

# SAFETY VS. SENSITIVITY: POSSIBLE WORLDS AND THE LAW OF EVIDENCE

Michael S. Pardo\*

*The University of Alabama School of Law*

## ABSTRACT

This article defends the importance of epistemic safety for legal evidence. Drawing on discussions of sensitivity and safety in epistemology, the article explores how similar considerations apply to legal proof. In the legal context, sensitivity concerns whether a factual finding would be made if it were false, and safety concerns how easily a factual finding could be false. The article critiques recent claims about the importance of sensitivity for the law of evidence. In particular, this critique argues that sensitivity does not have much of an effect on the value of legal evidence and that it fails to explain legal doctrine. By contrast, safety affects the quality of legal evidence, and safety better explains central features of the law of evidence, including probative value, admissibility rules, and standards of proof.

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## I. INTRODUCTION

The evidence: a criminal defendant's confession. Here is one possibility—the defendant did in fact commit the crime. Here is another possibility—the defendant did not commit the crime and is confessing falsely. Assume that the confession is true. Here are some additional possibilities: the defendant is confessing voluntarily in order to take responsibility for the crime; the defendant is confessing truthfully because he was beaten by the police, or because he was threatened by the police, or because he was promised leniency, or to protect a co-conspirator. Now assume that the confession is

\*My thanks for helpful comments on previous drafts to Ron Allen, Mark Brandon, Scott Hershovitz, David Manley, Sarah Moss, Dennis Patterson, Meredith Render, Alex Stein, the participants at a seminar at the University of Michigan Philosophy Department, and the anonymous referees for this journal. My thanks also to Dean Brandon and the Alabama Law School Foundation for generous research support. Email: [mpardo@law.ua.edu](mailto:mpardo@law.ua.edu)

false. Here are some further possibilities: he is confessing falsely because he was beaten or threatened by the police; he is protecting the actual guilty person; he wants to please the officers; or he wants to go home. Each of the two initial possibilities (true confession or false confession) branches into an endless number of other possibilities, which themselves will divide into other countless possibilities. And on and on. Some of the possible differences may not matter (was the defendant's shirt green or blue?) and some will matter greatly (did the defendant hit the victim accidentally or on purpose?).

What is true of this single item of evidence is true for all evidence and for the process of legal proof *writ large*. A fundamental task of the law of evidence is to regulate how legal decision-makers move from the countless possible ways the world could have been (or could be) to particular findings about how the world actually was (or is or will be).<sup>1</sup> In this respect, law is similar to many other contexts—the sciences, medicine, history, and everyday life, to name just a few—in which evidence is used to draw conclusions about facts. Greater philosophical attention to the law's epistemological practices may thus help to illuminate various aspects of legal proof.<sup>2</sup> And, indeed, a wide array of recent scholarship has drawn on epistemology to explore the law of evidence.<sup>3</sup>

This article explores the relationships between legal evidence and two epistemic concepts: *safety* and *sensitivity*. Philosophical discussions of these concepts typically take place in the context of beliefs and whether they qualify as knowledge.<sup>4</sup> Similar considerations apply to legal evidence and factual

1. Many factual findings at trial concern past events, but the disputed facts at trial may also involve current or future events (for example, current injuries and future earnings).

2. Within epistemology, issues involving law typically fall under the domain of "social epistemology," which concerns, among other issues, transmission of knowledge and the use of evidence within social institutions. See generally Alvin I. Goldman, *A Guide to Social Epistemology*, in *SOCIAL EPISTEMOLOGY: ESSENTIAL READINGS* (Alvin Goldman & Dennis Whitcomb eds., 2011), at 11; Alvin Goldman & Thomas Blanchard, *Social Epistemology*, in *STANFORD ENCYCLOPEDIA OF PHILOSOPHY* (2015) (<https://plato.stanford.edu/entries/epistemology-social/>) ("Since evidence, confidence, reasonable doubt and so on are epistemological notions, these [legal] rules are of interest to the social epistemologist").

3. See, e.g., SUSAN HAACK, *EVIDENCE MATTERS: SCIENCE, PROOF, AND TRUTH IN THE LAW* (2014); HO HOCK LAI, *A PHILOSOPHY OF EVIDENCE LAW* (2008); LARRY LAUDAN, *TRUTH, ERROR, AND CRIMINAL LAW: AN ESSAY IN LEGAL EPISTEMOLOGY* (2006); ALEX STEIN, *FOUNDATIONS OF EVIDENCE LAW* (2005); Michael S. Pardo, *The Gettier Problem and Legal Proof*, 16 *LEGAL THEORY* 37 (2010); Michael S. Pardo & Ronald J. Allen, *Judicial Proof and the Best Explanation*, 27 *LAW & PHIL.* 223 (2008); Mike Redmayne, *Exploring the Proof Paradoxes*, 14 *LEGAL THEORY* 281, 299 (2008); Frederick Schauer, *In Defense of Rule-Based Evidence Law—And Epistemology Too*, 5 *EPISTEME* 295 (2008); Amalia Amaya, *Justification, Coherence, and Epistemic Responsibility in Fact-Finding*, 5 *EPISTEME* 306 (2008); Alvin I. Goldman, *Quasi-Objective Bayesianism and Legal Evidence*, 42 *JURIMETRICS J.* 237 (2002); Ronald J. Allen & Brian Leiter, *Naturalized Epistemology and the Law of Evidence*, 87 *VA. L. REV.* 1491 (2001); Scott Brewer, *Scientific Expert Testimony and Intellectual Due Process*, 107 *YALE L.J.* 1535 (1998). For an overview of the literature, see Hock Lai Ho, *The Legal Concept of Evidence*, in *STANFORD ENCYCLOPEDIA OF PHILOSOPHY* (2015) (<http://plato.stanford.edu/entries/evidence-legal/>).

4. On safety, see Ernest Sosa, *How to Defeat Opposition to Moore*, 13 *PHIL. PERSP.* 141, 142 (1999) ("S would believe that p only if it were so that p."). On sensitivity, see ROBERT NOZICK,

findings made in the context of legal proof.<sup>5</sup> Safety and sensitivity each concern different aspects of conditional relationships between evidence and underlying factual possibilities. Roughly, safety concerns how easily a factual finding (or a belief) could be false. Roughly, sensitivity concerns whether a factual finding would be made (or a belief held) if it were false.

We can illustrate and distinguish safety and sensitivity with the confession example above. Suppose a jury convicts based on the confession evidence. *Safety* concerns how easily the jury's finding could be erroneous.<sup>6</sup> This inquiry will depend on how easily it could be the case that there would be such evidence if the defendant were innocent.<sup>7</sup> If it could not easily be the case, then the finding is safe; if it could easily be the case, then the finding is unsafe. *Sensitivity*, by contrast, concerns whether the finding would be made if the defendant were innocent (regardless of how easy or difficult it would be for that possibility to obtain). This inquiry will depend on whether the evidence (and the finding) would change if the defendant were innocent.<sup>8</sup> At first blush, these concepts may appear to be substantially similar—but, for reasons explored below, neither condition entails the other and they may come apart in particular cases.<sup>9</sup> On one hand, it might be the case that the jury's finding is *unsafe* but *sensitive*. For example, the circumstances and context of the confession may be such that they tend to easily produce false confessions; nevertheless, it might be the case that if the defendant were innocent, he would not have confessed. On other hand, it might be the case that the finding is *safe* but *insensitive*. For example, there might be procedures in place to ensure that false confessions could not easily occur; nevertheless, the circumstances might be such that even if the defendant were innocent, he would have confessed anyway (perhaps to protect someone else).<sup>10</sup>

PHILOSOPHICAL EXPLANATIONS (1981), at 172 (“If p weren’t true, S wouldn’t believe that p.”). See also Duncan Pritchard, *Safety, Sensitivity, and Anti-Luck Epistemology*, in *THE OXFORD COMPANION TO SCEPTICISM* (John Greco ed., 2008). Consider my (true) belief that there is unread email in my inbox. If I could easily be mistaken about this, then my belief is *unsafe*. If I would believe this even if there were no unread email, then my belief is *insensitive*.

5. Although similar epistemological issues arise in the legal context, it is important to note that the law's interests and concerns diverge from some of those at issue in the related philosophical literature. For example, safety may play an important role for legal evidence regardless of whether it is a necessary condition for knowledge. And issues regarding skepticism are less of a concern in the legal context.

6. John Greco, *Better Safe Than Sensitive*, in *THE SENSITIVITY PRINCIPLE IN EPISTEMOLOGY* (Kelly Becker & Tim Black eds., 2012), at 194 (“The spirit of a safety condition is that, in cases of knowledge, S would not easily go wrong by believing as she does.”).

7. On the prevalence of false confessions, see generally Brandon L. Garrett, *Contaminated Confessions Revisited*, 101 VA. L. REV. 395, 395–398 (2015); Lisa Kern Griffin, *Silence, Confessions, and the New Accuracy Imperative*, 65 DUKE L.J. 697 (2016).

8. Greco, *supra* note 6, at 194 (“The spirit of a sensitivity condition is that, in cases of knowledge, one would notice if things were different.”).

9. *Id.* at 195 (“[A] belief can be safe without being sensitive, and sensitive without being safe.”).

10. And, of course, findings may also be *safe* and *sensitive* as well as *unsafe* and *insensitive*. Both safety and sensitivity are distinct from probability. Two items of evidence may have the

The central thesis of this article is that epistemic *safety* is important for legal evidence and that it plays significant roles in the law of evidence. Most importantly, safety affects the quality and thus the probative value of evidence.<sup>11</sup> In discussing the importance of safety, the article also considers and rejects an analogous role for sensitivity. Contrary to recent claims in the legal<sup>12</sup> and philosophical<sup>13</sup> literature about the importance of sensitivity for the law of evidence, this article will argue that epistemic sensitivity does not (and should not) play much of a role. Sensitivity fails for reasons that are the inverse of why safety succeeds: sensitivity does not have much of an effect on the probative value of evidence. Understanding the differences between the two concepts, and why sensitivity goes awry, will thus help to reveal why safety is important.<sup>14</sup>

The analysis proceeds in four sections. **Section II** briefly discusses the relationship between epistemology and legal proof and clarifies a few methodological issues and assumptions. Most importantly, epistemological discussions of safety and sensitivity typically use or refer to “possible worlds”<sup>15</sup> in spelling out safety and sensitivity conditions,<sup>16</sup> and this section briefly explains how similar considerations may be used to articulate safety and sensitivity conditions in the context of legal evidence and proof.<sup>17</sup> **Section III** discusses epistemic sensitivity and its shortcomings in explaining legal evidence.<sup>18</sup> This section explains why some of the criticisms of

same probabilities associated with them, but findings based on them may differ in terms of safety or sensitivity.

