

## A Brief Comment on the Response By Professors Findley and Risinger to My Original Contribution to Professor Risinger's Symposium

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### I. THE MICROCOSM ISSUE: SHAKEN BABY SYNDROME (SBS)

The primary focus of my Symposium Article is not Shaken Baby Syndrome (SBS). The Article comments on a wide range of types of expert testimony; it uses examples relating to DNA typing, microscopic hair analysis, comparative bullet lead analysis (CBLA), bloodstain pattern analysis (BPA), psychiatry, forensic odontology, and intoxication testing.

However, the Article does touch on SBS. The Article proposes a test including a second prong that an accused should be entitled to a new trial when subsequent research seriously undermines a technique or theory that the prosecution relied on at the prior trial in the sense that the new research provides a solid empirical basis for preferring the new theory over the prior. To illustrate the application of that prong of the test, the article draws a contrast. On one hand, the article argues that a new trial is warranted when a later mtDNA test excludes an accused even though at the earlier trial the prosecution introduced a microscopist's opinion that the accused was the likely source of the hair strand discovered at the crime scene.<sup>1</sup> For its part,

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<sup>1</sup> The Symposium Article differentiates between the question of whether the subsequent research sufficiently invalidates the prior testimony and the issue of whether at a new trial the presentation of the new research is likely to change the outcome of the case. As Professors Findley and Risinger put it, the focus of the article is “a single variable in a multi-variable analysis” required to determine whether to grant a new trial. To gain a new trial, the accused must show both that to some extent the new research calls into question the validity of the

the microscopic analysis relies on the witness's subjective judgment; and in one of the leading investigations of the reliability of such analysis, half the declared matches were false positives.<sup>2</sup> The 2002 FBI study found that in 11% of the studied case in which the microscopist had declared a match, mtDNA analysis definitely excluded the suspect.<sup>3</sup> Each essential step in mtDNA analysis has been validated in much the same way as the essential steps in nuclear DNA testing. Thus, in this situation there is a solid empirical basis for concluding that the mtDNA result trumps the microscopist's opinion.

The Article contrasts that situation with a case in which a biomechanical expert contradicts a pathologist's opinion that the cause of an infant's fatal brain injuries was SBS. Like a prior 2010 article on SBS<sup>4</sup> and the discussion of SBS in a treatise,<sup>5</sup> the article points out that there are significant weaknesses in the case for SBS. The article notes that biomechanical research conducted since the advent of the SBS theory presents a serious challenge to SBS. Nevertheless, the article argues that this case is distinguishable from the hair analysis situation. As previously stated, each essential step in mtDNA analysis has been studied and empirically validated. The same cannot be said for the biomechanical case against SBS. Some biomechanical experts contend that mere manual shaking of an infant cannot generate the forces necessary to cause fatal brain injury. However, rather than relying on empirically validated brain injury thresholds for infants, biomechanical experts rely on "estimated" thresholds; they have to do so because medical ethics precludes subjecting actual infants to the controlled experiments that would be necessary to derive validated thresholds. The biomechanical experiments in question have involved adult primates and anthropomorphic models. In short, the empirical validity of mtDNA analysis has been demonstrated more thoroughly than the biomechanical critique of SBS.

In their Response, Professors Keith Findley and Michael Risinger take the position that the article understates the extent to which the critique of

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prior testimony and some likelihood that at a new trial the introduction could affect the outcome. Footnotes 44-47 of the Symposium Article note that the jurisdictions employ varying standards to define the requisite effect of the introduction of the new research.

<sup>2</sup> PRESIDENT'S COUNCIL OF ADVISORS ON SCI. & TECH., REPORT TO THE PRESIDENT: FORENSIC SCIENCE IN CRIMINAL COURTS: ENSURING SCIENTIFIC VALIDITY OF FEATURE-COMPARISON METHODS 119 (Sept. 2016), [https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast\\_forensic\\_science\\_report\\_final.pdf](https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf).

<sup>3</sup> *Id.* at 121.

