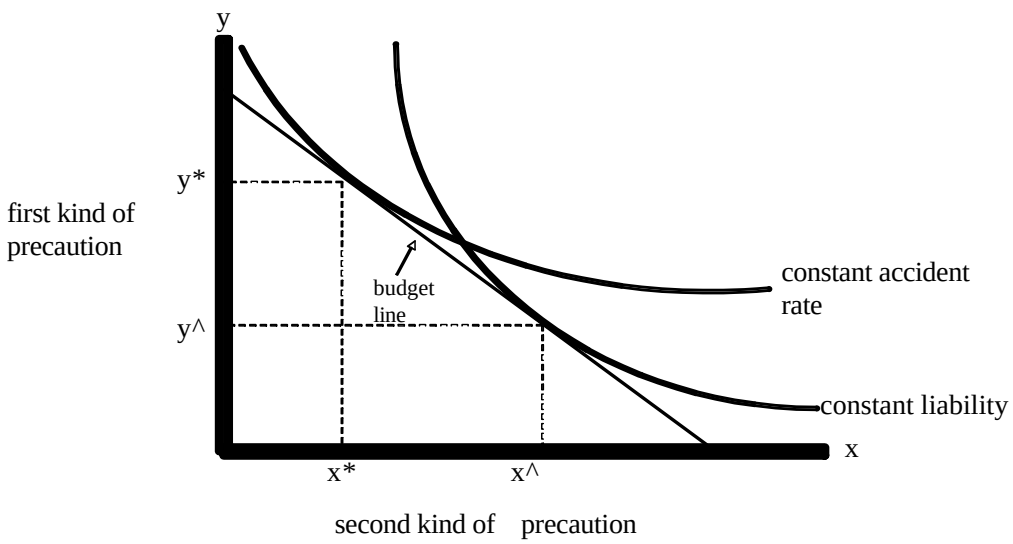
[46] Alternatively, a court could hold Precaution A is reasonable because it is socially efficient, and Precaution B is unreasonable because it is socially inefficient. Equating "reasonable" with "efficient" requires that courts have a lot of information on untaken precautions.

[47] The other way to restore efficient incentives, which we do not discuss here, is to impose strict liability for any harm resulting from the activity.

Figure 6 depicts this kind of substitution in a graph. The horizontal and vertical axes represent two different forms of precaution associated with an activity. The horizontal axis represents precautions that are more susceptible to lapses. In contrast, the vertical axis represents precautions that are less susceptible to lapses. Thus the horizontal axis might measure the number of people hired to check the quality of manufactured items, and the vertical axis might measure the number of machines used to check the quality of manufactured items. Or the horizontal axis might measure the hours of time that public accountants spend auditing the books, and the vertical axis might measure the hours of time that bookkeepers spend checking the books. Or the horizontal axis might measure the extent of due diligence for making decisions and the vertical axis might measure the extent of monitoring the execution of decisions.

The straight line in Figure 6 is the “budget line"—points of constant expenditure on the two forms of precaution. Moving down the budget line, the increase in expenditure on the activity measured horizontally exactly offsets the decrease in expenditure on the activity measured vertically. Thus moving down the budget line represents the substitution of expenditure on one form of self-monitoring for another, such as the substitution of capital for labor, or the substitution of expensive labor for inexpensive labor, or the substitution of due-diligence on decisions for monitoring the execution of decisions.

Figure 6: Socially Inefficient Substitution



The combination of the two forms of precaution determines the probability of an accident. The probability of an accident and the legal rule determined the actor's expected liability. The curved line labeled "constant liability" represents combinations of the two form of precaution that result in the same level of liability for a given legal rule. The point of tangency between the constant liability curve and the budget line, which occurs at (x^,y^), results in the actor's lowest liability for a given level of expenditure on precaution. A point with this characteristic minimizes the actor's total costs of precaution and liability.

The other curved line in Figure 6, labeled "constant accident rate," represents combinations of the two form of precaution that result in the same number of accidents.[48] The tangency of this curve and the budget line, which occurs as the point (x*,y*), is the point that results in the least number of accidents for a given level of expenditure on precaution. A point with this characteristic minimizes the social costs of precaution and

[48] To keep the analysis simple, we implicitly assume that each accident causes the same amount of social harm. Under this assumption, the curve that represents a constant accident rate also represents a constant level of social costs for accidents.

accidents, as required for the social efficiency.