11. Probative value plays a central role in the admissibility and sufficiency of legal evidence. *See, e.g.*, FED. R. EVID. 403 (authorizing courts to exclude evidence when its “probative value” is substantially outweighed by countervailing considerations).

12. David Enoch & Talia Fisher, *Sense and “Sensitivity”: Epistemic and Instrumental Approaches to Statistical Evidence*, 67 *STAN. L. REV.* 557 (2015).

13. David Enoch, Levi Spectre & Talia Fisher, *Statistical Evidence, Sensitivity, and the Value of Legal Knowledge*, 40 *PHIL. & PUBLIC AFFAIRS* 197 (2012). *See also* Michael Blome-Tillmann, *Sensitivity, Causality, and Statistical Evidence in Courts of Law*, 4 *THOUGHT* 102 (2015) (referring to the sensitivity account as a “recently influential” account of legal evidence).

14. To be clear, I do not claim that safety provides a complete account of legal evidence or that safety explains all aspects of the law of evidence. Rather, I argue for the more modest claims that safety is an important consideration for legal evidence and that it plays a greater explanatory role than sensitivity.

15. *See* DAVID LEWIS, *ON THE PLURALITY OF WORLDS* (1986). For overviews, *see* JON DIVERS, *POSSIBLE WORLDS* (2002); Christopher Menzel, *Possible Worlds*, in *STANFORD ENCYCLOPEDIA OF PHILOSOPHY* (2016) (<http://plato.stanford.edu/entries/possible-worlds/>).

16. *See* Duncan Pritchard, *In Defense of Moderate Anti-luck Epistemology*, in *THE SENSITIVITY PRINCIPLE*, *supra* note 6, at 177; Greco, *supra* note 6, at 194–195.

17. For other examples of legal analyses using possible worlds, *see* MICHAEL S. MOORE, *CAUSATION AND RESPONSIBILITY: AN ESSAY IN LAW, MORALS, AND METAPHYSICS* (2009), at 390 (“causation is best worked out using the ‘possible worlds’ conception”); Lawrence B. Solum, *Constitutional Possibilities*, 83 *IND. L.J.* 307, 316–320 (2008).

18. “Sensitivity” throughout this article refers to the epistemological concept and not to other uses of the term. In particular, and most importantly, it should not be confused with the common use of “sensitivity” in diagnostic testing to refer to the “true positive rate”—e.g., the probability that a test will yield a correct positive result among those who in fact have a disease. *See* David H. Kaye & David A. Freedman, *Reference Guide on Statistics*, in *REFERENCE MANUAL ON SCIENTIFIC EVIDENCE* (3d ed. 2011), at 296. The diagnostic use of “sensitivity”

sensitivity in epistemology also make it inappropriate as an important criterion for legal evidence, and it explains why sensitivity fails to account for examples of legal evidence and core features of legal doctrine. Section IV discusses epistemic safety and its importance for legal evidence.<sup>19</sup> This section explains how safety relates to legal evidence and how safety accounts for examples and core features of doctrine that sensitivity cannot. Most importantly, safety affects the probative value of evidence (and is reflected in a wide variety of legal rules that depend on probative value).<sup>20</sup> Section V concludes with some brief reflections on how the discussions of safety and sensitivity fit into a broader theoretical context—the interdisciplinary relationship between epistemology and law.

## II. EPISTEMOLOGY, POSSIBLE WORLDS, AND LEGAL PROOF

In order to provide context for the discussions of sensitivity and safety to follow, this section briefly discusses how epistemology and possible worlds relate to legal proof. Epistemology focuses on knowledge and related issues.<sup>21</sup> Many of the “related issues” concern topics that are of direct relevance to evidence law, including: the nature of evidence, testimony, inference, expertise, belief, doubt, acceptance, and justification. More generally, the process of legal proof is fundamentally, at root, an epistemic endeavor—an attempt to reach true conclusions based on evidence.<sup>22</sup> Accordingly, the law of evidence requires not only *psychological* but also *epistemic* appraisal from judges and juries.<sup>23</sup> In other words, legal fact-finding is not only about what judges

is contrasted with a test’s “specificity” (or true negative rate)—e.g., the probability that a test will yield a correct negative result among those who do not in fact have a disease. *Id.* at 298. Although there are some connections between these uses of “sensitivity,” in order to avoid confusion, readers familiar with the diagnostic use of the term should put that meaning to the side.

19. “Safety” throughout this article refers to the epistemological concept and not to other meanings of the term. In particular, epistemic safety is related to but distinct from the broader “unsafe verdict” standard for reviewing criminal appeals in the UK. See CRIMINAL APPEAL ACT §2 (1995). A reliance on epistemically unsafe evidence may be one reason a verdict is “unsafe” in the latter sense. See D. Michael Risinger, *Unsafe Verdicts: The Need for Reformed Standards of the Trial and Review of Factual Innocence Claims*, 41 HOUS. L. REV. 1281, 1332 (2004).

20. These include rules regulating experts, witnesses, exhibits, impeachment, hearsay, and character. See *infra* notes 110–117 and accompanying text.

21. Some scholars have questioned the relevance of epistemology (or aspects of it) for legal proof. See, e.g., STEIN, *supra* note 3, at 59 (“Adjudicators do not even purport to satisfy the ‘justified true belief’ standard or similar criteria for knowledge.”); Enoch et al., *supra* note 13, at 211 (“[T]he law should not care about knowledge, or indeed about epistemology in general.”).

22. See FED. R. EVID 102 (“These rules should be construed ... to the end of ascertaining the truth and securing a just determination.”); *Tehan v. United States*, 382 U.S. 406, 416 (1966) (“The basic purpose of a trial is the determination of truth.”).

23. Indeed, legal rules and procedures that regulate the “sufficiency of evidence” require judges to determine whether particular findings are justified based on the evidence and the burden of proof. See, e.g., FED. R. CIV. P. 56 (summary judgment); FED. R. CIV. P. 50

and juries find *persuasive* or *believe* to be true (although this is, of course, of critical importance)—it is also about whether findings or beliefs are justified or reasonable in light of the evidence.<sup>24</sup> Recognizing these aspects of legal proof, theoretical accounts of legal evidence have traditionally drawn on epistemological discussions to illuminate law,<sup>25</sup> and an extensive body of recent scholarship has continued this trend.<sup>26</sup>

Although some epistemic considerations are plainly relevant to law, the relationship between *knowledge* and legal proof is less clear. The law of evidence relies on the transmission of knowledge from witnesses (both lay and expert).<sup>27</sup> The relationship between *verdicts* and knowledge, however, is less certain and contested. The possible connections between knowledge and verdicts raise a number of tricky issues, and we must proceed carefully here. It might be the case, for example, that knowledge is too high of a demand to place on legal verdicts.<sup>28</sup> Rather than being a requirement, however, knowledge (or something similar to knowledge) may nevertheless be an important aim or goal of verdicts.<sup>29</sup> Nothing in the analysis to follow, however, will depend on resolving this relationship (or any contested issues about the nature of knowledge)—we can put the issue of how knowledge relates

(judgment as a matter of law); FED. R. CRIM. P. 29 (motion for a judgment of acquittal based on insufficient evidence); *Jackson v. Virginia*, 443 U.S. 307 (1979). Thus, with the exception of acquittals in criminal cases, the fact that a jury finds the evidence persuasive is neither sufficient, nor is it necessary, to constitute a legal judgment. Criminal acquittals present a special case—in order to preserve the power of jury nullification, acquittals are not reviewable on sufficiency grounds.

24. See *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986) (explaining that sufficiency of evidence in civil cases depends on what a “reasonable jury” could find based on the evidence); *Jackson v. Virginia*, 443 U.S. 307, 318 (1979) (explaining that sufficiency of evidence in criminal cases depends on what a “rational trier of fact” could find).

25. In discussing legal proof, Jeremy Bentham famously declared that “the field of evidence is no other than the field of knowledge.” AN INTRODUCTORY VIEW OF THE RATIONALE OF JUDICIAL EVIDENCE, WORKS VI(5) (1843) (John Bowring ed., 2002).

26. See *supra* note 3.

27. See FED. R. EVID. 602 (“A witness may testify only if evidence is introduced sufficient to support a finding that the witness has personal knowledge of the matter.”), 702 (regulating testimony based on an expert’s “scientific, technical, or other specialized knowledge”).

28. See Redmayne, *supra* note 3, at 299 (rejecting knowledge as the aim of verdicts); STEIN, *supra* note 3, at 59 (same). Moreover, knowledge requires *belief* but jurors may not necessarily believe their findings. See Jordi Ferrer Beltran, *Legal Proof and Fact Finders’ Belief*, 12 LEGAL THEORY 293 (2008). *But see* Pardo, *supra* note 3 (discussing different ways in which knowledge may relate to verdicts); Judith Jarvis Thomson, *Liability and Individualized Evidence*, 49 LAW & CONTEMP. PROBS. 199, 206–215 (1986) (discussing similarities between knowledge and verdicts); ANTHONY DUFF ET AL., THE TRIAL ON TRIAL: TOWARDS A NORMATIVE THEORY OF THE CRIMINAL TRIAL (2007), at 87–91 (arguing that criminal verdicts require knowledge); SARAH MOSS, PROBABILISTIC KNOWLEDGE (forthcoming 2018) (arguing that legal verdicts require knowledge of probabilistic contents).