<sup>4</sup> Edward J. Imwinkelried, *Shaken Baby Syndrome: A Genuine Battle of the Science (And Non-Scientific) Experts*, 46 CRIM. L. BULL. 156 (Jan.-Feb. 2010) [hereinafter *Battle*].

<sup>5</sup> 2 PAUL C. GIANNELLI, EDWARD J. IMWINKELRIED, ANDREA ROTH & JANE CAMPBELL MORIARTY, SCIENTIFIC EVIDENCE § 19.05[a] (5th ed. 2012 & 2017 Supp.) [hereinafter GIANNELLI].

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SBS calls the validity of the SBS theory into question. They state that I was misled by the writings of some of the strongest proponents of SBS, Dean Joelle Anne Moreno and a former prosecutor, Mr. Brian Holmgren.<sup>6</sup> It is true that both this article and the 2010 piece conclude that SBS testimony is admissible. (For that matter, Professors Findley and Risinger opine that such testimony is “likely admissible.”<sup>7</sup>) The extended treatment of SBS in the 2010 article does not argue that the case for SBS rests on classic scientific research in the sense of controlled experiments. Rather, the article lays out a different argument supporting SBS: There are tens of cases in which the autopsy of deceased infants revealed fatal brain injuries, and the other evidence indicated that there was shaking without striking. The 2010 article and the present article acknowledge that this argument is not scientific in the traditional sense<sup>8</sup> but contend that nevertheless, these studies support a rational inference that shaking can cause fatal brain injuries to infants. Professors Findley and Risinger dismiss this argument as “a thin reed indeed” and argue that the Symposium Article ought to conclude that the critique has so seriously undermined the SBS theory that a new trial should be awarded.

Professors Findley and Risinger’s Response places me in a curious position. As previously stated, they claim that in general I am too supportive of SBS and more specifically that I have been misled by the writings of Dean Moreno and her coauthor, Mr. Holmgren. Ironically, those claims would come as a surprise to Dean Joelle Moreno and Brian Holmgren. The Response cites one of Dean Moreno’s articles.<sup>9</sup> Dean Moreno and Mr. Holmgren have written two substantial pieces on the subject. In those articles, Dean Moreno and Mr. Holmgren characterize me as one of the “small” group of academics who “vocal[ly]” advance the “specious” claim that the SBS theory may be “junk science.”<sup>10</sup> Indeed, Professor Findley and

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<sup>6</sup> Keith A. Findley & D. Michael Risinger, *The Science and Law Underlying Post-Conviction Challenges to Shaken Baby Syndrome Convictions: A Response to Professor Imwinkelried*, 48 SETON HALL L. REV. 1209, n.24.

<sup>7</sup> *Id.* at n.45.

<sup>8</sup> The 2010 Article explicitly refers to the reliance on case studies as “non-scientific.” *Battle*, *supra* note 4. See also Edward J. Imwinkelried, *The Meaning of “Appropriate Validation” in Daubert—Interpreted in Light of the Broader Rationalist Tradition, not the Narrow Scientific Tradition*, 30 FLA. ST. U. L. REV. 735 (2003).

<sup>9</sup> Findley & Risinger, *supra* note 6, at n.14 (citing Joelle Anne Moreno & Brian Holmgren, *The Supreme Court Screws Up the Science: There Is No Abusive Head Trauma/Shaken Baby Syndrome Scientific Controversy*, 2013 UTAH L. REV. 1357 [hereinafter *The Supreme Court*]). See also Joelle Anne Moreno, *Extralegal Supreme Court Policy-Making*, 24 WM. & MARY BILL RTS. J. 451, 513–14 (2015).

<sup>10</sup> *The Supreme Court*, *supra* note 9, at 1373; Joelle Anne Moreno & Brian Holmgren, *Dissent Into Confusion: The Supreme Court, Denialism, and the False “Scientific” Controversy Over Shaken Baby Syndrome*, 2013 UTAH L. REV. 153, 158–59 [hereinafter *Dissent*].