Notice that the point (x^,y^), resulting in the actor's lowest liability is not the same as the point (x*,y*) resulting in the least number of accidents. Thus the actor has an incentive to choose a combination of the two forms of precaution that differs from the combination that minimizes social costs. This occurs under a first order negligence rule when a form of precaution that is less susceptible to lapses is inherently more dangerous per dollar spent on precaution than a form of precaution that is more susceptible to lapses. The next section gives concrete examples. The law should encourage the actor to use the forms of precaution that are socially more efficient. To do so, liability law should allow a defense of second order reasonableness. This defense removes liability for lapses by actors who take reasonable precaution against lapsing. The revised liability rule thus provides actors with an incentive to take reasonable precaution against lapsing, instead of providing them with an incentive to take precautions that are less susceptible to liability.

The substitution effect depicted in Figure 6 is not unique to lapses. Whenever liability law allows an actor to externalize part of the costs and benefits of his actions, there is a risk that the law will incentivize him to choose the more social costly of two alternatives.[49] Focusing on lapses, this paper has shown that a defense of second order reasonableness should be available when it prevents actors from switching to less effective forms of precaution. Next we discuss some concrete examples.

A. Capital vs. Labor

Under the rule of first order negligence, the driver in Example 1 might aim for 65 mph, in which case he will be liable for accidents caused by his lapses in speed. Alternatively, the driver might install cruise control, which presumably does not "lapse." With cruise control, the driver's liability for lapses in speed will be nil. The driver can

[49] Here are some causes of the substitution effect: First, sometimes one form of precaution is harder to verify in court than another. Second, under a negligence rule, the extent of the unavoidable losses for which the actor is not liable may differ for each form of precaution. Third, one choice sometimes creates positive externalities that are higher than those created by the other choice. See Cooter and Porat, Liability Externalities, *supra* note.

set the cruise control for 70 mph, which is the speed limit. Driving 70 mph with cruise control will have lower liability costs for lapses than driving 65 without cruise control. The former, however, may also result in more accidents than the latter.

Similarly, the following example illustrates that an organization can sometimes reduce its liability for lapses by performing a task with a machine instead of a person, even though the machine is more dangerous.

> **Example 3: Traffic Light and Policeman**. The municipality must decide whether to post a policeman in the intersection or to install a traffic light. Assume that a policeman is more flexible than the traffic lights in directing traffic at the intersection and therefore posting him is cost-justified. However, a policeman may be more susceptible to lapses than traffic lights are susceptible to defects.

First order negligence creates an incentive for the municipality to replace a policeman with traffic lights. The reason for this could be that a machine does not lapse, and even if lapses, a second order behavior defense can effectively be raised. Even if traffic lights occasionally fail to operate properly, the municipality can argue in court that there was no fault on its part.

The choice between labor and capital, or manpower and machines, often occurs in settings involving accidents. Employers must decide whether to reduce risks to employees in the workplace by using safer machines or imposing safer work rules on employees. Hospitals and other providers of medical services must decide whether to monitor their patients' condition by sophisticated equipment or by their medical stuff. Airport authorities and airlines must decide whether to promote passengers' safety by new technologies or posting guards. Lastly, drivers must decide whether to rely on devices like cruise controls or human skills. In those cases, technology is sometimes more effective in avoiding accidents than manpower is, and sometimes the opposite is true. Human sometimes lapse, machines sometimes fail, and accidents sometimes occur dues to no fault by human and no failure by machines. Liability law should not bias the

choice between human and machines just because only humans can lapse![50]

B. Susceptibility of Human Precautions to Lapses

A second form of substitution is between human precautions that are less susceptible to lapses and human precautions that are more susceptible to lapses. The following example illustrates such substitution.