29. Support for this idea may follow from the structural similarities between knowledge and verdicts. In particular, legal verdicts have analogs to the three components in the traditional conception of knowledge as “justified true beliefs.” First, both verdicts and knowledge require some level of cognitive endorsement of a proposition (a belief in the case of knowledge or a finding in the case of a verdict). Second, both require some level of epistemic support, justification, or warrant. Third, both aim at truth (factual accuracy).

to verdicts to the side and focus directly on safety and sensitivity and what each reveals about legal evidence.<sup>30</sup>

Within epistemology, philosophers typically state safety and sensitivity conditions for beliefs in terms of “possible worlds.”<sup>31</sup> These discussions focus on whether a belief would be held in counterfactual circumstances, and philosophical accounts of safety and sensitivity use possible worlds in the process of analyzing epistemic aspects pertaining to beliefs.<sup>32</sup> In other words, safety and sensitivity conditions are often articulated in terms of whether a belief would be held in various possible worlds. Possible worlds are typically taken to be “ordered” based on their “distance” from the actual world.<sup>33</sup> There are countless possible worlds—some that are nearly identical with the actual world except for minor differences and others that are radically different. Imagine the possible worlds branching out from the actual world based on these similarities and differences. Possible worlds that are similar to the actual world are characterized as “close” (or “nearby” or “adjacent”). As possible worlds become more and more dissimilar they become “distant” (or “remote” or “far off”). As Lawrence Solum explains, “[a] possible world that was just like the actual world—except that this Essay was never written—would be very close.”<sup>34</sup> By contrast:

distant worlds are easy to imagine. In ascending degree of remoteness, we can imagine a world in which the Mongols conquered Europe and the Renaissance did not occur, a world in which humans never evolved, or a world in which subtle variations in physical laws made the evolution of carbon-based life impossible.<sup>35</sup>

30. In other words, even though sensitivity and safety each arise in the context of philosophical debates about knowledge, we can prescind from any debates about how each relates to knowledge.

31. See *supra* notes 15–16. Philosophical debates about the metaphysical status of possible worlds (among other issues) are outside the scope of this article and nothing in the analysis will turn on them. See Menzel, *supra* note 15. Similarly, philosophical debates about how best to analyze or account for subjunctive conditionals are also outside the scope of this article. See JONATHAN BENNETT, A PHILOSOPHICAL GUIDE TO CONDITIONALS (2003); Robert Stalnaker, *A Theory of Conditionals*, in *STUDIES IN LOGICAL THEORY* (AMERICAN PHILOSOPHICAL QUARTERLY SUPPLEMENTARY MONOGRAPH SERIES) (Nicholas Rescher ed., 1968), at 98; DAVID LEWIS, COUNTERFACTUALS (1973); Nelson Goodman, *The Problem of Counterfactual Conditionals*, 44 *J. PHIL.* 113 (1947).

32. Greco, *supra* note 6, at 194 (“A more straightforward method is to state the safety and sensitivity conditions directly, by means of a possible-worlds heuristic.”); Pritchard, *supra* note 16, at 174 (“Sensitivity is usually cashed out in modal terms as demanding that in the closest possible world in which what the agent actually believes is false, the agent no longer believes it on the same basis as in the actual world.”).

33. See, e.g., Greco, *supra* note 6, at 195 (“Think of a space of possible worlds centered on the actual world and branching out according to some appropriate similarity ordering.”); MARTIN SMITH, BETWEEN PROBABILITY AND CERTAINTY: WHAT JUSTIFIES BELIEF (2016), at 106–108.

34. Solum, *supra* note 17, at 318.

35. *Id.* Also outside the scope of this article are the complex issues about how best to measure similarity between possible worlds and whether there is an objective metric for doing so when evaluating conditionals. See Michela Ippolito, *How Similar Is Similar Enough?*, 9 *SEMANTICS & PRAGMATICS* 1 (2016). In the legal-proof context (as in other contexts), this issue will depend heavily on the context of the case and will be influenced by the disputed facts, the

Similar to epistemological discussions of knowledge and beliefs, possible worlds may be used to state safety and sensitivity conditions for legal evidence. In the context of legal proof, the relevant inquiries concern issues such as whether factual findings based on evidence would be true or false in close possible worlds; whether evidence would continue to exist or change in close worlds; and whether findings would continue to be made or would change in such worlds. These inquiries help to express conditions that affect the quality of legal evidence (and factual findings made on the basis of such evidence), just as similar inquiries may be used to articulate epistemic conditions for knowledge and the justification or warrant of beliefs.<sup>36</sup> With this context in place, we now turn to the discussions of sensitivity and safety and their relationships with legal evidence.

### III. SENSITIVITY

Sensitivity provides one possible criterion for assessing legal evidence. Within epistemology, sensitivity concerns whether a true belief would be held *even if it were false*. In the legal context, the focus is on whether evidence would exist and be used as the basis for a factual finding *if that finding were false*. Although scholars have argued that sensitivity plays an important role in the law of evidence,<sup>37</sup> this article rejects the importance of sensitivity in this context. This section will first provide a brief overview of sensitivity in epistemology in order to extract a number of lessons that will also be relevant when considering legal evidence. This section will then critique recent claims about the role of sensitivity in law. Understanding the limitations on sensitivity—some of which are similar to those in philosophy and some of which are unique to law—will provide necessary background for a discussion of safety in [Section IV](#).

available evidence, and the alternative arguments being made by the parties. The process of legal proof relies to a large extent on the parties to present the relevant alternative possibilities. See Pardo & Allen, *supra* note 3; Ronald J. Allen, *The Nature of Juridical Proof*, 13 *CARDOZO L. REV.* 373 (1991).

36. Indeed, referring to possible worlds in the process of analyzing legal evidence has a natural fit with the law of evidence. Two foundational concepts in evidence doctrine—relevance and probative value—are each defined in terms of comparisons with alternative possibilities. The federal rules of evidence, for example, define “relevant evidence” as evidence having “any tendency to make a fact [of consequence] more or less probable than it would be without the evidence.” *FED. R. EVID.* 401. This definition requires judges to compare the world in which this item of evidence is admitted with an alternative possible world in which the evidence does not exist and then to assess whether the likelihood of the fact being true changes. See, e.g., *United States v. Stever*, 603 F.3d 747 (9th Cir. 2010). Similarly, the United States Supreme Court has explained that the probative value of evidence depends not only on the connection between the evidence and the fact for which it is offered—it also requires comparisons with possible evidentiary alternatives. See *Old Chief v. United States*, 519 U.S. 172 (1997) (explaining that probative value depends on “comparing evidentiary alternatives”); *FED. R. EVID.* 403. This necessarily requires judges to assess the value of evidence by considering different possible ways in which parties may prove disputed facts.

37. See Enoch et al., *supra* note 13; Enoch & Fisher, *supra* note 12.



## A. Sensitivity in Epistemology

Sensitivity has played a prominent role in epistemology.<sup>38</sup> Most notably, sensitivity has been proposed as a necessary condition for knowledge.<sup>39</sup> Under such an account, knowledge requires not only that beliefs be true, but also that they be sensitive. For example, if my true belief that there is unread email in my inbox is not sensitive—i.e., I would believe that there is unread email even if the inbox were empty—then I do not *know* that there is unread email.<sup>40</sup> Some of the upsides of sensitivity, as well as the problems facing it, within epistemology carry over to the context of legal proof. The discussion below outlines these connections, beginning with the potential upsides and then turning to the problems.

Sensitivity's upsides include its potential to explain puzzling philosophical examples.<sup>41</sup> Here are two well-known examples—the puzzle concerns the apparent tension between them.<sup>42</sup> In one example (*Lottery*), you own a ticket in a lottery. Prior to the drawing, it is typically assumed that you do not *know* that your ticket is a loser. This is so even if you believe that it will lose and there is a high probability that it will lose.<sup>43</sup> In the second example (*Newspaper*), you read in the newspaper the day after the drawing that your ticket did not win. You thus believe that the ticket did not win. It is typically assumed that in this case you do know that your ticket lost. This is so even if we stipulate that the probability the newspaper made a mistake is the same (or higher) than the odds of your ticket winning the lottery. Sensitivity plausibly explains the different results.<sup>44</sup> The belief in *Lottery* is insensitive—if the ticket had been a winner, you would still have believed that it is a loser (on the same basis). The belief in *Newspaper*, however, is sensitive. If your ticket had won, the newspaper would have (most likely) reported the correct result and you would not have believed that your ticket lost (you would instead have believed, correctly, that it won).

38. Kelly Becker & Tim Black, *The Resilience of Sensitivity*, in *THE SENSITIVITY PRINCIPLE*, *supra* note 6, at 1 (referring to sensitivity as “a very simple and intuitively compelling idea in epistemology”). *But see* ERNEST SOSA, *JUDGMENT & AGENCY* (2015), at 123 (referring to sensitivity as a “siren call” with “execrable consequences”).

39. *See* NOZICK, *supra* note 4, at 172; Fred Dretske, *Conclusive Reasons*, 49 *AUSTRALASIAN J. PHIL.* 1 (1971); Alvin Goldman, *Discrimination and Perceptual Knowledge*, 78 *J. PHIL.* 771 (1976); Keith DeRose, *Solving the Sceptical Puzzle*, 104 *PHIL. REV.* 1 (1995). For recent discussions, *see* *THE SENSITIVITY PRINCIPLE*, *supra* note 6.

40. Beliefs may also fail to be true for reasons other than being false—for example, they may have no truth value or no content. *See* David Manley, *Safety, Content, Apriority, Self-Knowledge*, 104 *J. PHIL.* 403 (2007).

41. Sensitivity also features prominently in philosophical discussions of general issues such as skepticism, *see* Pritchard, *supra* note 4, closure, *see* Sherrilyn Roush, *Sensitivity and Closure*, in *THE SENSITIVITY PRINCIPLE*, *supra* note 6, at 242, and luck, *see* DUNCAN PRITCHARD, *EPISTEMIC LUCK* (2005), at 152–173. Sensitivity also potentially explains some “Gettier cases.” *See* Edmund L. Gettier, *Is Justified True Belief Knowledge?*, 23 *ANALYSIS* 121 (1963).

42. These examples are part of a family of puzzling cases involving lotteries. *See* JOHN HAWTHORNE, *KNOWLEDGE AND LOTTERIES* (2004).

43. *See* Pritchard, *supra* note 16, at 177.

44. *Id.* (“the sensitivity principle offers us a very attractive way of dealing with the lottery problem”).