I are mentioned in the same breath—that is, the same footnotes in the two articles—as leading critics of SBS. The upshot is that both the strong proponents of SBS and its strong opponents take issue with my position. However, that is understandable.

A. *Support for SBS*

It is expectable that Dean Moreno and Mr. Holmgren think that I am insufficiently supportive of SBS. The titles of their two articles assert their belief that there is no legitimate controversy over the validity of SBS; one refers to “the False ‘Scientific’ Controversy Over Shaken Baby Syndrome”<sup>11</sup> while the other flatly asserts that “There Is No Abusive Head Trauma/ Shaken Baby Syndrome ‘Scientific’ Controversy.”<sup>12</sup> In contrast, the title of the 2010 article refers to “A Genuine Battle of the Scientific (and Non-Scientific) Experts.”<sup>13</sup> Moreover, in treatise, I wrote that the courts should approach SBS testimony with “wariness.”<sup>14</sup> Both the 2010 article and this Symposium Article contend that SBS’ reliance on case reports raises common sense doubts about the validity of the theory:

[I]t is questionable to accept these [case] reports at face value. [T]he caregiver could easily be traumatized by the event; and as a consequence, he or she might experience amnesia or “defensive forgetting” of any impact. A loving parent’s recollection of their child’s head accidentally striking an object or wall might be a painful memory that the parent would want to repress. On the alternative assumption that the caregiver acted in bad faith, in order to minimize her culpability the caregiver might deliberately withhold the detail that they struck the child’s head against an object or surface.<sup>15</sup>

I also agree with Professors Findley and Risinger that there is credible evidence that symptoms such as severe retinal hemorrhages in infants are not pathognomonic for head trauma; there can be other causes.<sup>16</sup> In sum, my position is that it is inaccurate to claim that it is as settled as Dean Moreno

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<sup>11</sup> *Dissent*, *supra* note 10.

<sup>12</sup> *The Supreme Court*, *supra* note 9.

<sup>13</sup> *Battle*, *supra* note 4.

<sup>14</sup> GIANNELLI, *supra* note 5, at 249, § 19.05[a].

<sup>15</sup> *Battle*, *supra* note 4, at 174. In fact, both of Dean Moreno’s articles recognize the risk that an accused who acted in bad faith would withhold relevant details from the authorities. *Supreme Court*, *supra* note 9, at 1424; *Dissent*, *supra* note 10, at 216.

<sup>16</sup> Mark J. Shuman & Kenneth D. Hutchins, *Severe Retinal Hemorrhages with Reinoschisis in Infants Are Not Pathognomonic for Abusive Head Trauma*, 62 J. FORENSIC SCI. 807 (2017).

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and Mr. Holmgren make it out to be that without a striking, merely shaking an infant can cause fatal brain injury.

B. *Opposition to SBS*

However, I can also understand why Professors Findley and Risinger find my position unsatisfactory. They do not cast their position as categorically as Dean Moreno and Mr. Holmgren do. In particular, Professors Findley and Risinger do not assert that it is clearly settled that SBS is junk science. However, they state their position forcefully. For example, they claim that the recent research has “indisputably debunk[ed]” many of the propositions previously advanced by SBS proponents. They draw on published articles by authors such as Doctors Faris A. Bandak<sup>17</sup> and Patrick Barnes.<sup>18</sup> They acknowledge that the recent biomechanical research has involved primates and models and concede that biomechanical experts rely on “estimated” brain injury thresholds for infants. However, they counter that those facts “would only invalidate the findings of the biomechanical research if those estimates—based on extrapolation from known injury thresholds for adults, cadaver studies, animal studies, and computer modeling—were off by many orders of magnitude, which is highly unlikely.”<sup>19</sup>

I largely agree with the individual points made by Professors Findley and Risinger. However, the case for the validity of the critique of SBS is still weaker than the extent of the validation of mtDNA—the contrast made in the Symposium Article. It is certainly permissible for an expert to rely on sensible extrapolation in his or her analysis.<sup>20</sup> Furthermore, in this setting the extrapolations are highly plausible. But the bottom line is that plausibility does not equate with proof. The plausibility of a hypothesis makes it a good candidate for an empirical test, but it is not a substitute for the test. Unfortunately, in this context medical ethics bar any test to directly determine infant’s brain injury threshold.