> **Example 4: Deliveries of Babies.** Assume that doctors are much more likely to lapse in executing a vaginal delivery than in executing a caesarian delivery. Also assume courts cannot verify *ex post* whether the doctor's decision was right or wrong, so no liability attaches to the doctor's *decision* to deliver by caesarian, even when the decision was bad. Courts, however, can verify whether the doctor lapsed in executing the delivery, and also whether that lapse caused the injury.[51]

In Example 4, the prevailing negligence rule gives doctors an incentive to perform too many caesarian deliveries.[52] With vaginal delivery, lapses cause a substantial part of harms, and doctors are liable for lapses. This is so, even though a reasonable doctor lapses from time to time. These harms occur without second order negligence. In contrast, with cesarean delivery, according to Example 4, lapses do not cause most harms, so the doctor avoids liability. Under prevailing negligence law liability is not attached to unavoidable losses, as long as those losses are not the result of lapses.

To illustrate more concretely, assume that vaginal delivery harms the mother 1%

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[50] Interesting, Grady argued that new technologies result in higher standards of liability, so tort liability obstructs innovation and development. Our argument points out to an opposite influence. Mark Grady, *Why are People Negligent? Technology, Nondurable Precautions, and the Medical Malpractice Explosion*, 82 NW U. L. REV. 293 (1988).

[51] The distortions caused by tort law with respect to caesarian and vaginal birth are extensively analyzed by this paper's authors in Cooter & Porat, Liability Externalities, *supra* note. According to a report of the U.S. Department of Health and Human Services, one of the explanations for the increasing use of cesarean section in the United States concerns malpractice liability: "[i]n 1976, almost all questionnaires returned from 50 representative medical school department chairpersons, other professors, and obstetricians, mentioned malpractice suits as a factor in increased cesarean section rates." The report quotes Marieskind, who interviewed 100 physicians, and concluded that the threat of malpractice suits was the chief causal factor in the increased use of cesarean section. See also "Caesarean section on the rise", the Lancet November 18th 2000 ("[f]rom a defensive medicine perspective, US obstetricians seem to be viewing caesarean section as a safe option since the rate of caesarean section in that country, now 22% has nearly quadrupled over the past 20 years.")

[52] We assume that doctors cannot adjust their prices to account perfectly for the different liability risks of liability posed by each procedure.

of the time, and a lapse by the doctor is the cause in 75% of these cases. Thus vaginal delivery results in doctor's liability to the injured mother in 0.75% of cases. In contrast, assume that caesarian delivery harms the mother 2% of the time and a lapse by the doctor is the cause in 25% of these cases. Thus caesarian birth results in doctor's liability to the injured mother in 0.50% of cases.[53] According to these numbers, a first order negligence rules makes the accident risk for patients twice as great from caesarian birth as from vaginal birth, whereas the liability risk is for doctors is half as great from caesarian birth as from vaginal birth.[54]

A first order negligence rule creates a bias towards human precautions that are less susceptible to lapses in many activities. For example, because of this bias, there is a risk that organizations will bind their employees who engage in risky activities with detailed and burdensome rules. Such rules impose unreasonable costs to reduce the risk of lapses. Moreover, even if the detailed regulations leave no room for lapses, the risk created by the activity could increase. The following example illustrates this point.

> **Example 5. Regulation vs. Discretion.** The police department considers how to regulate policemen in various circumstances. Among other things, it can regulate policemen's behavior by a comprehensive set of specific rules. The police can apply these rules mechanically with few mistakes or lapses. Comprehensive rules reduce liability for lapses, and also make the police inflexible. Alternatively, the police department can provide police with general principles whose application often results in mistakes or lapses in judgment. General principles increase liability for lapses and make the police more flexible:

What will the police department do under the prevailing rule of negligence? It may wish

[53] For simplicity, we implicitly assume that the average harm from vaginal and caesarian deliveries is the same.

[54] In general, doctors are advised by risk management experts to choose procedures that reduce their liability potential, when the enhanced risk is not captured by prices. *See* Charles F. Fenton, III, David Edward Marcinko, *Risk Management in Modern Medical Practice*, in INSURANCE AND RISK MANAGEMENT STRATEGIES 107 (Jones and Bartlett Publishers, David E. Marcinko ed., 2005): "[Physicians] should evaluate their own practice and identify those procedures and those patient types that carry a high risk of malpractice for which the physician is not adequately reimbursed. Physicians then should tailor their practice so that they no longer provide those services. The revenue lost will be worth the risk of the malpractice suit and the collateral consequences". Id. 133.

to decrease its liability risks at he cost of a decrease in effectiveness.