In order to evaluate the sensitivity of beliefs, we need possibilities to compare. In the *Lottery* and *Newspaper* cases, for example, we compared true beliefs with situations in which the ticket is a winner. Within epistemology, this is where “possible worlds” come into play. Sensitivity is typically assessed by comparing the actual world with “possible worlds” (in which the ticket is a winner). Accounts of sensitivity along such lines, however, raise several issues. If knowledge requires that no false belief is formed in any possible world imaginable, then this would imply that no one knows anything. Why? Because we can easily point out far-off possibilities in which someone forms a false belief based on misleading evidence. For example, imagine an elaborate plot to trick me into believing that there is unread email in my inbox when there is not, or a world in which newspapers regularly print erroneous lottery results. You and I may believe falsely in these worlds, but that does not necessarily mean that we lack knowledge (say, of my email or your lottery outcome) in the actual world. In short, the absence of false belief in every possible world is too demanding of a standard. Instead, philosophers typically focus on “close” possible worlds in articulating sensitivity conditions.<sup>45</sup> This too, however, raises difficult line-drawing issues. How similar must a possibility be to count as a “close” world? How many close worlds are relevant? Under one common formulation, sensitivity is evaluated based on the closest possible world in which the belief is false.<sup>46</sup>

Sensitivity accounts, however, have been subjected to serious objections from philosophers.<sup>47</sup> From these objections, we can extract two related implications for legal evidence. First, sensitivity does not track the reliability of evidence.<sup>48</sup> Second, sensitivity does not track the risk of drawing erroneous inferences from evidence in close possible worlds.

45. *Id.* at 174.

46. Sensitivity is also typically limited to beliefs formed via the same method. See NOZICK, *supra* note 4, at 179. This, however, also raises additional difficulties in delineating what counts as the same method. For discussions, see Kelley Becker, *Methods and How to Individuate Them*, in THE SENSITIVITY PRINCIPLE, *supra* note 6, at 81; Peter Baumann, *Nozick's Defense of Closure*, in *id.* at 17 (“[I]t has proved notoriously difficult to identify the method used by the subject in a systematic, principled, and non-arbitrary way ... [this] so-called generality problem probably has no solution.”).

47. The context for these objections is whether sensitivity is *necessary* for knowledge.

48. In this context, “reliability” means a tendency to produce true beliefs. ALVIN I. GOLDMAN, *EPISTEMOLOGY AND COGNITION* (1986), at 26. This meaning is distinct from the use of “reliable” in some contexts to refer to merely consistent or similar results (even if false or invalid). For a discussion of these different meanings, see HAACK, *supra* note 3, at 200–201. The use of “reliable” in evidence law also typically refers to the former (i.e., a tendency to produce true beliefs). See *id.* (discussing the meaning of “reliability” in the context of scientific expert testimony under FED. R. EVID. 702). Reliability may refer to a process, method, or type of evidence in general or it may refer to close possible worlds. Reliability in general and in close possible worlds may diverge. See Manley, *supra* note 40, at 409 (“My ability to discriminate larks from other birds may be so reliable that there are only five token birds in the world that I mistake for larks. But if all five happen to be in my yard along with a real lark, that is enough to undermine my knowledge.”). Sensitivity fails to track the reliability of evidence both generally and in close possible worlds.

The reliability of evidence is distinct from whether a belief is sensitive. The reason for this—and this reason will be an important reason when assessing legal evidence—is that the closest possible world in which a belief is false *may not be a close possibility*. Consider the following example from Ernest Sosa:

*Trash Bag*: On my way to the elevator I release a trash bag down the chute from my high-rise condo. Presumably I know my bag will soon be in the basement. But what if, having been released, it still (incredibly) were not to arrive there? That presumably would be because it had snagged somehow in the chute on the way down (an incredibly rare occurrence), or some such happenstance. But none such could affect my predictive belief as I release it, so I would still predict that the bag would soon arrive in the basement. My belief seems not to be sensitive, therefore, but constitutes knowledge anyhow.<sup>49</sup>

The example is intended to reveal the following point: the mere possibility that something could have gone awry (no matter how remote), even though it did not, does not necessarily undermine knowledge.<sup>50</sup> More importantly for our purposes, however, the example reveals a general point about evidence: the mere fact that it is possible for an inference from evidence to be mistaken does not tell us whether the evidence is reliable or how likely that the inference is mistaken.

Moreover, the fact that a belief is insensitive does not necessarily undermine a range of accurate inferences in close possible worlds. Consider the following example:

*Speed*: Suppose that I am generally poor at estimating speed. I'm now trying to estimate whether cars driving past my house are going faster than 35 miles per hour (the posted speed limit). A car drives by going 10 miles per hour. Even though I'm poor at estimating, there are clear cases and this is one of them. I know this car is going slower than 35 miles per hour, and I am willing to testify as such if needed.<sup>51</sup> I tend to underestimate speed, however. Therefore, in the closest possible world in which my belief is false (say, where the car is going

49. Sosa, *supra* note 4, at 145–146.

50. *Id.*; Pritchard, *supra* note 16, at 176 (discussing this example: “if Ernie doesn’t have knowledge, then it would appear that inductive knowledge is very hard to come by, since Ernie’s inductive basis for his true belief is about as good as an inductive basis can be.”). Readers who reject knowledge in *Trash Bag* may find the following example more persuasive:

Suppose a million service operators are employed to answer questions about Apple products. Within this lot, suppose one is a liar prepared to give false answers, and the rest are honest and reliable. Calls are randomized and when you call you receive a true answer from one of the reliable operators. Does the possibility that you could have received a false answer from the one bad apple mean you do not know the true answer that you did receive? Again, if so, then this would render most everyday knowledge all but impossible. Notice, however, that your belief is insensitive: in the closest world in which you received a false answer (bad apple), you would likely have formed a false belief.

SOSA, *supra* note 38, at 119. Nothing in the analysis to follow, however, will depend on whether the beliefs in the examples constitute knowledge.

51. At trial, my testimony would likely be permissible as a lay opinion. See FED. R. EVID. 701.

36 miles per hour), I would still believe the car is going slower than 35 miles per hour and be mistaken.<sup>52</sup>

The belief is both *insensitive* and within a range for which my estimates are reliable. It is insensitive because in the closest possible world in which the belief is false, I would believe falsely. But it would be strange if that hypothetical possibility undermined my belief in this easy case.<sup>53</sup> Even if my estimates are unreliable in cases hovering around 35 miles per hour, I could not easily confuse this slow-moving car for one going faster than 35 miles per hour. These mundane examples reveal important, general lessons for law: epistemic sensitivity does not track the reliability of evidence or the risk of erroneous inferences.

## B. Sensitivity and Law

Sensitivity provides a possible criterion for assessing legal evidence. In the evidentiary context, sensitivity concerns whether evidence would exist—and a factual finding would be made—if that finding were false. Given the law's obvious interest in avoiding erroneous verdicts, one might intuitively think that sensitivity plays an important role in the law of evidence. And, indeed, scholars have argued that sensitivity plays such a role. These arguments based on sensitivity are misplaced, or so I will argue below. Sensitivity does not play a significant role in the law of evidence, nor should it. Understanding the limitations on sensitivity will set the stage for understanding the importance of epistemic safety.

In recent articles, David Enoch, Levi Spectre, and Talia Fisher argue that sensitivity plays a significant role in evidence law.<sup>54</sup> In particular, they contend that sensitivity explains a distinction in law between statistical and “individualized” evidence.<sup>55</sup> Their argument depends on analogizing the philosophical cases discussed above (*Lottery* and *Newspaper*) with well-known legal examples. Their analog to *Lottery* is:

*Blue Bus*: “A bus causes harm... . [T]here is no eyewitness, but we have uncontested data regarding the distribution of buses in the relevant area; in

52. This example is based on TIMOTHY WILLIAMSON, *KNOWLEDGE AND ITS LIMITS* (2000), at 159–160.

53. There is an analog to this point in the distinction between so-called “hard” and “easy” legal cases. See FREDERICK SCHAUER, *THINKING LIKE A LAWYER* (2009), at 20–24. The fact that some legal questions (typically at the appellate level) permit more than one plausible answer based on the legal materials does not mean that there are not right or correct answers in easy cases.

54. Enoch et al., *supra* note 13; Enoch & Fisher, *supra* note 12.

55. Enoch et al., *supra* note 13, at 199 (“[T]he distinction between statistical and individual evidence is a general one, and it seems to call for a general solution.”); *Id.* at 209 (“Sensitivity-like counterfactuals capture—often enough, in sufficiently central cases—an epistemically relevant feature of the distinction between statistical and individual evidence.”). They also contend that sensitivity explains “the prevailing legal doctrine” on evidentiary requirements. Enoch & Fisher, *supra* note 12, at 558.

particular, the Blue Bus Company owns roughly 70 percent of the buses there.”<sup>56</sup>

Their analog to *Newspaper* is:

*Eyewitness*: Instead of the market-share data, “an eyewitness recognizes the bus as belonging to the Blue Bus Company. The witness, however, is imperfectly reliable; let us say that she is roughly 70 percent reliable in matters such as this one.”<sup>57</sup>

They posit different outcomes in the two examples. In *Eyewitness*, “the law has no qualms about accepting eyewitness testimony as evidence and indeed basing a positive finding that this bus was a Blue Bus bus (and perhaps also that the Blue Bus Company is liable).”<sup>58</sup> By contrast, with the market-share data, “the law typically will not be willing to base a positive finding of fact—and certainly not liability—on just this kind of evidence. Indeed, in most jurisdictions it is not even clear that such evidence would be considered admissible or relevant.”<sup>59</sup> In the examples, however, the probabilities are the same.

They argue that sensitivity explains the different treatment.<sup>60</sup> Similar to the belief in *Newspaper*, a finding in *Eyewitness* is sensitive: “had it not been a Blue Bus bus, she would have probably not testified that it was; and in that case we would not have found the Blue Bus Company liable.”<sup>61</sup> By contrast, when a finding is based on the market-share data, the finding is insensitive: “had it not been one of the [Blue Bus] buses that caused the harm, nothing would have been different regarding the market shares... . So in that case, too, we would have found the Blue Bus Company liable.”<sup>62</sup> After concluding that sensitivity explains the distinction between statistical and “individualized” evidence, however, they argue that the distinction is not justified on epistemic grounds because “excluding statistical evidence amounts to

56. Enoch et al., *supra* note 13, at 197; Enoch & Fisher, *supra* note 12, at 573–576. This famous example is based on dicta in *Smith v. Rapid Transit*, 58 N.E.2d 754 (Mass. 1945).

57. Enoch et al., *supra* note 13, at 197; Enoch & Fisher, *supra* note 12, at 573–576. Findings in experimental psychology support the idea that people tend to treat the two examples differently. See Gary L. Wells, *Naked Statistical Evidence of Liability: Is Subjective Probability Enough?*, 62 *J. PERSONALITY & SOC. PSYCHOL.* 739 (1992).