The article by Dr. Bandak cited by Professors Findley and Risinger is frequently invoked by the biomechanical critics of SBS. However, that article has been criticized. As Dean Moreno and Mr. Holmgren have noted,

[B]iomechanics experts have published articles critiquing Dr. Bandak’s conclusions. In 2006, Dr. Susan Margulies of the University of Pennsylvania Department of Engineering, along with seven other biomechanical engineers, discovered that Dr.

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<sup>17</sup> Findley & Risinger, *supra* note 6, at 1216 n.27.

<sup>18</sup> Findley & Risinger, *supra* note 6, at 1212, 1217 nn.10 & 30.

<sup>19</sup> Findley & Risinger, *supra* note 6, at 1216 n.26.

<sup>20</sup> Gen. Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997).

Bandak had made significant errors in his mathematical calculations which led her to express “grave[] concern[s] that the conclusion reached by Bandak may be invalid due to apparent numerical errors in his estimation of forces.” When Dr. Margulies repeated Dr. Bandak’s calculations, not only was she unable to replicate his findings, but she found “values of neck forces that are actually more than 10 times lower than those [calculated by Dr. Bandak].” Dr. Margulies found that Dr. Bandak had used “flawed calculations” to “erroneously conclude[] that the neck forces in even the least severe shaking event far exceed the published injury tolerances of the infant neck.” According to Dr. Margulies, “when accurately calculated, the range of neck forces is considerably lower, and includes values that are far below the threshold of injury” calculated by Bandak.<sup>21</sup>

Dean Moreno and Mr. Holmgren add that two of the coauthors of Dr. Margulies’ article were authorities whom Dr. Bandak cited in his paper.<sup>22</sup> In short, opposition to SBS among biomechanical engineers is not monolithic.

For that matter, in an article written last year, Dr. Barnes, another authority cited by Professors Findley and Risinger, made it clear that he is “not one who says shaking can’t cause the triad” at the heart of SBS—subdural hemorrhage, retinal hemorrhage, and brain injury.<sup>23</sup> To be sure, he disagrees with experts who previously “march[ed] in lockstep”<sup>24</sup> and testified in absolutist terms that shaking not only could cause fatal brain injury but went to the length of declaring that the triad of symptoms was “pathognomonic of SBS.”<sup>25</sup> However, he uses the adjective “unsettled” to describe the state of the research about the “SBS versus impact trauma” question.<sup>26</sup>

I confess that I am probably uncommonly concerned about the uncertainty in expert analysis. Shortly after the rendition of the *Daubert* decision, I wrote a piece about the implications of the decision.<sup>27</sup> The article recognizes the importance of the Court’s formal holdings that the enactment of the Federal Rules of Evidence impliedly superseded the *Frye* general

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<sup>21</sup> *Supreme Court, supra* 9, at 1385–86.

<sup>22</sup> *Supreme Court, supra* 9, at 1386.

<sup>23</sup> Patrick Barnes, *Child Abuse—Nonaccidental Injury (NAI) and Abuse Head Trauma (AHT)—Medical Imaging: Issues and Controversies in the Era of Evidence-Based Medicine*, 50 U. MICH. J.L. REFORM 679, 687 (2017).

<sup>24</sup> *Id.* at 685.

<sup>25</sup> *Id.* at 679.

<sup>26</sup> *Id.* at 686.

<sup>27</sup> Edward J. Imwinkelried, *Evidence Law Visits Jurassic Park: The Far-Reaching Implications of the Daubert Court’s Recognition of the Uncertainty of the Scientific Enterprise*, 81 IOWA L. REV. 55 (1995).