C. Execution vs. Judgment

A third form of substitution is between judgments and executions. In some fields discussed in Part I of the paper, liability attaches to faulty execution more than to faulty judgment. In these circumstances, actors have an incentive to choose the precautions least susceptible to lapses in execution and more susceptible to lapses in judgment, even when the latter are less efficient than the former. Example 6 illustrates such a case.

> **Example 6. Treating Cancer**. Hospital X must adopt procedure A or procedure B for treating a type of cancer. Procedure A involves more execution than judgment and procedure B involves more judgment than execution. The *choice* between the procedures as such will not be considered negligence, because courts are unwilling to "second guess" the hospital's choice.

Courts, it seems, are less willing to impose liability for a lapse in judgment than for a lapse in execution.[55] If the hospital cannot perfectly adjust prices for each procedure to reflect liability risks, a first order negligence rule may cause the hospital to prefer procedure B. Procedure B may lower liability costs, even though it may raise accident costs.

V. Constructing Second Order Negligence

Now we turn to problems of implementing a defense of second order reasonableness against liability for lapses. Implementing the defense encounters two difficulties, both related to information. The first difficulty concerns proving second order reasonableness or unreasonableness. It is hard to prove that the driver's self-monitoring in Example 1 was reasonable or unreasonable, or that the doctor in Example 2 made reasonable or unreasonable preparation for the operation, or the policeman who lapsed in directing traffic in Example 3 does so less or more often than a reasonable policeman. To answer such questions, the trier of facts should have information about the actors' lapses over a period of time, or alternatively, about the efforts he actually took at an earlier stage to decrease the probability or magnitude of his lapses.

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[55] *Supra*.

When proving second order reasonableness or negligence is difficult, the party with the burden of proof will usually lose. If the burden of proving second order negligence rests on the plaintiff, then plaintiffs will rarely win. If instead the rule assigns liability for first order negligence and allows the defense of second order reasonableness, then the plaintiff who proves defendant's first order negligence will usually win. The latter liability regime however, provides incentives for potential injurers to collect information on second order behavior and present it to courts. Thus cautious drivers may install recording devices to prove that they seldom speed, and they will use this information to defend themselves in court in the event that their lapse causes an accident. Similarly a law allowing a second order defense will encourage the doctor in Example 2 to document preparations for an operation. Since typically defendants can collect information with respect to their second order behavior better than plaintiffs, the second order reasonableness should be a defense, rather than second order negligence being part of the plaintiff's cause of action.

The second difficulty occurs when the court determines whether the defendant's second order unreasonableness causes the harm that materialized. Unreasonable second order behavior increases the *probability* of a lapse. Increasing the probability of an event, however, is less than causing it to occur. If unreasonable second order behavior causes the probability of a lapse to increase from 3% to 4%, it is still more likely than not that the harm would have occurred even if the actor's second-order precaution had been reasonable. Under these conditions, a simple application of the preponderance of the evidence rule will yield no liability. Second order negligence will often increase the probability of a lapse by less than 100%, so a real concern emerges that second order negligence will end up too often with no liability.

This causation problem has two obvious solutions. One solution is a presumption that if the defendant' second order behavior was unreasonable, and if an accident occurred, then the former causes the latter. Under this approach, the injurer who was second order negligent will be liable so long as his lapse is the cause of the accident. This solution is a practical one, and relatively easy to implement.

A second route is to recognize a principle of probabilistic recovery and to apply it to lapses. Under this solution, the driver in the previous example, whose second order negligence increased the probability of a lapse from 3% to 4%, would compensate the victim for 25% of his harm.[56] Probabilistic recovery raises many issues that we cannot discuss here.[57]

Finally, for cases of repeat harms, a rule of liability for excessive harm can be applied. By this rule, which we developed elsewhere,[58] an actor who caused m units of harm over a certain period of time, while only n units of harm would have been produced if the actor had behaved reasonably, should pay for the excessive harm, which is m-n. Instead of applying a rule of second order negligence on a case by case basis for each and every lapse of a doctor that caused harm, a rule of liability for excessive harm can be applied to hospitals on an annual basis. The excessive harm principle circumvents the difficulties in proving causation in each and every case where a lapse caused harm. Note, however, that the principle of excessive harm requires determining the level of reasonable harm, which we denoted "n." The optimal units of harm n is the amount resulting from a reasonable level of second order precaution. So liability for excessive harm can be viewed a variant of the rule of second order negligence.