58. Enoch et al., *supra* note 13, at 197.

59. *Id.* Three doctrinal issues are embedded in this quotation and should be distinguished: whether evidence is (1) sufficient to prove a fact (to a standard of proof), (2) admissible, or (3) relevant. Evidence may be relevant without being admissible or sufficient. And it may be admissible without being sufficient.

60. *Id.* at 209 (“Sensitivity-like counterfactuals capture—often enough, in sufficiently central cases—an epistemically relevant feature of the distinction between statistical and individual evidence.”); Enoch & Fisher, *supra* note 12, at 557 (claiming that sensitivity provides “a comprehensive answer to the statistical evidence debate”).

61. Enoch et al., *supra* note 13, at 206, 197.

62. *Id.* at 206–207. Smith challenges the conclusion that the eyewitness evidence is sensitive, SMITH, *supra* note 33, at 62, and Blome-Tillman presents a variation in which the statistical evidence is sensitive, Blome-Tillman, *supra* note 13, at 106. I will accept for the analysis to follow that the eyewitness evidence is sensitive and the statistical evidence is insensitive.

excluding (what is often) good, genuinely probative evidence.”<sup>63</sup> Admitting statistical evidence, they conclude, will improve the accuracy of verdicts.<sup>64</sup>

Sensitivity does not explain a distinction between statistical and “individualized” evidence in law. Moreover, even putting aside the statistical-individual distinction, sensitivity does not explain the law’s evidentiary requirements.<sup>65</sup> I discuss each point in turn.

Sensitivity fails to explain the statistical-individual distinction. It cannot support the explanatory weight that they place upon it for three main reasons: (1) some statistical evidence is both sensitive and admissible; (2) some statistical evidence is admissible despite being insensitive; and (3) several types of individualized evidence are also insensitive and frequently admissible. They acknowledge the first point (i.e., that some statistical evidence is sensitive) and they point to DNA evidence as an exception.<sup>66</sup> But there are

63. Enoch et al., *supra* note 13, at 212. Based on their sensitivity analysis, they conclude that knowledge and epistemology also do not matter for law. *Id.* at 211 (“[T]he law should not care about knowledge, or indeed about epistemology in general.”). This claim is problematic for several reasons. First, the fact that sensitivity is not important for law does not mean that other epistemic notions are likewise unimportant. Second, epistemology may contribute to law even if verdicts do not require knowledge. See Section II. Finally, the manner in which they challenge the relevance of knowledge is itself problematic. They ask us to compare two different standards for criminal convictions: World A in which jurors “only convict when they know,” and World B in which “the chances of System B convicting an innocent are lower.” Enoch et al., *supra* note 13, at 212. They contend that the law should prefer System B. *Id.* The choice presented, however, is a false one. Knowledge is “factive”—if something is *known*, then it is true. Therefore, every conviction in World A will be true and World B cannot produce fewer false convictions.

64. Although they reject epistemic reasons, they argue that “instrumental” reasons may justify a preference for sensitive evidence. Enoch et al., *supra* note 13, at 201; Enoch & Fisher, *supra* note 12, at 583. These reasons include the ex ante incentives for actors deciding whether to comply with the law. Cf. Chris William Sanchirico, *Character Evidence and the Object of Trial*, 101 COLUM. L. REV. 1227 (2001) (arguing that ex ante incentives justify the character rules). They illustrate their claim with the following example from the evidence literature:

*Gatecrashers*: “it is uncontested that of, say, a thousand people attending a stadium event, only ten purchased tickets. If an individual—call him John—is sued ... then finding against John merely on the strength of the (very strong!) statistical evidence here seems to be inappropriate.”

Enoch et al., *supra* note 13, at 217. The evidence is insensitive: it would be the same regardless of whether John crashed the gate. By contrast, a piece of individualized evidence (“a videotape”) that is “probabilistically equivalent ... seems perfectly fine.” *Id.* at 207. Instrumental reasons, they argue, justify this distinction. Using the statistical evidence “almost entirely annihilates” John’s incentive not to break the law because he will be held liable “regardless of whether or not he buys a ticket.” *Id.* at 217–218. When evidence is sensitive, they argue, “there is no similar incentive-corrupting effect.” *Id.* This “instrumental” rationale is generally outside the scope of this article; however, to the extent that this rationale depends on aligning the statistical-individual distinction with the sensitive-insensitive distinction, the critique below applies to the instrumental account as well.

65. The critique thus challenges their descriptive claims about the relationships between sensitivity, evidence, and legal doctrine.

66. See Enoch et al., *supra* note 13, at 221 n.38; Enoch & Fisher, *supra* note 12, at 591. Although many examples of DNA evidence are sensitive, the evidence will be insensitive when there are close possible worlds in which innocence and matching samples coexist. This may be the case, for example, because (1) the DNA test does not discriminate among relatives

several other examples of sensitive statistical evidence—including evidence used to prove discrimination, causation, and antitrust violations.<sup>67</sup> These counterexamples put pressure on the sensitivity explanation.

The two other reasons cause the explanation to collapse. On one hand, some statistical evidence is *insensitive* and yet admissible. A recent example includes the statistical evidence discussed by United States Supreme Court in *Tyson Foods*.<sup>68</sup> The disputed issue was the time that it took employees to don and doff protective gear, which was relevant to plaintiffs' claim for over-time pay. The evidence consisted of expert testimony on the average time that it took to don and doff the gear, based on a study conducted by the expert, which was then applied to individual employees. The Court explained that the evidence was properly admitted and relied upon.<sup>69</sup> But the evidence is *insensitive* when applied to individual employees: even if an individual's time to don and doff was much shorter (or longer) than the statistical average, the evidence remains the same. Thus, the category of *admissible* statistical evidence cuts across the sensitivity-insensitivity distinction.

On the other hand, several types of admissible "individualized" evidence are *insensitive* as well.<sup>70</sup> The list of such evidence includes: some character

(e.g., Y-STR testing) and there is a close possible world in which a matching relative commits the crime, or (2) there is a close world in which DNA is present for reasons unrelated to the crime (e.g., the defendant previously worked in the location where the sample was collected). For discussion and examples, see ERIN E. MURPHY, *INSIDE THE CELL: THE DARK SIDE OF FORENSIC DNA* (2015), at 33.

67. In *Enoch & Fisher*, *supra* note 12, at 585–586, they acknowledge these examples. They qualify their claims by noting that they are "not interested in all instances in which statistical assessments are used as evidence." *Id.* at 586. Rather, their focus is on cases like *Blue Bus* in which the evidence is "the base rate for the defendants' liability." *Id.* This qualification, however, is inconsistent with the thesis that sensitivity provides a comprehensive account of the general distinction between statistical and individualized evidence. *Id.* at 557 ("The aim of this Article is to provide a comprehensive answer to the statistical evidence debate."); *Enoch et al.*, *supra* note 13, at 199 ("[T]he distinction between statistical and individual evidence is a general one, and it seems to call for a general solution."). Cases like *Blue Bus* are a tiny portion of statistical-evidence cases (if they exist at all); statistical-evidence cases typically involve the integration of statistical evidence with other evidence on both sides (including the failure to provide other evidence), even when one side attempts to rely on base-rate evidence. See Jonathan J. Koehler, *When Do Courts Think Base Rate Statistics Are Relevant?*, 42 *JURIMETRICS J.* 373 (2002) (discussing examples).

68. *Tyson Foods, Inc. v. Bouaphakeo*, 136 S. Ct. 1036 (2016).

69. *Tyson Foods*, 136 S. Ct. at 1043–1046. The Court rejected the defendant's argument that such evidence was improper because of possible variations involving individual employees. *Id.* In doing so, the Court rejected a categorical rule regarding the use of statistical evidence in class actions. *Id.* ("A representative or statistical sample, like all evidence, is a means to establish or defend against liability. Its permissibility turns not on the form a proceeding takes—be it a class or individual action—but on the degree to which the evidence is reliable in proving or disproving the elements of the relevant cause of action.")

70. The significance of these categories is that they are frequently admissible despite being insensitive. Therefore, sensitivity cannot explain individualized evidence. It might be objected that in most cases evidence in these categories will not be sufficient by itself to prove liability (or to support a conviction). But this is a red herring because no single item of evidence is typically sufficient. Even cases based on one prominent item of evidence—such as confessions or "cold hit" DNA matches—are assessed in conjunction with all other evidence, as well as the possible reasons for not producing additional evidence.

evidence;<sup>71</sup> prior acts admitted for a non-character purpose (such as proving motive, opportunity, intent, preparation, plan, knowledge, identity, absence of mistake, or lack of accident);<sup>72</sup> most impeachment evidence;<sup>73</sup> evidence of habits or routine practices;<sup>74</sup> expert testimony (particularly, about general phenomena);<sup>75</sup> and some admissible hearsay.<sup>76</sup> In sum, the sensitivity-insensitivity distinction does not map onto the statistical-individual distinction closely enough to explain or vindicate it.<sup>77</sup>

Putting aside the statistical-individualized issue, sensitivity may still possibly play an important role in the law of evidence. Even though sensitivity provides a plausible account of *Blue Bus* and *Eyewitness*, the pattern breaks down when we expand our focus. The reasons for this are similar to those in epistemology: namely, sensitivity does not tell us much about either the reliability of evidence or how easily a factual finding could be mistaken.<sup>78</sup> Evidence may be reliable, admissible, and relied upon for verdicts, even though it is insensitive. This may be the case because the closest world in which a finding is false *is not a close world*.<sup>79</sup> On the other hand, even evidence that is sensitive may be unreliable and easily lead to erroneous findings. This may be the case when there are several nearby worlds in which the evidence produces a false finding (even though the evidence does not lead to a false finding in the closest one). For these reasons, sensitivity fails to predict the law's treatment of evidence.

Three stylized examples will illustrate these points about sensitivity: two showing that sensitivity is not *necessary* and one showing that it is not

71. See, e.g., FED. R. EVID. 404(a)(2) (character evidence in criminal cases), 413–415 (defendant's prior acts of sexual assault or child molestation).

72. FED. R. EVID. 404(b)(2).

73. The relevance of impeachment evidence concerns the credibility of witnesses and this evidence is typically going to be insensitive. Consider, for example, evidence of bias on the part of a witness because of a prior relationship with one of the parties. See also FED. R. EVID. 608 (impeachment with character evidence), 609 (prior convictions), 613 (prior inconsistent statements).