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acceptance test and that the reference to “scientific knowledge” in Rule 702 prescribes a new reliability/validation test. However, I wrote then—and still believe—that the most important passage in *Daubert* is the Court’s explicit acknowledgment of the uncertainty in scientific analysis: “arguably, there are no certainties in science.”<sup>28</sup> No matter how many experimental tests appear to confirm a hypothesis, one can always conceive of another test; and so long as that is true, there is a possibility of subsequent falsification of the hypothesis. More recently, I have written about the uncertainty of seemingly precise scientific measurements—such as the measurements that biomechanical experts make.<sup>29</sup> Metrology is the science of measurement. The fundamental tenet of metrology is that one can never be certain that he or she has captured the true value of the measurand.<sup>30</sup> No matter how scrupulously the analyst conducts the measurement and no matter how carefully the measuring instrument has been calibrated, there is always uncertainty in the most exacting scientific measurement.

It is especially appropriate to acknowledge the considerable uncertainty surrounding SBS. In the United Kingdom, the Royal Society and the Royal Society of Edinburgh have teamed to prepare a series of primers on scientific issues for the judges in their countries. They have already issued primers on DNA typing and another on so-called gait analysis, the theory that a computer can identify a walker depicted in a video by studying the nuances of their movements. The primer on gait analysis informs the judges that “there is a lack of credible research” to validate the theory.<sup>31</sup> However, despite a request by judges for a primer on SBS, to date the societies have not issued a primer on that topic. A board commissions the primers. His Honor Mark Wall, QC, is the representative of criminal judges on the board. Judge Wall explained the societies’ failure to release a primer on SBS: The gist of his explanation is that “there is as yet no consensus. The science was and still is far from settled.” That assessment is accurate. That assessment confirms that the criticisms of SBS, including the biomechanical research, have not undermined SBS as seriously as mtDNA analysis has undercut microscopic hair analysis.

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<sup>28</sup> *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 590 (1993).

<sup>29</sup> Ted Vosk & Edward J. Imwinkelried, *Forensic Science: Measurements in Forensic Science—of Errors and Uncertainty*, 53 CRIM. L. BULL. 532 (2017); Edward Imwinkelried, *The Importance of Forensic Metrology in Preventing Miscarriages of Justice: Intellectual Honesty About the Uncertainty of Measurement in Scientific Analysis*, 7 J. MARSHALL L.J. 333 (2014).

<sup>30</sup> See generally TED VOSK & ASHLEY F. EMERY, *FORENSIC METROLOGY: SCIENTIFIC MEASUREMENT AND INFERENCE FOR LAWYERS, JUDGES AND CRIMINALISTS* (2015).

<sup>31</sup> Pallab Ghosh, *UK Judges to Get Scientific Guides*, BBC (Nov. 27, 2017), <http://www.bbc.com/news/science-environment-42057009>.

C. *The Macrocosm Issue: The Standard for Granting New Trials*

The Symposium Article proposes a two-pronged standard for determining whether the subsequent analysis has invalidated the prior theory to the extent that a new trial is warranted.<sup>32</sup> As previously stated, the second prong is that the new analysis seriously undermines the prior theory in the sense that it provides a solid empirical basis for preferring the new theory over the prior theory. As an illustrative case, the article poses a hypothetical case in which an mtDNA analysis excludes a person whom a microscopist testifies might well be the source of a hair strand. The other, initial prong of the proposed test is that the new analysis utterly discredits the prior theory. The Article uses CBLA to illustrate that prong.<sup>33</sup> At one time FBI experts testified that based on a comparative elemental analysis of a crime scene bullet and a bullet associated with the accused, they could determine whether the two bullets came from the same batch, that is, a single day's production at a bullet manufacturing plant. An essential assumption of CBLA analysis was that the elemental composition of each batch is both uniform and unique. However, after FBI experts had repeatedly testified on the basis of CBLA, William Tobin began to question that assumption. When he reviewed the production data from bullet manufacturers, he discovered that the assumption was false: There were often variations within each batch, and sometimes the elemental composition of different batches matched.<sup>34</sup> This situation is a step beyond the mtDNA case. In that case, the mtDNA analysis does not directly contradict an essential assumption of microscopic hair analysis; rather, the mtDNA analysis yields an inconsistent result, and the mtDNA analysis trumps because the thoroughgoing validation of mtDNA provides a solid empirical basis for preferring the mtDNA result. Tobin's analysis directly invalidated an essential assumption of CBLA.