The second order reasonableness defense raises two more issues that we mention here only briefly and leave for future research. The first issue relates to the *alternatives of reducing risks*: should a defendant be allowed to show that he took second order precautions that reduced risks much below the threshold of "reasonable risks", although he failed to reduce his level of lapses even further at his second order behavior? To illustrate, should a driver who lapsed and caused an accident be allowed to raise the argument that he installed in his car expensive safety devices which he was not obliged to install, thereby reducing risks dramatically, although given the existence of the devices his second order behavior was unreasonable?

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[56] In 1 out of 4 cases the lapse was caused by the second order negligence. The probability that the lapse in question is the one caused by the second order negligence is therefore 1/4.

[57] Porat & Stein, *supra* note, at 101-29.

[58] Robert Cooter & Ariel Porat, *Total Liability for Excessive Harm* 36 JOURNAL OF LEGAL STUDIES 63 (2007).

The second issue relates to *third parties' second order behavior*: should a doctor who lapsed due to fatigue and caused injury be allowed to show, that the hospital where he worked created the background conditions for his high level of lapses, for example by requiring him to work too many extra hours? If such an argument is allowed for the doctor, it will be essential to impose liability on the hospital, conditioned upon establishing its negligence.[59]

Conclusion

Lapses cause a high proportion of accidents, but they are under-theorized in liability law. To model lapses, we assume that actors do not choose an exact level of precaution. Instead, we assume that actors draw precaution from a probability distribution. We call the result of this draw "first order precaution" because it determines the probability of an accident. A lapse is a draw from the distribution's lower tail. The prevailing tort rule is liability for harm caused by a lapse that falls below the standard of reasonable care.

"Second order precaution" refers to behavior that shifts the probability distribution over first order precaution. This shift decreases the probability of a lapse, which decreases the probability of an accident. Thus first order precaution directly reduces the probability of an accident, whereas second order precaution indirectly reduces the probability of an accident by reducing the probability of a lapse. Preparation and self-monitoring are two general categories of second order behavior.

Under the prevailing tort rule, an actor is liable for the harm caused by a lapse, regardless of how much precaution he takes to avoid lapsing. However, liability law

[59] *Cf.* Mello & Studdert, *supra* note, who argue that instead on focusing on individual doctors' negligence, tort law should focus on institutions, and impose enterprise liability; and that systemic errors are major causes for most medical accidents even if typically combined with individual errors. The authors also suggest that "most promising opportunities for injury prevention lie at the organizational level", id 601, and that "system factors may underlie many physician errors in the sense that they create conditions in which human error is likely to occur and to go unnoticed until injury results." Id. 609. An analogous question relates to gatekeeper's liability: under what conditions it is desirable to impose liability on gatekeepers in addition, or instead of, the direct cause of the injury. This general question is beyond the scope of this paper. *See* Doug Lichtman and Eric Posner, *Holding Internet Service Providers Accountable*, 14 S. CT. ECON. REV. 221 (2006) (arguing for imposing liability on Internet Services Providers).

sometimes permits a defense of second order reasonableness. Courts are reluctant to second-guess decisions made in emergencies or judgments by experts who balance various considerations. Consequently, liability law sometimes considers a defense of second reasonableness for a lapse in judgment, but not for a lapse in skill when executing a decision.

The prevailing tort rule makes sense most of the time because courts usually cannot verify the reasonableness of second order behavior. The prevailing tort rule, however, burdens activities whose positive externalities benefit others, such as practicing medicine. We advocate extending the defense of second order reasonableness to such activities in order to reduce the burden of liability and encourage them. We also advocate allowing this defense when it prevents actors from substituting worse forms of precaution for better ones, as sometimes happens when machines substitute for people, or when activities requiring risky judgments substitute for activities requiring risky execution.