74. FED. R. EVID. 406.

75. FED. R. EVID. 702–703.

76. See, e.g., FED. R. EVID. 803(6) (records of regularly conducted activities, including business records), 803(8) (public records), 803(21) (reputation concerning character), 803(22) (judgments of previous convictions).

77. This is not to suggest that sensitivity is never a relevant consideration—it may play an instrumental role in some types of cases. See *supra* note 64. Rather, the key point is that neither the statistical-individual distinction nor the admissibility-inadmissibility distinction can be explained in terms of the sensitivity-insensitivity distinction. None of these three distinctions (sensitivity-insensitivity, statistical-individual, admissible-inadmissible) can be explained in terms of another. Indeed, there are four different types of *admissible* evidence: (1) sensitive statistical, (2) insensitive statistical, (3) sensitive individual, and (4) insensitive individual—and the same four possibilities for *inadmissible* evidence.

78. On reliability, see *supra* note 48.

79. Steven Luper, *False Negatives*, in THE SENSITIVITY PRINCIPLE, *supra* note 6, at 222 (“[T]he closest worlds in which p is false might be remote indeed. They might be worlds in which the laws of physics are very different or even nonexistent. Does it really matter that we get false positives in such worlds?”).



sufficient.<sup>80</sup> On one hand, evidence can be reliable and admissible, and yet lead to insensitive factual findings:

*Drug Weight:* A criminal defendant is tried for possessing a large amount of an illegal substance. According to the criminal statute at issue, the prosecution must prove that the defendant possessed 500 grams or more of the substance. A chemist who sampled and tested the substance will testify as an expert that the amount seized was over a kilogram. The expert is well qualified, employed an acceptable and reliable methodology, and otherwise satisfies the criteria for admitting expert testimony.<sup>81</sup> The chemist's process, however, tends to overestimate weight by a very small amount (say, by one gram or less).

The evidence is probative and admissible to prove the fact at issue.<sup>82</sup> Nevertheless, a finding based on the evidence is insensitive—in the closest possible world in which the seized amount is below 500 grams (i.e., a world in which the amount seized is slightly below 500 grams) the expert would still testify that the amount satisfies the statutory amount. The fact that the expert's testimony would still exist and lead to a false inference in this world, however, does not undermine the quality of the evidence (where the seized amount is approximately twice the statutory amount).<sup>83</sup>

Similarly, consider the following:

*Lake Pollution:* The defendant is charged with illegally dumping a toxic substance into a lake. A video clearly shows the defendant dropping a container of what appears to be the toxic substance down a long drain pipe that leads to the lake. There is a small hook in the pipe, however, and it is possible that the container could have caught on the hook and not reached the lake, although it would be extremely difficult for this to have occurred.

The video evidence is probative and admissible (assuming it is properly authenticated).<sup>84</sup> Nevertheless, it is insensitive—in the closest world in which the container does not reach the lake, it catches on the hook. In that world, however, the video evidence would still exist. The law of evidence does not require sensitivity.<sup>85</sup>

80. A brief word on methodology. The purpose of these simplified examples is to illustrate the conceptual relationship between sensitivity and legal evidence by presenting extremes in the different categories. The notes provide additional examples and cases that fit the categories. My thanks to an anonymous referee for suggesting examples along these lines.

81. See FED. R. EVID. 702.

82. See *United States v. Dent*, 149 F.3d 180 (3d Cir. 1998).

83. Similar to the belief in *Speed*, see *supra* note 52 and accompanying text, a finding based on the evidence is within a range of reliable inference even though it lacks sensitivity.

84. See *United States v. Hamel*, 551 F.2d 107 (6th Cir. 1977). On authentication, see FED. R. EVID. 901. Similar to the belief in *Trash Bag*, see *supra* note 49 and accompanying text, the mere fact that the evidence could lead to a false inference (in the closest world in which the finding is false) does not undermine the reliability of the evidence.

85. See, e.g., *Tyson Foods, Inc. v. Bouaphakeo*, 136 S. Ct. 1036, 1048–1049 (2016) (“[T]he study here could have been sufficient to sustain a jury finding as to hours worked if it were introduced in each employee’s individual action.”). Importantly, this point applies to both

On the other hand, sensitivity is not sufficient: the law will reject some evidence that satisfies sensitivity because of other epistemic reasons (including lack of reliability). Consider the following example:

*Bad Lab:* A lab technician will declare a “match” between a crime sample and a test sample whenever the police tell him that the test sample came from a suspect. The police recover a sample from a crime scene and ask the technician whether the sample came from the defendant. The technician will testify that the sample from the crime scene “matches” the defendant.

Suppose that the technician’s testimony fails the basic admissibility criteria for expert testimony.<sup>86</sup> But suppose also that if the defendant hadn’t committed the crime, the police would not have focused their attention on the defendant or obtained his sample.<sup>87</sup> In other words, the finding of guilt is sensitive—in the closest possible world in which the finding is false, the evidence is not presented to the jury. Nevertheless, the evidence is inadmissible.<sup>88</sup>

To sum up: sensitivity neither explains a distinction between statistical and individualized evidence nor does it provide a doctrinal requirement for legal evidence. As a general account of legal evidence, therefore, it is a false start.<sup>89</sup> Understanding where and how the sensitivity account goes awry, however, points the way toward a more promising idea: epistemic safety.

statistical and individualized evidence: regardless of its form, evidence may be probative, reliable, and admissible, and yet fail to satisfy sensitivity.

86. See FED. R. EVID. 702. Suppose, for example, that the technician does not have proper training or any specialized knowledge; the technician failed to follow proper protocols in the instant case; the technique itself is not generally accepted or recognized in the forensic science community; and the technique is of unknown reliability. Cf. *Manuel v. City of Joliet*, 580 U.S. \_\_\_ (2017), slip op. at 1 (civil claim based on allegations of fraudulent forensic evidence and lies by technicians).

87. The evidence meets the test articulated by Enoch & Fisher, *supra* note 12, at 591: if the defendant had not committed the crime, he would, in all likelihood, not have been convicted.

88. As with the previous examples, the analysis above applies to both statistical and individualized evidence. Consider the following example involving an eyewitness:

*Bad Witness:* A cab causes harm. Mr. Green owns one cab, which is green. A witness will testify to seeing a green cab cause the harm. The witness, however, is colorblind and cannot distinguish green and red hues. Mr. Red owns the other ten cabs in the town. Nine of Mr. Red’s cabs are red and one is blue. Moreover, the cabs are not distributed evenly throughout the town. The blue cab is usually closer to where the accident occurred, and the other nine cabs are often in the same vicinity but not as often as the blue one. The eyewitness can accurately identify blue hues.

Although the testimony may be admissible—under Federal Rule of Evidence 602, the witness would likely be allowed to testify that the cab *appeared* green to the witness—it will not be sufficiently probative to establish that Mr. Green’s cab caused the harm. This is so because, by the witness’s own admission (let’s assume) the witness cannot distinguish Mr. Green’s cab from nine of the ten other cabs in the town. But notice the evidence appears to satisfy sensitivity: in the closest world in which a non-green cab causes harm, the witness no longer testifies to seeing a green cab (instead, she testifies to seeing a blue one). For a similar example, see Greco, *supra* note 6, at 201.

89. This is not to deny, however, that sensitivity may play an instrumental role for some types of cases. See *supra* note 64.

## IV. SAFETY

Safety provides an alternative criterion for assessing evidence. Within epistemology, safety concerns how easily a true belief could have been false. Safety can also be used to evaluate legal evidence. In this context, safety concerns how easily a factual finding based on the evidence could be erroneous. This section first provides a brief overview of safety in epistemology and then discusses the importance of safety for legal evidence.

## A. Safety in Epistemology

Safety has played a prominent role in philosophical debates about knowledge.<sup>90</sup> Most importantly, safety has been proffered as an alternative to sensitivity as a modal requirement for knowledge.<sup>91</sup> In this context, the basic idea behind safety concerns how easily it could be the case that (1) an agent holds a particular belief and (2) that belief is false. Safety is a matter of degree, and it is typically evaluated in terms of possible worlds.<sup>92</sup> As we will see, many of the upsides to safety in epistemology will also apply in the legal context.

Philosophers have argued that safety can explain the philosophical examples discussed in Section II. For example, Duncan Pritchard argues that safety distinguishes between *Lottery* and *Newspaper* because the belief (i.e., that the ticket lost) in *Newspaper* is safer than in *Lottery*.<sup>93</sup> All it takes for a false belief to occur in the latter is for, say, a different set of numbers to pop up. For a false belief to occur in *Newspaper*, however, there would have to be one or more mishaps leading to the newspaper printing an erroneous result.<sup>94</sup> Safety also explains the apparent counterexamples to sensitivity—*Trash Bag* and *Speed*—where knowledge appears to be present even though the beliefs are insensitive.<sup>95</sup> Safety provides a plausible explanation for *why* the beliefs should count as knowledge: the beliefs are true in close possible worlds. In *Trash Bag*, the bag continues to fall in several close possible worlds. In *Speed*, in the close possible worlds in which the speed is near 10 miles per hour, I continue to know that the speed is below 35 miles per hour.

90. Sosa, *supra* note 4; Pritchard, *supra* note 16.

91. In particular, philosophers have argued that safety explains issues such as closure, skepticism, and luck. Sosa, *supra* note 4 (skepticism); Luper, *supra* note 79 (closure); PRITCHARD, *supra* note 41 (luck).

92. See, e.g., Greco, *supra* note 6, at 195 (“S’s belief that p is safe just in case: there are no close worlds where both S believes that p, and p is false.”). See also Manley, *supra* note 40. In assessing closeness, Pritchard distinguishes between the probability of the world obtaining and how easy it would be for that world to obtain. Duncan Pritchard, *Risk*, 46 METAPHILOSOPHY 436, 452–457 (2015).

93. Pritchard, *supra* note 16, at 180.

94. *Id.* Nothing in the analysis on legal evidence depends on whether this explanation succeeds with regard to knowledge (i.e., why *Newspaper* counts as knowledge and *Lottery* does not). See *supra* note 30 and accompanying text.