The original article proposes the two-pronged test as the standard because both prongs are judicially manageable and consistent with a commitment to empiricism. The question posed by the Response is whether we should go farther. The Response argues in favor of doing so by endorsing the standard adopted by the intermediate Wisconsin appellate court in *State v. Edmonds*.<sup>35</sup> There the court announced that "the emergence of a legitimate

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<sup>32</sup> Again, to use Professors Findley and Risinger's terminology, that is the proposal for one "variable in a multi-variable analysis" to determine whether to award a new trial. Another variable is the effect that the introduction of the new evidence would likely have had to the prior verdict. See *supra* note 1.

<sup>33</sup> In most cases, firearms experts rely on a comparative analysis of the striations on the two bullets. However, in some cases the crime scene bullet is too deformed to permit that type of analysis.

<sup>34</sup> William A. Tobin & Edward J. Imwinkelried, *Comparative Bullet Lead Analysis (CBLA) Evidence: Valid Inference or Ipse Dixit?*, 28 OKLA. CITY U. L. REV. 43 (2003).

<sup>35</sup> 746 N.W.2d 590 (Wis. Ct. App. 2008).

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and significant dispute within the medical community” over SBS constitutes newly discovered evidence justifying a new trial.<sup>36</sup> A number of cases embrace a similar standard.<sup>37</sup> Professors Findley and Risinger state that the Symposium Article does not ascribe sufficient “significance” to the “shifts in the scientific and medical understandings underlying the SBS/AHT hypothesis.”

In fact, such shifts can have a four-fold significance. First, at the original trial they can provide the defense with a powerful argument for summation. The thrust of the argument would be that there is reasonable doubt because, using a different theory, another qualified expert came to a different conclusion than the prosecution expert.<sup>38</sup> The defense attorney might argue:

Ladies and gentlemen, her Honor will instruct you that you cannot find Mr. Welsh guilty unless you are convinced beyond a reasonable doubt that he shook his child and that that shaking caused his child’s brain injuries. There’s obviously reasonable doubt in this case. You heard two experts with impressive credentials give diametrically opposed opinions about causation. One says Yes. The other says No. Our witness, Dr. Vanucci, explained that while at one time many experts agreed with the shaken baby theory, today many experts, including her, reject it. Even the scientists can’t agree. Ladies and gentlemen, none of us is a scientist. I know I’m not. During jury selection, you all to me that you don’t have a scientific background. If the scientists can’t agree among themselves, how in the world can lay people—regular folks like us—decide the *scientific* issue and conclude that there was causation?

If even a single juror found that argument convincing, the argument could prevent the return of a guilty verdict.

Second, especially in a *Frye* jurisdiction, the shift would presumably raise grave doubts in a court’s mind about the reliability of any verdict based on SBS. The most popular rationale for the *Frye* test is that lay jurors lack the background and critical acumen to resolve a true battle of the experts.<sup>39</sup> Positing that rationale, the courts reasoned that proof of general acceptance

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<sup>36</sup> *Id.* at 599.

<sup>37</sup> *E.g.*, *People v. Bailey*, 999 N.Y.S.2d 713 (App. Term 2014) (noting a sea change in medical thinking).

<sup>38</sup> EDWARD J. IMWINKELRIED, *THE METHODS OF ATTACKING SCIENTIFIC EVIDENCE* § 13-4 (5th ed. 2014).