95. See *supra* notes 49–53 and accompanying text.

In addition to giving plausible explanations of the examples with regard to knowledge, safety also fits with general evidentiary considerations relevant to law. Safety, unlike sensitivity, concerns the risk of drawing erroneous inferences in close possible worlds. Moreover, safety, unlike sensitivity, better tracks the reliability of evidence in close possible worlds.<sup>96</sup> These aspects of safety are easiest to appreciate when reflecting on the types of situations where safety and sensitivity diverge. On one hand, beliefs can be *insensitive* yet *safe*. This could be the case because the closest world in which a belief is false is itself a distant world. In such a situation, the belief will be *safe* because it is true in close possible worlds. Nevertheless, the belief may be *insensitive* because in the closest world in which it is false (which is a distant world), it is still held. To put this another way, in this situation the agent could not easily go wrong (safety), but in the closest world where she does go wrong she would fail to notice (insensitivity). On the other hand, beliefs can be *sensitive* yet *unsafe*. This will be the case when the following two conditions exist: (1) there are several close possible worlds in which a belief is false and held anyway (unsafe), but (2) in the closest possible world in which the belief is false, the agent does not hold the belief (sensitive). To put this another way, in this situation the agent could easily go wrong (unsafe), but in the closest world in which the belief is false she does not go wrong (sensitive). For these reasons, safety (unlike sensitivity) tracks the reliability of evidence in close possible worlds and how easily it could lead to erroneous inferences.

Safety, however, also faces challenges within epistemology.<sup>97</sup> Most importantly, safety accounts of knowledge face difficult line-drawing issues. Because safety is vague and a matter of degree, a belief's safety will fall on a spectrum between safe and unsafe, depending on how easily things could have gone wrong epistemically. Therefore, it may be difficult to specify exactly how safe a belief must be to qualify as knowledge.<sup>98</sup> This potential challenge, however, does not carry over to law. This is because, as will be explained below, the feature of legal evidence that safety most closely maps onto—the probative value of evidence—is also vague and a matter of degree. Thus, safety may play an important epistemic role for legal evidence regardless of whether it succeeds in accounting for knowledge.

## B. Safety and Law

Safety provides an alternative criterion for assessing legal evidence.<sup>99</sup> In the legal context, safety concerns how easily a factual finding based on evidence

96. Greco, *supra* note 6, at 193 (“[S]afety just is reliability throughout a space of close counterfactual situations.”). On reliability, see *supra* note 48.

97. See, e.g., Ran Neta & Guy Rohrbaugh, *Luminosity and the Safety of Knowledge*, 85 PAC. PHIL. Q. 396 (2004); Juan Comesaña, *Unsafe Knowledge*, 146 SYNTHÈSE 395 (2005).

98. Even if safety is vague, we can draw distinctions along a spectrum. See, e.g., Greco, *supra* note 6, at 196 (comparing “weak” and “strong” safety).

99. Epistemic safety has not been explored in detail in the legal literature. Redmayne briefly considers but rejects safety as a legal requirement; however, he employs an extremely strong

could be erroneous. I will argue that safety fits with legal doctrine better than sensitivity and is an important consideration for legal evidence. The discussion first explains how safety relates to the legal examples discussed above, and it then explicates why safety matters for the law of evidence.

Safety better accounts for the legal examples than sensitivity. Recall that sensitivity was advanced primarily as a way to distinguish *Blue Bus* and *Eye-witness*. Safety, however, also provides a plausible way in which to distinguish these two cases. The eyewitness evidence will be safer when there are close possibilities in which similar accidents are caused by non-blue buses.<sup>100</sup> In close worlds in which another company causes the accident, the witness (who, by hypothesis, has an accuracy rate of 70 percent) is unlikely to testify that the bus was blue. By contrast, in close possible worlds in which another company causes the accident, the market-share evidence remains the same. For example, suppose there are ten similar cases except that the Red Bus Company caused the accidents. Relying on the market-share evidence in those cases would result in ten errors against the Blue Bus Company and zero correct decisions. By contrast, relying on a witness who is 70 percent accurate would be expected to produce seven correct identifications (“the bus was red”) and three errors (“the bus was blue”).<sup>101</sup>

More importantly, safety explains cases in which sensitivity predicts the wrong results. In the examples *Drug Weight* and *Lake Pollution*, the evidence is probative and admissible even though it fails sensitivity. In the closest world in which the drug weight is below 500 grams, the expert would have testified that it met the statutory requirement. In the closest world in which the container fails to reach the lake, the video evidence is the same. Safety explains why these items nevertheless are probative and admissible: in close possible worlds, the evidence leads to correct factual findings. In close possible worlds in which the drug weight is near 1 kilogram, findings based on the expert’s testimony will be correct. Similarly, in close

conception of safety (a belief must be true in every close possible world). See Redmayne, *supra* note 3, at 301–302. Enoch & Fisher, *supra* note 12, at 575 n.60, briefly mention but dismiss safety as a “less appropriate” consideration. Pritchard briefly discusses safety in the context of error rates in criminal trials and suggests a possible safety requirement for verdicts. Pritchard, *supra* note 92, at 452–457.

100. In close possibilities where Blue Bus does cause the accident, the items of evidence would likely produce the same number of correct decisions (100 percent). And in close possibilities where no accident occurs (and thus any lawsuits are false claims), the items of evidence would also likely produce the same number of errors (100 percent).

101. Although I conclude that safety plausibly distinguishes the two examples, it is important to emphasize that I am *not* arguing that safety explains a general distinction between statistical and non-statistical (or “individualized”) evidence. Therefore, explaining these two examples is less important for my purposes than it is for anyone trying to vindicate such a distinction. For the reasons discussed in Section III, I am skeptical that there is a meaningful epistemic distinction to be drawn. Moreover, as with sensitivity, the safe-unsafe distinction also cuts across the distinction between statistical and individualized evidence (some statistical evidence will be safe and some individualized evidence will be unsafe). The central thesis of this article—that safety affects the quality and hence the probative value of legal evidence—does not necessarily depend on distinguishing these cases. Thus, any readers who reject the above analysis may still accept the general claims about safety and legal evidence.

possible worlds in which the container is dropped in the drain pipe, the evidence reaches the lake. Safety correctly explains the law's treatment of such evidence.

Safety also explains the reverse situation: cases in which evidence is sensitive yet inadmissible. The example of *Bad Lab* fits this pattern. A finding based on the evidence is sensitive: in the *closest* possible world in which the finding is false, the lab analyst does not testify to a match. Although the finding is sensitive, the evidence is unreliable and inadmissible.<sup>102</sup> Safety explains the rejection of such evidence: there are several close possible worlds (in which the police are mistaken or lying) in which such evidence would lead to an erroneous finding.<sup>103</sup>

Why does safety matter for legal evidence? And how does safety arise within the law of evidence? The primary reason that safety matters for legal evidence is that, unlike sensitivity, safety tracks the reliability of evidence in close possible worlds and, therefore, affects the quality of legal evidence. The discussion below explicates the relationship between safety and four aspects of the law of evidence: probative value, admissibility rules, standards of proof, and the comparative nature of the proof process.

First, and most importantly, safety affects the *probative value* of legal evidence. Probative value refers to the strength and quality of evidence in proving a disputed fact.<sup>104</sup> In general, probative value depends on more than probabilities. It also depends on the quantity and quality of other evidence and a variety of contextual factors.<sup>105</sup> Other things being equal, when inferences from evidence are safe, the evidence will have higher probative value.<sup>106</sup> When inferences based on evidence are unsafe, the evidence will have lower probative value because it will do a poor job of ruling out alternative inferences. When the inferences are unsafe, in other words, there are close possibilities in which a finding based on the evidence is false (e.g., the defendant is innocent). Evidence will thus have lower value in proving the disputed fact (e.g., guilt). We can illustrate these points with the above examples. With *Bad Lab*, there are close possible worlds in which the evidence leads to false findings.<sup>107</sup> With *Drug Weight* and *Lake Pollution*, by contrast,

102. See *supra* notes 86–88 and accompanying text.

103. Safety also explains *Bad Witness*, *supra* note 88. Although the witness's testimony would change in the *closest* possible world in which the verdict is false (i.e., the cab is blue), there are nine other close possible worlds in which the witness cannot distinguish Mr. Green's cab from the competition.

104. See FED. R. EVID. 403.

105. See *Old Chief v. United States*, 519 U.S. 172, 182–183 (1997) (discussing the factors that affect probative value, including (1) the parties' need for the evidence, (2) possible evidentiary alternatives available to the party, and (3) how the evidence fits with the narratives being presented).

106. This is not to suggest that safety captures all aspects of probative value. Safe evidence may have low probative value for other reasons. For example, when there are not close possibilities in which the findings are false, then evidence of otherwise poor quality will be safe. In addition, safe evidence may have low probative value because it is cumulative of other evidence.

107. Similar considerations apply to *Bad Witness*, *supra* note 88.

the evidence leads to true findings in close possible worlds. The evidence has higher probative value in the latter examples precisely *because* an inference from the evidence is safe—it could not easily lead to a false finding. By contrast, in *Bad Lab*, false findings could easily be made based on the evidence. Safety thus provides an important consideration in assessing the probative value of legal evidence.<sup>108</sup>

Second, safety also fits with several types of admissibility rules that depend on considerations of probative value.<sup>109</sup> Safety plays an important role in the rules regulating expert testimony.<sup>110</sup> Admissibility of expert testimony depends on its reliability: courts are instructed to consider whether (1) the testimony is “based on sufficient facts or data”; (2) the testimony is “the product of reliable principles and methods”; and (3) the expert “reliably applied the principles and methods.”<sup>111</sup> This standard reduces unsafe inferences from expert testimony—i.e., evidence that leads to false findings in close possible worlds.<sup>112</sup> When evidence fails to satisfy the admissibility standard, jurors could easily draw false conclusions from it. Similar considerations apply to other admissibility rules that depend on considerations of probative value. A list of such rules includes: (1) the many exceptions to the general ban on hearsay,<sup>113</sup> (2) the categories of self-authenticating documents,<sup>114</sup> (3) the requirements that witnesses have personal knowledge

108. For similar reasons, the probative value in *Eyewitness* is greater than the probative value in *Blue Bus*. See *supra* note 101 and accompanying text. See also Edward K. Cheng, *Reconceptualizing the Burden of Proof*, 122 YALE L.J. 1254, 1270 (2013) (arguing that the market-share data “borders on irrelevancy”). Safety also fits with a countervailing reason to exclude evidence under Federal Rule of Evidence 403—namely, the tendency of evidence to be “misleading” (i.e., to produce unwarranted inferences). When inferences from evidence are unsafe, the evidence is more likely to mislead the jury.