<sup>39</sup> *See People v. Kelly*, 549 P.2d 1240, 1244–45 (Cal. 1976); *People v. Barney*, 10 Cal. Rptr. 2d 731 (Ct. App. 1992); *People v. Barbara*, 255 N.W.2d 171, 194 (Mich. 1977); *Grady v. Frito-Lay, Inc.*, 839 A.2d 1038, 1045 (Pa. 2003).

would be the best proxy or surrogate for a direct inquiry into the scientific merit of the technique or theory.<sup>40</sup> If that is the case and subsequent research generally erodes the scientific community's faith in the validity of a theory that a prior conviction rests on, the court ought to be concerned that the prior conviction represented a miscarriage of justice. At one time, *Frye* was the overwhelming majority view in the United States.<sup>41</sup>

Thirdly and most importantly, in a *Frye* jurisdiction a marked shift in sentiment in the relevant scientific communities can have a critical impact on the admissibility analysis. If the admissibility test is general acceptance and the shift has reduced the support for the theory below the general acceptance level, the prosecution testimony about the theory will not even be admissible at a retrial.

Fourth and finally, if that prosecution testimony is necessary evidence on an essential element of the charged crime—such as causation in a prosecution for an infant's murder—the prosecution will not even have enough evidence to survive a motion for a directed verdict. The exclusion of the evidence under *Frye* will render the prosecution case legally insufficient to sustain the government's initial burden of production or going forward.

Given the third and fourth dimensions of the significance of the shift, it becomes clear that the *Edmonds* test is the *Frye*-era equivalent of the first prong of the test proposed by the Symposium Article for the *Daubert* era. Most jurisdictions have moved away from *Frye* toward some version of a *Daubert*-style reliability test.<sup>42</sup> Under *Frye*, proof of a significant shift in sentiment directly negates an essential foundational requirement for the admissibility of the testimony, namely, proof of general acceptance. In the *Daubert* era, as in the CBLA example, proof of subsequent research utterly discrediting an essential assumption of the prior theory directly negates an empirical requirement for a satisfactory foundation.

It made eminently good sense in the *Frye* era to treat a showing of a significant shift in expert sentiment—standing alone—as an adequate basis for granting a new trial. It is less clear that that standard is well suited for the *Daubert* era. After the panel at Professor Risinger's Symposium, there was a question-and-answer period. One of the attendees asked why the Symposium Article criticized the new California legislation on shifted science. The amended California statute, Penal Code § 1473, authorizes new trial relief whenever the prosecution witness at the prior trial later

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<sup>40</sup> Bert Black, Francisco J. Ayala & Carol Saffran-Brinks, *Science and the Law in the Wake of Daubert: A New Search for Scientific Knowledge*, 72 TEX. L. REV. 715, 722–35 (1994).

<sup>41</sup> GIANNELLI, *supra* note 5, § 1.06.

<sup>42</sup> GIANNELLI, *supra* note 5, §§ 1.08-1.10.

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“repudiate[s]” his or her opinion. The Symposium Article remarks:

It is . . . wrong-minded to treat an expert’s repudiation of prior testimony as an adequate basis for postconviction relief. No expert schooled in the empirical tradition would accept a scientist’s change of mind without inquiring *why* the scientist has adopted a new view. In *Daubert*, Justice Blackmun stated that reliable “knowledge” “connotes more than subjective relief . . . .” At the original trial [if *Daubert* governed], the judge should never have admitted the expert’s opinion if it amounted to nothing more than the expert’s subjective opinion. By the same token, at the later postconviction relief proceeding, the judge should not accept the expert’s repudiation of the earlier opinion [as an adequate justification for granting a new trial] if the repudiation amounts to nothing more than a subjective change of mind.