109. This is not to suggest that safety provides an overarching theory of admissibility. Probative value is one consideration underlying rules of evidence (and probative value includes more than safety). Some rules are justified based on other reasons, including privileges and rules designed to encourage out-of-court conduct. See, e.g., FED. R. EVID. 407 (subsequent remedial measures), 408 (compromise negotiations), 409 (medical expenses), 410 (pleas), 411 (insurance).

110. FED. R. EVID. 702–706.

111. FED. R. EVID. 702. For discussion of reliability in this context, see HAACK, *supra* note 3.

112. The same relationship exists between safety and the factors announced in *Daubert* to assess expert testimony: (1) whether the basis for the testimony has been tested, (2) whether it has known error rates, (3) whether it has been subjected to peer view and published, (4) whether it possesses standards of control, and (5) whether it is accepted in the relevant community of experts. See *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993). These factors each reduce unsafe inferences from expert testimony. As one leading evidence treatise explains, “*Daubert* expects judges to decide the question whether the theories, techniques, and data as applied can be trusted... what *Daubert* seeks is the best available assurance of reliability in the sense of accurate and correct outcomes.” CHRISTOPHER B. MUELLER & LAIRD C. KIRKPATRICK, 3 FEDERAL EVIDENCE §7:10 (4th ed. 2016).

113. See, e.g., FED. R. EVID. 803, 807. The Advisory Committee Notes to Rule 803 explain that the categorical exceptions are justified based on their “circumstantial guarantees of trustworthiness.”

114. See FED. R. EVID. 902. The Advisory Committee Notes to Rule 902 explain that these categories possess characteristics that “reduce the possibility of unauthenticity to a very small dimension.”

and that exhibits be authenticated;<sup>115</sup> and (4) some limitations on character evidence.<sup>116</sup> These rules improve epistemic safety by excluding evidence likely to lead to false findings in close possible worlds.<sup>117</sup> In sum, because safety affects probative value, it also plays a role in the wide array of rules that regulate evidence based on considerations of probative value.

Third, safety affects whether evidence satisfies standards of proof. Whether evidence satisfies a particular standard of proof—e.g., “preponderance of the evidence” or “beyond a reasonable doubt”—depends on the probative value of the evidence as a whole.<sup>118</sup> Whether a fact is proven depends on how strongly the evidence supports an inference of this fact. The strength of the evidence depends, in part, on how well the evidence rules out alternative possibilities.<sup>119</sup> Evidence that leads to safe inferences rules out alternatives better than evidence that produces unsafe inferences. When evidence has lower probative value because of safety considerations it consequently is less likely to satisfy a particular standard of proof. Consider, again, a defendant’s confession. Although it is impossible to know in the abstract whether this evidence is sufficient to prove guilt beyond a reasonable doubt,<sup>120</sup> one important consideration will be the safety of inferences from the evidence: Are there close possible worlds in which the

115. FED. R. EVID. 602 (requiring evidence sufficient to support a finding that witnesses have personal knowledge), 901 (requiring evidence sufficient to support a finding that exhibits are what their proponents claim them to be).

116. FED. R. EVID. 404. The Advisory Committee Notes to Rule 404 mention that character evidence often has low probative value and high potential for unfair prejudice.

117. In addition, impeachment rules designed to reveal possible defects with testimony allow for evidence indicating reasons why inferences from testimony might be unsafe (i.e., reasons to think the witness is mistaken or lying). See FED. R. EVID. 607–609, 613.

118. This will also include the probative value of any competing evidence. Standards of proof implement policy goals regarding accuracy and the risk of error. The “preponderance of the evidence” standard is designed to minimize errors and to allocate the risk of error roughly evenly between the parties. See *Grogan v. Garner*, 498 U.S. 279, 286 (1991). By contrast, the “beyond a reasonable doubt” standard is designed to shift the risk of error away from false convictions. See *In re Winship*, 397 U.S. 358, 364 (1970).

119. See *Anderson v. Griffin*, 397 F.3d 515, 521 (7th Cir. 2005) (“[I]f in a particular case all the alternatives are ruled out, we can be confident that the case presents one of those instances in which [a] rare event did occur.”).

120. One would need to know something about other evidence and details about the particular case. It would also be impossible even if we knew, in the abstract, the base rates for true and false confessions. If, for example, we had data indicating that 95 percent are true and 5 percent are false, this would not establish whether this defendant is guilty beyond a reasonable doubt. Moreover, even more extreme numbers in either direction would not change the need to assess the details and other evidence. This is not to suggest that default rules for when evidence is insufficient cannot be established. The common law *corpus delicti* rule, for example, required additional evidence of a crime before a confession could be sufficient to support a conviction. See James Q. Whitman, *Presumption of Innocence or Presumption of Mercy?: Weighing Two Western Modes of Justice*, 94 TEX. L. REV. 933, 951 n.78 (2016) (discussing corroboration requirements for confession evidence). Cf. Andrea Roth, *Safety in Numbers? Deciding When DNA Alone Is Enough to Convict*, 85 N.Y.U. L. REV. 1130, 1184 (2010) (recommending a minimal threshold for the sufficiency of DNA evidence, but also noting that its probative value will depend on other evidence and the competing theories advanced by the parties).



defendant is innocent and confesses? How easily could that be happening in this case?<sup>121</sup>

Fourth, and finally, safety fits with the *comparative* nature of legal proof. Scholars have explained this phenomenon in a variety of ways—for example, comparative probabilistic ratios, contrasting explanations of the evidence, and competing narratives.<sup>122</sup> One commonality among these different perspectives is that legal fact-finders do not examine the relationships between evidence and facts in isolation. They do so in the context of alternative, competing evidence, explanations, and arguments.<sup>123</sup> The fundamental epistemic issue at trial is whether legal fact-finders are justified in accepting facts as proven, given (1) the evidence, (2) the standard of proof, and (3) any plausible contrasting explanations or arguments supporting the other side. Safety contributes to this process because evidence that produces safe inferences better distinguishes between the different factual possibilities. When inferences from evidence are unsafe, the evidence is consistent with different close possibilities (e.g., guilt and innocence). The more unsafe, the less likely it is that the evidence distinguishes between these possibilities.<sup>124</sup> When the inferences are safe, the evidence assists in ruling out alternatives.<sup>125</sup> Evidence that produces safe inferences is thus better precisely because it better supports one conclusion (over its alternatives) in close possible worlds.

## V. CONCLUSION

This article has defended the importance of epistemic safety for legal evidence. In the process of doing so, the article also considered an alternative epistemic consideration—sensitivity—that scholars have claimed plays an important role in the law of evidence. I argued, however, that

121. Importantly, both safety and probative value are matters of degree. This similarity indicates another important difference between the legal and philosophical contexts. This feature may be a downside in epistemology, see *supra* notes 97–98, but there is no similar downside in explaining a legal concept that already shares this feature. Indeed, this confluence supports an explanatory fit between the two concepts.

122. See, e.g., Richard O. Lempert, *Modeling Relevance*, 75 MICH. L. REV. 1021 (1977); Cheng, *supra* note 108; Pardo & Allen, *supra* note 3; Allen, *supra* note 35; Nancy Pennington & Reid Hastie, *A Cognitive Model of Jury Decision Making: The Story Model*, 13 CARDOZO L. REV. 519 (1991).

123. The same is also true for many projects in philosophy. See Walter Sinnott-Armstrong, *A Contrastivist Manifesto*, 22 SOC. EPISTEMOLOGY 257 (2008).

124. Evidence that does not by itself distinguish between the parties' explanations may nevertheless be relevant. Indeed, some trial evidence is "overlapping" in the sense that it is consistent with the claims made by each side.

125. To be clear, I am not arguing that the law imposes—or should impose—a specific safety requirement for verdicts. See Pritchard, *supra* note 92, at 457 (suggesting the possibility of imposing a safety requirement on verdicts). Safety and probative value are matters of degree. See *supra* note 121. Thus, rather than trying to draw sharp lines around a safety requirement for law, we can recognize an important (epistemic) role for safety by revealing its role in the probative value of legal evidence. When evidence leads to unsafe inferences, its probative value diminishes accordingly.

sensitivity does not and should not play this role. The reasons for this are similar to those advanced in epistemology: sensitivity does not track the reliability of evidence, or the risk of drawing erroneous inferences, in close possible worlds. Safety, however, does track these features and thus has a greater effect on the probative value of evidence. For this reason, safety is an important consideration for legal evidence, and safety explains several aspects of the law of evidence that depend on considerations of probative value.

This article's discussion of safety provides one example of how epistemology can contribute to the law of evidence. As such, it is part of a larger interdisciplinary project in legal philosophy. The importance of safety for both knowledge and legal proof—and for similar reasons—suggests a deep similarity between the two disciplinary contexts. At the heart of each is a concern for reliable evidence and justified conclusions. Indeed, according to one prominent view, knowledge *ascriptions* function to flag reliable agents or reliable sources of information.<sup>126</sup> The legal requirements for verdicts serve a similar function: they provide a procedural framework for identifying reliable sources of evidence and the verdicts on which the law will (and will not) rely.<sup>127</sup> Safety aids this goal in both domains.<sup>128</sup> This further suggests that even if verdicts do not necessarily aim at knowledge,<sup>129</sup> both domains are pursuing very similar cognitive goals.

126. EDWARD CRAIG, *KNOWLEDGE AND THE STATE OF NATURE* (1990), at 91. See also *KNOWLEDGE ASCRIPTIONS* (Jessica Brown & Mikkel Gerken eds., 2012).

127. See *supra* notes 23–24 and accompanying text. Importantly, verdicts will be overturned if they are not supported by sufficient evidence. See *supra* note 23. Another way of recognizing this similarity is to note, as Robert Brandom has argued, that when one ascribes knowledge, the agent *ascribing* knowledge is endorsing an inference from (1) commitment to the truth of a proposition to (2) entitlement (to that commitment). See ROBERT B. BRANDOM, *MAKING IT EXPLICIT: REASONING, REPRESENTING, AND DISCURSIVE COMMITMENT* (1994), at 217. The law does something similar with verdicts. In declaring evidence sufficient to support a verdict, the law is endorsing an inference from a jury's commitment (the verdict) to entitlement (the legal judgment).

128. Consider, for example, witness testimony. The decision to rely on this evidence (inside or outside the law) should depend on how easily the witness could be mistaken or lying (safety).

129. See *supra* notes 28–29 and accompanying text.