The courts arguably should treat evidence of a change in the scientific community’s collective sentiment in the same fashion. Under *Daubert*, the extent of the acceptance is only one of the factors that the judge considers in evaluating the sufficiency of the showing of the reliability of a technique or theory.<sup>43</sup> If the judge takes the empirical tradition seriously, standing alone proof of the popularity of a technique or theory should not guarantee the admissibility of testimony based on the technique or theory. The judge ought to inquire *why* the technique or theory enjoys that popularity: Is there empirical data warranting that level of popularity? The parallel reasoning would be that without more, a change in the expert community’s collective sentiment does not mandate a new trial. Here too the judge should ask *why* the sentiment has shifted. Can the defense point to new scientific research or further accumulated experience that accounts for the shift and answers the *why* question. Adding an empirical component to the inquiry provides greater assurance that on the specific facts of the case, the policy of overturning potentially wrongful convictions outweighs the legitimate public interest upholding finality of judgment. Under *Daubert*, the expert’s ipse dixit does not suffice.<sup>44</sup> Neither should the ipse dixit of the scientific community. Its collective sentiment was dispositive under *Frye*, but that is no longer true in federal practice and most states.

In their Response, Professors Findley and Risinger are not content to prove that there has been a shift in the sentiment in the scientific community regarding SBS. If a shift in sentiment automatically warranted a new trial, they could have radically shortened the Response by citing only the survey

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<sup>43</sup> *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 594 (1993).

<sup>44</sup> *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997).

described in footnote 23: “two surveys of pathologists found that 35% to nearly 60% of forensic pathologists in 2010 and 2015 respectively question the SBS ‘diagnosis.’” Instead, they marshaled a wealth of empirical studies that yielded findings inconsistent with the SBS theory. Whether by design or accident, they strove to establish both the occurrence of the shift in medical sentiment and the empirical data prompting the shift. In effect, they addressed the *why* question.

#### CONCLUSION

In their Response, Professors Findley and Risinger criticize the Symposium Article for failing to sufficiently explore the significance of shifts in scientific sentiment. That criticism is justified. The Response has prompted me to consider that issue further. As we have seen, a shift can be significant in four different respects. It can not only affect the weight of the prosecution testimony. In addition, particularly in *Frye* jurisdictions, a marked shift can impact the court’s view of the reliability, admissibility, and legal sufficiency of the prosecution testimony. As previously stated, the *Edmonds* standard was ideally suited for the *Frye* era; a significant shift could directly negate general acceptance and render the prosecution testimony inadmissible as well as legally insufficient. The question that now presents itself is whether we should update the standard for an era in which most jurisdictions adhere to some variation of the *Daubert* standard.

In closing, I would like to thank Professors Findley and Risinger—as well as Dean Moreno and Mr. Holmgren. In his concurrence in *Daubert*, Chief Justice Rehnquist voiced the concern that the new validation standard would push federal judges out of their comfort zone and force them to become amateur scientists.<sup>45</sup> More broadly, *Daubert* posed a challenge to judges, attorneys, and Evidence scholars: Would they be willing to stop “hiding from science,” roll up their sleeves, and deeply immerse themselves in the empirical data and methodologies that they needed to understand to make *Daubert* “work”? Professor Findley, Professor Risinger, Dean Moreno, and Mr. Holmgren have done precisely that. It is true that they have not resolved the controversy over SBS. However, thanks to their efforts, we have a much more sophisticated and nuanced understanding of the various aspects of the controversy.<sup>46</sup> Their example gives us reason to be hopeful

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<sup>45</sup> *Daubert*, 509 U.S. at 598–99 (Rehnquist, C.J., concurring).

<sup>46</sup> The Symposium Article deals with only the admissibility of testimony about SBS and post-conviction claims that a new trial should be granted because the trial judge erred in admitting the testimony. The Article does not discuss the question of whether, standing alone, SBS testimony is legally sufficient to support a judgment of conviction. See RANDY PAPETTI, *THE FORENSIC UNRELIABILITY OF THE SHAKEN BABY SYNDROME* 195, 257, 308–09 (2018); Edward J. Imwinkelried, *The Legal Sufficiency Analysis of Genuine Battles of the Experts in Criminal Trials: The Unrealized Potential of the Supreme Court’s Landmark*

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*A BRIEF COMMENT*

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about the *Daubert* era.